

INTERNATIONAL ENERGY AGENCY



VOLUME TWO

MAJOR POLICIES AND ACTIONS

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The International Energy Agency (IEA) is an autonomous body which was established in November 1974 within the framework of the Organisation for Economic Co-operation and Development (OECD) to implement an international energy programme.

It carries out a comprehensive programme of energy co-operation among twenty-three* of the OECD's twenty-four Member countries. The basic aims of the IEA are:

i) co-operation among IEA participating countries to reduce excessive dependence on oil through energy conservation, development of alternative energy sources and energy research and development;

ii) an information system on the international oil market as well as consultation with oil companies;

iii) co-operation with oil producing and other oil consuming countries with a view to developing a stable international energy trade as well as the rational management and use of world energy resources in the interest of all countries;

iv) a plan to prepare participating countries against the risk of a major disruption of oil supplies and to share available oil in the event of an emergency.

* *IEA participating countries are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, the United States. The Commission of the European Communities takes part in the work of the IEA.*

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Pursuant to Article 1 of the Convention signed in Paris on 14th December 1960, and which came into force on 30th September 1961, the Organisation for Economic Co-operation and Development (OECD) shall promote policies designed:

— to achieve the highest sustainable economic growth and employment and a rising standard of living in Member countries, while maintaining financial stability, and thus to contribute to the development of the world economy;
— to contribute to sound economic expansion in Member as well as non-member countries in the process of economic development; and
— to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.

The original Member countries of the OECD are Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The following countries became Members subsequently through accession at the dates indicated hereafter: Japan (28th April 1964), Finland (28th January 1969), Australia (7th June 1971) and New Zealand (29th May 1973). The Commission of the European Communities takes part in the work of the OECD (Article 13 of the OECD Convention).

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THE HISTORY OF THE INTERNATIONAL ENERGY AGENCY

VOLUME II

MAJOR POLICIES AND ACTIONS OF THE IEA

Table of Contents

Table of Abbreviations 9

Chapter I Introduction 13

Chapter II Energy Policy Overview 23

A. Introductory Summary 23

B. Energy Policy Origins of the 1973 - 1974 Oil Supply Vulnerability: The Optimistic-passive Approach to Oil Policy 25

C. Corrective Policies Adopted in the I.E.P. Agreement 33

D. IEA Energy Security: Expansion of the Vital Concept 37

E. Long-Term Energy Policies: Reducing Oil Imports 42
1. Conservation 43
2. Direct Measures for the Reduction of Imported Oil 44
3. Alternatives to Oil: Energy Diversity 46

F. Energy and the Environment: A Major Policy Force 52

G. Research and Development: The Still Longer-Term 56

H. The Oil Market: Transparency and Dissemination 59

I. Globalisation and Non-Members 61

J. Looking to the Future: Freer Markets and Shared Goals 63

Chapter III IEA Oil Security: The Core of Energy Security 67

A. Oil Security Policies and Systems 67

B. Oil Sharing: The Emergency Sharing System 71
1. Oil Stock Building 73
2. Demand Restraint 80
3. Allocation 83
4. Activation and the Trigger Calculation 86
5. Operations 92
(a) Operation of the Sharing System 92
(b) European Communities (EU) 98
(c) Non-Member Countries 99
6. Information Systems 101
7. Co-operation with the Oil Industry 105
(a) Oil company Co-operation 105
(b) Industry Advisory Board (IAB) 106
(c) U. S. Antitrust Defence and EU Competition Exemption 107
8. Resolution of Differences and Disputes 109

C. The 1979-1981 Oil Supply Disruption 114
1. IEA Response 114
2. December 1981 Decision on Supply Disruptions 121

D. CERM: Co-ordinated Emergency Response Measures 123

E. The 1990-1991 Gulf Crisis 133
1. Preparation for Action 134
2. The IEA Contingency Plan of 11 January 1991 139

F. Continuing Emergency Response Readiness 148
1. Systems Tests 149
2. Country Reviews 153

Chapter IV Long-Term Energy Policies: Reducing Members' Dependence on Imported Oil 157

A. The Long-Term Co-operation Programme (LTCP) 158

B. Energy Conservation and Efficiency 160

C. Oil Import Reduction Policies and Actions 164
1. Oil Import Objectives and Ceilings 164
2. Energy Investment Measure (MSP) 167
3. Indigenous Production of Oil 168

D. Alternatives to Oil: Energy Diversity 170
1. Principles for Energy Policy (1977) 171
2. Coal Production, Trade, and Use 172
3. Natural Gas 181
4. Nuclear Energy 185
5. Hydroelectricity and Other Renewables 191
6. Electricity 194
7. Energy Trade and Investment 197

E. Energy and Environment 207

F. Reviews of Members' Energy Policies and Goals 218

G. Freer Markets and IEA Shared Goals of 1993 223

Chapter V Energy Research and Development: Towards Long-Term and Still Longer-Term contributions 227

A. IEA Organization of R & D 230

B. Research and Development Policies and Strategies 235

C. System for International Collaboration on Energy R & D Projects 257
1. Purpose, Scope, and Application 258
2. Project Formation and Management 260
3. Financing and Facilities 266
4. Intellectual Property 269
5. Participation 272
6. Functions of the Implementing Agreements 278
7. Role of the IEA 282

D. Country Reviews and Technology Reviews 283

Chapter VI The International Oil Market: Transparency and Information Dissemination 287

A. Oil Market Information Policies 288

B. General Oil Market Information System 304
1. Early IEA Systems 304
2. Crude Oil Import Register 312

C. Role of the Oil Industry 314
1. Industry Working Party (IWP) 314
2. Formal Consultations with Oil Companies 317

D. Dissemination of Oil Market Information 320

Chapter VII Co-operation with Non-Member Countries: The Global Perspective 325

A. Non-Member Policy Arrangements 326
1. Institutional Arrangements 327
2. Information Exchange Among Members 329

B. Early Producer-Consumer Dialogue 332

C. Policies and Actions Concerning Developing Countries 342

D. Globalisation of IEA Policies and Actions 348

E. Producer and consumer Relations: New Ministerial Conferences and IEA Meetings of Experts (Beginning in 1991) 360

F. The IEA Review of Relations with Non-Members 1992-1994 365

Appendices 373

Appendix I Officers of the Governing Board at Ministerial and Official Level, Standing Groups and Committees, and Senior Members of the Secretariat 373

Appendix II Oil Import Dependence of OECD Countries 1950-1973 379

Appendix III 1977 IEA Principles for Energy Policy 381

Appendix IV 1993 IEA Shared Goals 385

Appendix V IEA Energy R D & D Implementing Agreements and Other Instruments 1975-1994 387

Appendix VI Highlights of Recent IEA Developments 1994 391

Appendix VII Table of Ministerial Communiqué Document References 395

Table of Abbreviations

ADD	Addendum
Ad Hoc Group/ CNMC	The Ad Hoc Group on International Energy Relations (AHGIER), later renamed the Committee on Non-Member Countries (CNMC)
AHGIER	Ad Hoc Group on International Energy Relations
APEC	Asia Pacific Economic Cooperation
API	American Petroleum Institute
AST	Allocation Systems Test
bbl	price per barrel (of oil)
C	Council (OECD document reference)
CADDET	Centre for Analysis and Dissemination of Demonstrated Energy Technologies
CCH	Commerce Clearing House
CERM	Co-ordinated Emergency Response Measures
CERT	Committee on Energy Research and Technology
CIAB	Coal Industry Advisory Board
CIEC	Conference on International Economic Co-operation
CIF	Cost, Insurance and Freight
CNMC	Committee on Non-Member Countries
CO_2	Carbon Dioxide
CPE	Centrally Planned Economies
CRD	Committee on Energy Research and Development
CRD/CERT	The Committee on Energy Research and Development (CRD), later renamed the Committee on Energy Research and Technology (CERT)
DAE	Dynamic Asian Economies
DED	Deputy Executive Director
DSC	Dispute Settlement Centre

EBRD	European Bank for Reconstruction and Development
EBV	Erdölbevorratungsverband (German Stockholding Agency)
EC	European Communities
ED	Executive Director
EDDC	Energy Deficient Developing Countries
EEC	European Economic Community
ECG	Energy Co-ordinating Group
EET	European Economies in Transition
EMM	Emergency Management Manual
ENERLAC	Energy Conference of Latin America and the Caribbean
EOT	Emergency Operations Team
EPCA	Energy Policy and Conservation Act (United States, 1975)
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
ESS	IEA Emergency Sharing System
ETP	Energy Technology Policy
EU	European Union
FCCC	Framework Convention on Climate Change
FIS	Financial Information System
FOB	Free on Board
G-7	Group of 7 industrial countries: Canada, France, Germany, Italy, Japan, the United States, and the United Kingdom
G-77	Group of 77 developing countries
GATT	General Agreement on Tariffs and Trade
GB	Governing Board (document reference)
GDP	Gross Domestic Product
GREENTIE	Greenhouse Gas Technology Information Exchange
HLG	High Level Group for Energy Technology Commercialization
IAB	Industry Advisory Board
IBRD	International Bank for Reconstruction and Development (World Bank)
IEA	International Energy Agency
IEI	International Energy Institute
I.E.P.	International Energy Program
IER	International Energy Relations (document reference)
IETG	International Energy Technology Group

I.L.M.	International Legal Materials
IMF	International Monetary Fund
INC	Intergovernmental Negotiating Committee on a Framework Convention on Climate Change
INFCE	International Nuclear Fuel Cycle Evaluation
IPCC	Intergovernmental Panel on Climate Change
ISAG	Industry Supply Advisory Group
IWP	Industry Working Party
LTCP	Long-Term Co-operation Programme
mbd	Million barrels a day (of oil)
Mtoe	Million tonnes of oil equivalent
MOA	Memorandum of Agreement
MSP	Minimum Safeguard Price
NEA	Nuclear Energy Agency
NESO	National Emergency Sharing Organisation
NIS	New Independent States
NMC	Non-Member Countries, or Committee on Non-Member Countries
NO_X	Nitrogen Oxide
NRC	Non-Reporting Company
OECD	Organisation for Economic Co-operation and Development
O.J.E.C.	Official Journal of the European Communities
OLADE	Latin American Energy Organization
OLC	Office of the Legal Counsel
OMR	The IEA *Oil Market Report*
OPEC	Organization of Petroleum Exporting Countries
PROV	Provisional
QuA	Questionnaire A
QuB	Questionnaire B
QuC	Questionnaire C
RC	Reporting Company
R & D	Research and Development

RD	Room Document
RD & D	Research, Development, and Demonstration
REV	Revision
SEQ	Standing Group on Emergency Questions
SFRY	Socialist Federal Republic of Yugoslavia
SLT	Standing Group on Long-Term Co-operation
SOM	Standing Group on the Oil Market
SO_X	Sulphur Oxide
SPC	Standing Group on Relations with Producer and Other Consumer Countries
T.I.A.S.	Treaties and Other International Acts Series
TPES	Total primary energy supply
U.N.T.S.	United Nations Treaty Series
U.S.T.	United States Treaties and Other International Agreements

Introduction

Volume I of this *History* surveyed at some length the institutional origins of the International Energy Agency in the 1973-1974 oil crisis, and examined the 1974 I.E.P. Agreement and other oil consumer actions which established the Agency as an operational intergovernmental institution. Volume I also considered the most important IEA relationships, the internal structure of the Agency, and the institutional arrangements which enabled the Agency to develop over the years into an effective instrument for energy policy co-operation among its Members.

Volume II moves on from these essentially institutional considerations to take up the *energy policies and actions* of the Agency during its first twenty years, from 1974 to 1994 inclusive. While the weak institutional situation of the industrial countries in the 1973-1974 crisis period made it all but impossible for them to adopt decisive and effective responses when the time for action came, the reasons for their vulnerability to the oil producer countries were perhaps less their underdeveloped institutions than their essentially optimistic and passive oil management policies during the years preceding the crisis. Other policy choices which might have prevented or softened the crisis were available to them, as Volume II will show.

However, the oil security problem was poorly understood when policy makers confronted the dramatic disruption of oil supplies and the unprecedented increases in the price of oil during the 1973-1974 crisis. The rapid rise in imports of inexpensive oil, especially during the early 1970s, provided obvious economic advantages, but the industrial countries failed to give full attention to the vulnerability of their supply of oil, which was physically situated chiefly in the politically fragile Middle East region. The security problem was compounded by the absence of sufficient investment in indigenous oil exploration and development in the industrial countries, where increased investment might have added significantly to their own supplies as a balance against the growing import dependency. At the same time the industrial countries became increasingly dependent on *oil* in comparison with *alternative* fuels which might have brought a greater

measure of energy security through diversity of energy sources. Under such circumstances, longer-term research and development in alternative energy sources and in conservation and energy efficiency inevitably suffered. An added element of vulnerability in the industrial countries arose from their absence of understanding about the operation of the energy markets during the period building up the crisis and in the course of the crisis itself, which meant that these countries were ill-equipped, for lack of information, to cope with the supply emergency when it came in 1973. All of these factors were exacerbated by the absence of institutional arrangements for co-operation, as shown in Volume I. While more effective institutional arrangements might have softened the impacts of the events of 1973-1974, the cause of the crisis is to be found more in the industrial countries' "optimistic-passive" approach to oil security in the period leading up to the crisis.

To give the necessary background on the industrial countries' policies, the "Energy Policy Overview", which follows in Chapter II, begins with a Section on "Energy Policy Origins of the 1973-1974 Oil Supply Vulnerability: The Optimistic-passive Approach to Oil Policy". The main events and developments leading up to the crisis are briefly outlined in this Section, together with a short presentation of the policy views and critical conclusions that were made on that situation by some of the most knowledgeable oil specialists of the period. If the policy views and warnings of these specialists were not sufficiently accepted early enough to help avoid the crisis, they did have considerable influence afterwards on the industrial countries' "corrective policies", adopted in the IEA. The remainder of Chapter II focuses on these "corrective policies", first as reflected in the I.E.P. Agreement which contains the Members' strongly held policy views on this subject, and then in the Agency itself over the period of its first twenty years. These policies are discussed in the overview Chapter under the following categories, which also provide the subjects of the ensuing Chapter: IEA energy security, long-term policy, R & D, oil market transparency and information dissemination, and globalisation of IEA activities, all of which have implications for energy security. Since environment and globalisation have played important and growing roles in *all* sectors of IEA work, these subjects are taken up as well in the context of each of the other Chapters which follow. Chapter II closes with a look to the future, to freer markets and the IEA Shared Goals adopted by Ministers in 1993, in the most recent comprehensive IEA policy statement.

Passing from the "overview" to more detailed description and analysis, Chapter III of this Volume surveys IEA oil security, beginning with the main initial *raison d'être* of the IEA, the oil Emergency Sharing System.

The discussion moves next to the 1979-1981 oil supply disruption, to the IEA's responses to this first crisis managed by the Agency, and to the strengthening of the oil disruption response measures which then became necessary. New measures included the IEA's flexible emergency response system for "Co-ordinated Emergency Response Measures" known as "CERM". The IEA applied in essence a CERM-type response in the 1990-1991 Gulf crisis, which in turn is examined in some detail. Discussion of the continuing readiness of the IEA response measures concludes this Chapter.

The IEA's long-term policies for reducing its Members' dependence on imported oil are the subject of Chapter IV. These long-term policies include not only measures for the reduction of oil import dependence and for the increase in indigenous production of oil and other energy sources, but also the more interventionist measures adopted in the early years of the Agency to fix oil import objectives and ceilings, to establish firm and comprehensive "Principles for Energy Policy", and to protect new investment in energy producing assets. Long-term policy naturally extends to the promotion of the energy conservation and efficiency and to the development of a host of energy alternatives to oil, such as coal, natural gas, nuclear energy, hydroelectricity and other renewable sources of energy. In the IEA, long-term policy also includes the subjects of electricity, and energy trade and investment. Chapter IV next describes the development of some of the leading IEA work in the field of *energy and the environment*, which is also seen in the Chapters on Energy Security (Chapter III), on Energy R & D (Chapter V), on the Oil Market (Chapter VI), and on Relations with Non-Members (Chapter VII). The Long-Term Chapter then surveys the Agency's far-reaching reviews of Members' policies in this sector and closes with a discussion of the "free markets" policy and of the IEA Shared Goals of 1993.

The still longer-term Energy Research and Development in the IEA is the subject of Chapter V which reviews the internal organization of IEA work in the R & D field and looks closely at the various energy R & D policy and strategy exercises which have been carried out in the Agency over the years. A later Section of this Chapter is devoted to the IEA system of collaborative R & D programmes and projects, and to the IEA energy project "Implementing Agreements". The discussion of this system is followed by historical and current material on the R & D policy reviews.

Chapter VI follows with the discussion of the Oil Market policies and practices of the Agency, where the main and durable goals are "transparency and information dissemination". In the IEA's early years, the policy objective was the development of formal information system, with the assistance of the oil industry. Having developed the system of principal

information sources (mainly Member governments and oil companies, but including other knowledgeable sources as well), the IEA has concentrated more recently on *widening* the information base and on *disseminating* the expanding information products to the growing numbers of participants in the markets and to other interested parties. This includes the IEA's monthly *Oil Market Report*, which has achieved recognition as a leading source of reliable oil market information.

The final Chapter addresses the Agency's policies and actions with respect to Co-operation with Non-Member Countries, which began with the information exchange and related functions for Members that continue to the present day. Chapter VII then takes up Members' policies and activities in connection with the oil producer and consumer country dialogue of 1976-1977 (called also the North-South Conference or CIEC) and outlines its disappointing outcome. The conclusion of this dialogue led to a period of IEA emphasis on policy relating to developing counties, where the Agency could be helpful without becoming a vehicle for development assistance. In the late 1980s, the Agency deepened its policy interest in a world-wide range of non-Member countries, as IEA energy policy became increasingly affected by changes in energy supply, demand, and environmental impacts on a global basis. Policy with respect to Central and Eastern Europe, the New Independent States, and particularly the Russian Federation, as well as other regions moved up on the scale of IEA priorities. These events also led the Agency to adopt a more inclusive approach to the participation of non-Members in many of its activities, thus bringing non-Members into closer relations with the Agency.

This Volume concludes with a number of appendices containing reference information closing in most cases at the end of 1994. Appendix I updates the lists of officers of the main IEA bodies and adds to that list senior members of the Secretariat going back to 1974. Appendix II on "Oil Import Dependence of OECD Countries 1950-1973" provides the statistical data employed in creating the graph on this subject found in Chapter II, Section B. Appendix III reproduces the full text of the 1977 IEA "Principles for Energy Policy" which is discussed in Chapter IV, Section D-1 and elsewhere, while Appendix IV does the same for the "1993 IEA Shared Goals", discussed mainly in Chapter II, Section J, and in Chapter IV, Section G and generally in that Chapter. To complement the references in Chapter V on energy R & D, Appendix V contains a list of the main subjects of the "IEA Energy RD & D Implementing Agreements and Other Instruments 1975-1994". In "Highlights of Recent IEA Development 1994", Appendix VI carries forward for the year 1994 the IEA "Highlights" described in Volume I, Appendix VI for the period

1974-1993. Appendix VII of this Volume contains a "Table of Ministerial Communique Document References" to facilitate the reader's access to the Communique texts which appear in both the Governing Board document series and the IEA "PRESS" document series.

The continuation of the history of the IEA in this Volume is not intended to provide simply a traditional narrative of leading or interesting IEA events, although there are necessarily elements of narrative in Volume I as well as in the pages that follow. Building on the institutional base described in Volume I, this Volume presents the policies which the IEA founders sought to establish at the outset and those developed and articulated in the course of the Agency's first twenty years. This is accompanied by a description of the leading IEA actions which have been intended to give tangible expression to the Agency's policy objectives. The actions comprise the main activities of IEA Ministers, the Governing Board at official level, the leading bodies of the Agency, and the Secretariat. Volume II is organized topically with material presented mostly in chronological order within each topic and sub-topic. While Volume II refers to a number of general international political and economic events which influenced IEA policies and actions, the broader elements of background and context, as well as the policy views of individual Members as expressed in the IEA, fall outside the intended scope of this work.

In this Volume as in Volume I, the author's intention is to describe and analyze the IEA's historical policies and activities particularly for Agency constituents, for governments, their officers, energy co-operation planners and builders, for scholars and others who concern themselves with international co-operation in energy or in other domains, and for those who might do so one day in the future. Researching, reflecting, and writing on the Agency's first twenty years has strengthened the author's hope that historical works on subjects of this kind will continue to advance the cause of inter-governmental co-operation and relations. As Volume I put it, the world system is

> too limited in resources, too fragile in structure and too hazardous overall for those relations to be left to the individual circumstances of each government's independent actions [Page 24].

This book will show that the story of the policy origins of the IEA and first twenty years of IEA policy and actions is a history of the

Agency's "optimistic-active" policy approach overcoming the effects of the earlier "optimistic-passive" one, whereby the industrial countries "active" approach favoured co-operative policies developed in the institutional framework of the IEA. In the early years of the Agency, Members adopted interventionist policies which were later displaced by the free market orientation which represents the mainspring of IEA policy at the time of writing. If the *establishment* of the Agency in 1974 demonstrated the enormous political will necessary to prevail over competing pressures and objectives, the *successful operation* of the Agency since that time confirms the fact that the Members' active and continuing dedication to energy co-operation has been an essential element of their broad policy to achieve what has been called in IEA shorthand the three "Es" of energy policy: energy security, sustainable economic growth, and protection of the environment [See Chapter II, Section J, Chapter IV, Section G, and the IEA Shared Goals of 1993 in Appendix IV below].

If the creation of the Agency demonstrated that a group of like-minded governments facing an adverse and deteriorating economic situation such as oil import vulnerability is capable of responding constructively in building a sound and stable institutional mechanism for achievement of common objectives, twenty years of IEA history have demonstrated that dedication, flexibility and adaptability in the policy and actions of the institution are also essential to its continuing relevance and success. Initially, the Agency's principal role included the establishment, start up, and membership growth of the Agency itself, the adoption of its modes of operation and approaches to problem solving, the development of numerous policy objectives and mechanisms left in the I.E.P. Agreement for later decision, the creation of the operational essentials of the oil emergency response system, and the analysis and choice of strategic alternatives and modalities of action in virtually every sector of the IEA's responsibilities. The early years formed perhaps the most *heroic period* of the IEA. In the face of changing circumstances and challenges, however, the Agency soon applied a process of rapid adaptation, now recognized and respected as one of the major strengths of the Agency, to develop and apply new approaches to energy policy.

Until the early 1980s, the IEA had a penchant for adopting market intervention and firm statements of principles for policy guidance. Many examples of such measures are seen in Chapter IV below, including the major effort to fix Group Objectives and individual country ceilings for oil imports and like measures, together with the adoption of the "Principles for Energy Policy" and the Coal Principles. The response of the IEA to the 1979-1981

oil disruption, often called the "second oil supply crisis", was to adopt a group of interventionist measures, mainly a policy agreement to reduce oil demand by five per cent in Member countries. When doubts about the effectiveness of measures of this type became evident, the IEA moved rapidly away from such actions and emphasized preparations for more concrete responses, like the development and use of oil stocks and demand restraint for early use in a range of oil supply disruption, including the situations foreseen in the IEA's formal system for sharing oil in cases of emergency. The IEA's adaptability is clearly exemplified in Chapter II below, in the expansion of the energy security concept beyond the oil emergency response mechanisms, to policies concerning natural gas, energy and the environment, and the globalisation of energy policy. Further examples of adaptability will be seen throughout Volume II, as the Agency moved strongly into environment work generally and expanded the scope of its overall work world-wide, re-established meetings of the industrial countries and other oil consumers with the oil producer countries, and adapted itself to changes in energy, markets and to the growing impact of non-Members on the world energy situation.

Just as the founders' establishment of IEA was made possible by an essentially *optimistic* judgement that constructive co-operation in a coherent institutional setting provides the best means for tackling serious multinational problems, so the Agency's actions since 1974 and its capacity to adapt to changing conditions may be in part also attributed to an "optimistic-active" approach which made possible new departures in IEA co-operative policies and actions. Indeed, as will be seen in Chapter II, Sections B and C below, it has been the "active" part of this "optimistic-active" approach to energy co-operation which has distinguished the IEA period from the "passive" part of the "optimistic-passive" energy policy followed during the lead up to the 1973-1974 crisis. In sum, Volume II of the IEA *History* emphasize that this spirit has continued to guide and shape the work of the Agency to the present day over the entire range of its operations.

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Energy Policy Overview

This Chapter first surveys broadly the energy policies, more particularly the oil policies, of the industrial countries during the lead-up to the 1973-1974 oil crisis and upon the establishment of the Agency in November 1974. The focus then shifts to the ensuing twenty year period when energy policies evolved within the framework of the IEA, in all the major sectors of IEA activities which will be taken up in the more technical and detailed Chapters to follow.

A. Introductory Summary

In the pre-IEA years, the industrial countries viewed energy policies in an essentially "optimistic-passive" fashion. Characterized by unco-ordinated and independent actions permitting the importation of "cheap oil", these policies ultimately created an unacceptable vulnerability to oil supply disruptions. One major response to this vulnerability was for the industrial countries to co-operate in developing and implementing common energy policies where their interests converged. The question, however, as later formulated by former IEA Governing Board Chairman Ulrich Engelmann, was whether it would "be possible for the Western industrialised countries to find a common line between the interests of the Western producing and the Western consuming countries" [Statement at a special seminar on "The IEA in the 21st Century: Challenges and Prospects" in commemoration of the 20th Anniversary of the IEA, held in Kyoto, Japan on 14 April 1994]. Following the 1973-1974 oil crisis, the oil producing and non-producing industrial countries alike shifted dramatically to *co-operation* in energy policies as their *modus operandi*, and as a result they developed and entered into the Agreement on an International Energy Program [usually called the "I.E.P. Agreement", reproduced in Volume I, Appendix III]. In that process, the IEA governments embarked upon an earnest and concentrated effort to build policies which responded favourably to the concerns underlying Dr. Engelmann's question.

These early IEA policies consisted mainly of the short-term type of response embodied in the IEA's Emergency Sharing System and the longer-term policy commitments designed to reduce the dependency on imported oil which had been allowed to build up over the previous decades. The industrialized countries first adopted the IEA's energy policies in the I.E.P. Agreement and then over the years developed them in both depth and breadth. This made the IEA leading energy policy forum of the industrial countries.

While the IEA Members' policy concept of energy security during the second half of the 1970s was largely devoted (1) to developing systems for the sharing of oil and related measures in response to short-term oil supply disruptions and for oil market transparency, and (2) to reducing their long-term oil import dependence, there began at the turn of the decade a process of broadening the scope of energy security to include other subjects and different instruments. In the early 1980s, IEA Members extended security policy to include the management of oil disruptions which do not fully fit the oil supply disruption scenario foreseen in the Emergency Oil Sharing System or which otherwise require more flexible oil disruption response measures. In 1983 the Members found it necessary to include natural gas security, as well. In the years which followed, environmental concerns strengthened steadily, to become in the early 1990s one of the core elements of IEA policy and operations, and a key element in the Agency's approach to energy security. During the same period, the evolution of the world energy system brought a growing global interdependence, extending beyond IEA countries and the oil producing countries on a world-wide basis, and this led the IEA to expand generally the geographical reach of its energy security concept to include greater emphasis on relations with non-Member countries.

Early IEA actions in the long-term sector focused on energy conservation, reduction of imported oil, and the development of alternative energy sources. These policies were grounded largely on the free market for energy, though they did not escape entirely from market management efforts intended to strengthen the consumers' interests. During this period the IEA's Governing Board adopted the Agency's comprehensive framework for long-term energy policy co-operation, the Long-Term Co-operation Programme (LTCP). The Governing Board also adopted energy conservation goals, then oil import goals and targets, first for the group and later for the individual Members' but such intervention measures eventually proved to be ineffective or unnecessary and gave way to less ambitious but more effective policy instruments for energy security. Throughout its history the IEA has made major contributions to promoting energy conservation and efficiency;

indigenous and worldwide oil producing; coal production, trade and use; natural gas; nuclear power; and renewable sources of energy. The energy and the environment responsibilities of the IEA have increased as the Agency has sought to balance the Members' objectives in both of these sectors. With a long-term energy perspective, the Agency has also carried out a continuous series of analyses of energy R & D strategies, and has established a comprehensive network of projects in this sector.

Since its earliest days, the Agency has supported the objective of increasing the development and availability of international oil market information, and has established a number of systems designed to achieve this objective. Dissemination of the information has equally received IEA policy support, leading to the highly regarded IEA monthly *Oil Market Report* and to other information dissemination actions.

The globalisation of IEA policy and actions that was mentioned above in the discussion of oil security has occurred more broadly. The IEA's perspective in recent years has been enlarged to include greater focus on Central and Eastern Europe, Latin America, the Asia-Pacific region, and Africa, because of their growing impacts on all participants in the world energy system, notably with respect to their growing energy demand and to their role in environment questions.

B. Energy Policy Origins of the 1973-1974 Oil Supply Vulnerability: The Optimistic-Passive Approach to Oil Policy

Much of the direction of IEA policy over the Agency's first twenty years was foreshadowed in the industrial countries' experience with policy weaknesses during the lead-up to the 1973-1974 crisis. These weaknesses brought to the fore a sharp awareness of energy generated risks to the economies of the industrial countries, and to their political and social stability. It was all but inevitable that the lessons of that crisis would have a strong influence on the development of Members' "corrective policies" established in the IEA.

The vulnerability of the industrial countries to serious oil supply disruptions and to price shocks occurring largely outside of their control was not a sudden development, although the *awareness* of the associated risk did appear suddenly to many energy policy makers only late in 1973 when the crisis began. The combination of situations which created the crisis evolved over a number of years before the crisis occurred.

The first step in the series of events leading to the energy vulnerability of the industrial countries was doubtless the shift from coal to oil as the favoured source of energy. Coal was the ever present energy source prior to the 1930s, accounting for over eighty per cent of the industrial world's fuel consumption, but it was destined to be overtaken and displaced because of the practical advantages, the ready availability, and the lower price of oil. One immediate disadvantage of the change to oil was the loss of an abundant domestic supply of the favoured energy source: there was a great deal of domestic coal in many important industrial countries, but most of them lacked a large domestic supply of oil. The advantages of oil were thus obtained at the cost of potential vulnerability to disruption of the supply of oil derived from foreign sources.

This vulnerability did not affect all major consumers to the same degree. It was not so much an immediate concern for the United States, for example, because until the 1960s the United States remained capable of meeting the bulk of its oil supply needs from domestic sources. Yet from that time forward the United States became increasingly a major importer of oil and thereupon joined the ranks of Europe, Japan, and others in facing potential supply vulnerability. Moreover, the net oil importer status of the United States increased the vulnerability of the other consumers as well, because the United States soon proved incapable of making an excess supply available to the others when the need arose. The excess United States supply had disappeared, and no other industrial country could replace it.

Besides the shift from coal to oil, the industrial countries' energy vulnerability was created not by a single event or policy line, but rather by the interaction of a host of other critical factors, especially the rapid and unprecedented growth in the industrial countries' appetite for oil, and their notable reduction in domestic oil production (particularly in the United States). Demand grew with the shift to oil as the energy of choice and with the rapid economic growth generally over the 1960s and early 1970s. This was a natural consequence of the then prevailing conditions of ample oil supply at relatively low prices compared to the prices of other energy sources. In one of the *Foreign Affairs* articles which appeared during the period leading up to the 1973-1974 crisis, Iranian Ambassador Jahangir Amuzegar characterized these conditions aptly as "Cheap oil as a matter of national policy", and stated that

> The artificially low price of oil (a) discouraged oil producers from searching effectively for new sources of supply; (b) helped hold down prices of substitutes (e.g. coal, gas and hydroelectricity),

> and likewise dampened their development prospects despite their huge reserves; (c) stifled and/or delayed research in the development of more efficient technology for the economical use of nonconventional energy sources; and above all, (d) contributed to an inexcusably reckless waste and inefficient use of world premium fuels [Jahangir Amuzegar, "The Oil Story: Facts, Fiction and Fair Play", *Foreign Affairs*, Vol. 51 (July 1973) p.676, 681].

Some of the flavour of these early 1970s trends was caught remarkably well by Anthony Sampson in this passage from *The Seven Sisters:*

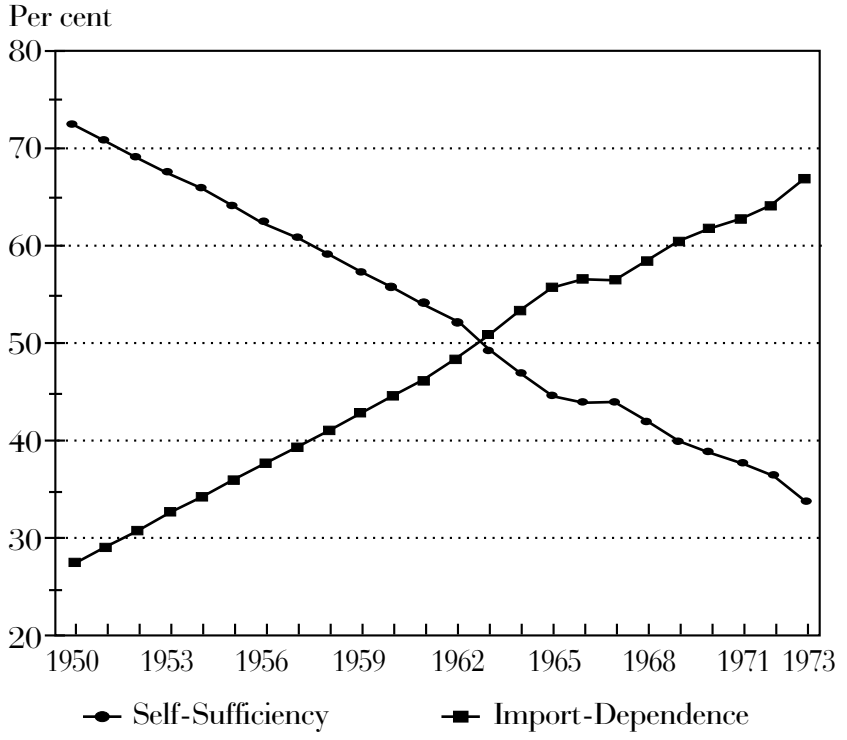
> . . . the signs of a shortage were now visible everywhere. The summer of 1973 was an eerie one for the oil companies. The demand for oil was going up above the wildest predictions — in Europe, in Japan, and most of all in the United States. Imports from the Middle East to the U.S. were still racing up: production inside the United States was still falling. In April President Nixon had again lifted restrictions on imports of oil, so that Middle East oil flowed in still faster; and the administration did nothing to control a scramble for oil. While the majors were trying to establish their safe sources of supply, the independents were bidding frantically for the "participation oil" from the producers, thus pushing the price up and up [*The Seven Sisters*, (1975) p. 242].

The oil shortage was not solely a function of demand growth. It was also a function of changes in the supply sources of the industrial countries. In the United States, domestic production decreased as a consequence of the absence of policies discouraging the importation of oil, and because of insufficient domestic investment to develop indigenous supply. In many countries, these factors were exacerbated by the absence of suitable energy conservation measures and by the insufficient development of domestic or otherwise secure alternative energy sources. The potential for such vulnerability to damage industrial countries economically was strengthened by the growing demands of the oil producer countries and by the progressive weakening of the role of the international oil companies which had primary responsibility for bringing oil to the consumers.

The growing oil requirements of OECD countries and their decreasing reliance upon domestic production of oil during the years building up to

the first crisis are readily visible in the table set forth in Appendix II. The falling oil supply self-sufficiency and the consequential rising oil import dependence of the industrial countries make clear the growing trend of energy vulnerability during the years before the 1973-1974 crisis:

Oil Self-Sufficiency and Import Dependence
OECD Total 1950-1973



Notes :
Oil Self-Sufficiency is calculated as domestic oil production/oil supply.
Import dependence is calculated as net oil imports/oil supply.
Oil supply in this table is defined as Production + Imports - Exports.
For comparability purposes, the graph includes for each year data for all countries which were OECD Members in 1973.
Data for the new Federal states of Germany are not included.

The numbers in Appendix II tell the story in more detail. During the time span covered in the above graph, the demand for oil in OECD countries increased dramatically. It grew in North America from 320 Mtoe (million tonnes of oil equivalent) in 1950 to 907 in 1973 and in OECD Europe from 61 Mtoe to an impressive 764 for the same years. For all

OECD countries demand rose from 386 Mtoe in 1950 to 1980 in 1973, more than a five-fold increase. Despite the gradual rise in domestic production in all OECD regions during this period (domestic production rose from 280 Mtoe in 1950 to 662 in 1973), growing demand was increasingly met by imports of oil which multiplied over ten-fold for the OECD as a group between the years 1950 and 1973. Consequently, OECD import dependence rose from 28 per cent in 1950 to 67 per cent in 1973, the year the crisis began. With the advantage of hindsight, it is not difficult to envisage that in 1974 the future carried a strong risk of serious oil security uncertainty, to say the least.

The policy implications of these declining self-sufficiency and growing import dependency numbers are best seen in their economic and political context. The low price and apparent abundance of oil encouraged its growing use, while the impact of any policy efforts to reduce oil use was restrained by the factors moving consumers rapidly in the opposite direction. Although leading policy makers in the industrial countries were fully aware of this rapidly growing vulnerability (either by virtue of the warnings sounded quite clearly in serious policy journals or in such other fora as the U.S. Congress), they were unable to act decisively to arrest it.

A brief look at some early warnings during the 1970s helps put the problem in perspective, in showing the depth of the problem and the issues requiring examination in searching for solutions. One of the most penetrating and comprehensive early analyses was written for the July 1971 issue of *Foreign Affairs* by the respected oil consultant Walter J. Levy, under the title "Oil Power". This article described the significant shifts in oil politics, economics and market structure, and the confrontations between the international oil industry and the major oil producing countries during 1970. It charted trends over several years, especially the strengthening of producer demands and organization, and the industrial countries' growing dependence on imported oil. Levy made it clear to all that more serious troubles were fast approaching:

> And the traumatic experience of confrontation between the industry and the producing governments raises new questions as to the security of essential oil flows against interruption. Clearly, a very real challenge to the historical structure and operation of the internationally integrated oil industry is emerging — at a time when demand for oil is increasing swiftly [Walter J. Levy, "Oil Power", *Foreign Affairs*, Vol. 49 (July 1971) p. 652].

> Despite discoveries in the North Sea, Far East and elsewhere, it is clear that the Eastern Hemisphere will continue to depend decisively on OPEC oil to meet mounting oil requirements. With its surplus productive capacity largely gone, the United States, too, will probably have to increase its oil imports [Levy, p. 653].
>
> The question now arises, what should or can constitute a Western oil policy? The major concern is oil availability — on acceptable commercial terms, strategically secure and not subject to political blackmail. These require bargaining leverage and countervailing power [Levy, p. 656].
>
> And with oil reserves so heavily concentrated in a handful of developing countries of North Africa and the Middle East, it is inevitable also that these countries will use to the utmost their control over the resources — certainly for their economic advantage, but also where possible for political purposes [Levy, p. 664].
>
> The political effectiveness of OPEC unity, of unilateral action and of the threat of an embargo—these are the realities to which companies and consuming governments must now begin to address themselves [Levy, p. 658].

In this particular case, the early warnings of 1971 were accompanied by a number of now familiar policy questions and suggestions. Mr. Levy stated that

> The issue is whether we are prepared to expose ourselves to undue dependence on insecure oil imports, or whether we will keep import volumes under restraint and foster a domestic energy environment with adequate incentives to continuing exploration and development [Levy, p. 663].

In addition to diagnosing the problem, Levy suggested a number of possible solutions. He referred to the diversification of oil supply sources, to such alternatives to oil as nuclear energy and coal, to the need for more effective relations between the oil industry and the industrial countries [Pages 663-664], to the importance of increasing oil stockpiles, storage facilities, and adequate tanker tonnage, and to the exploration and development of oil

resources in "safe" areas. He pointed to the unattractive prospects of direct negotiations between industrial countries and producing countries (as respects both the terms of trade and the risks of political confrontation between the negotiating governments). In his article there were some hints of industrial country co-operation, but as yet no concrete international institutional proposals. Certainly nothing like the 1974 IEA co-operation notions was envisaged in these 1971 reflections, but such ideas were "in the air" and were soon to surface in the growing energy debates in industrial countries.

One of the most visible and respected statements which pointed toward the future IEA approach to energy security was made by Ambassador James E. Akins, during his U.S. State Department energy service in 1973, in an article entitled "The Oil Crisis: This Time the Wolf is Here". After analysing the strengths of the oil producers and a potential parade of "political nightmares" (many of which took tangible form within months after this article appeared), Ambassador Akins turned to possible co-operative responses by the industrial countries:

> The consumers are not without power of their own — or they would not be if they were united. So far they have not been, and they have as yet shown little inclination toward collective action in spite of repeated urgings by the United States. In the fall 1969 meetings of the OECD oil committee, before the first OPEC crisis, the Department of State first raised with the EEC the possibility of a common approach to the energy problems we would all soon be facing. Assistant Secretary of State Philip Trezise, in the OECD meeting in Paris in May 1970, urged that energy problems be considered in a multilateral context, but got little positive response.
>
> In the fall of 1971, the United States raised more formally with Europeans and the Japanese the possibility of a joint approach to the energy problem; apart from a general expression of support for the companies in their dealings, no ideas were forthcoming [James E. Akins, "The Oil Crisis: This Time the Wolf is Here", *Foreign Affairs*, Vol. 51 (April 1973) p. 462, 485-486].

At various times, according to ambassador Akins, the United States discussed consumer co-operation from the standpoint (1) of finding new sources of energy and new sources of hydrocarbons and (2) of forming "an international

authority to avoid cutthroat competition for available energy in times of shortage" [Akins, p. 487], in essentially an "optimistic-active" modality. Some of the later IEA notions then appeared: he considered that "all agreed" in the OECD that a consumer organization should be formed, not as a challenge to OPEC, not to drive down prices, "not to ruin the producers", but "to protect to consumers" [Akins, pp. 487-488]. Another of Ambassador Akins's main suggestions was the requirement for the industrial countries to develop in the long run alternative energy sources and conservation practices. Elements of this suggestion would soon become the core of IEA long-term energy policy.

However, as it turned out, these suggestions did not find decisive acceptance before the industrial countries had to absorb the lessons of the 1973-1974 crisis, just a few months later. There were a number of reasons why Ambassador Akins's reflections were not accepted with full understanding and conviction in many countries, including his own. The short-run advantages of plentiful and "cheap" oil seemed manifest. The views and threats of the oil producers were not taken seriously, because it was believed that the producers *had to sell* their oil and the industrial countries were the *only buyers*, that the producers were more eager to sell than the consumers were to purchase, that producers would often enough seek the "quick return" rather then follow longer-term price increase policies, that OPEC would not be aware of its apparent power if the consumers kept quite about it, that boycotts were not to be feared because they never work, that OPEC itself feared that competition among producers would always drive prices down, that there were vast new reserves to be found, that arctic and North Atlantic reserves would solve all problems of supply, that prices would continue to fall, and that the Arabs would never use oil as a political weapon (or the like). Events would prove that these essentially "optimistic-passive" assumptions were all erroneous.

Hence the ideas apparently justifying continuing dependence on "cheap and abundant" foreign oil were firmly entrenched. As the foregoing suggests, those ideas were fuelled by an optimistic outlook which foresaw, without the need for concerted actions of the industrial countries, the continuation indefinitely of an ample supply of imported oil at low cost and at moderate or negligible political risk. This all but ensured the continuation of their higher demand and lower indigenous production policies and practices. In the early 1970s the modest counter-forces had little hope of bringing about policy changes designed to offset the trend. One result of this optimistic outlook was relative policy passivity and inaction, and this at a time when there might still have been the opportunity to reduce

the industrial countries' vulnerability to deliberate, accidental, natural or other supply disruptions and to the oil producers' power to impose damaging price increases. Another result was the shock of the first oil crisis, which brought severe economic damage to the industrial countries. It was out of this shock, however, that the industrial countries realized at last that corrective policies would have to be developed and carried out on an urgent basis.

This background to IEA energy policy developments is further described and analyzed in Ulf Lantzke, "The International Energy Agency", in *European yearbook*, Vol. XXVI (1978) p. 41, Daniel Yergin, *The Prize*, (1991) Chapters 28-31, Anthony Sampson, *The Seven Sisters*, (1975) Chapters 11-15, the *Foreign Affairs* articles cited above, and the literature cited in these sources. As the industrial countries suffered the consequences of the first oil crisis, their attention turned swiftly to the analysis of their vulnerability, and to the appropriate remedial policy responses as well as institutional arrangements to be envisaged. The next Section looks at the "corrective policies" adopted in the I.E.P. Agreement, the first systematic effort of the industrial countries to develop a coherent co-operative response to the new challenges which arose out of that crisis.

C. Corrective Policies Adopted in the I.E.P. Agreement

As the potential for significant oil supply disruption grew in magnitude during the early 1970s , the worst fears of the industrial countries' forward looking policy analysts were to be realized in the first oil crisis in 1973-1974, when the intentional interruption of supply brought about devastating economic consequences. The main Arab producers were successful in establishing an unprecedented embargo of oil deliveries to a number of industrial countries, and they galvanized the oil producers countries, organized in OPEC, to raise crude oil prices [See Volume I, Chapter II for more background on this subject]. Not only could oil producers impose an embargo as an "oil weapon" to strengthen their hand for political purposes, they were also able to bring about an increase of almost 400 per cent in the market price of crude oil. The oil producers imposed this price increase by "legislative" actions of their own, without negotiating with the international oil companies, while only a few years earlier the companies had been fully able themselves to legislate prices without negotiating with the producers.

Control over significant oil supplies had thus completely changed hands from consumers to the producer governments. With that change the producers acquired extraordinary economic and political powers as well as a significant institutional triumph. Although somewhat reduced in the 1990s, that fundamental change of power has persisted through various periods of waxing and waning of the relevant market conditions.

In 1973 and 1974 this left the industrial countries in an oil policy quandary. As Dr. Ulf Lantzke, the first Executive Director of the IEA, put it a few years later.

> Unprepared to face this sudden situation, the industrialised countries felt the immediate impact of the oil shock in different degrees, depending on the extent of their dependency on oil imports, the fragility of their balance of payments, and the orientation of their foreign policy. Due to these fundamental differences and in contrast to the common view on prices and production shared by the oil-producing countries, the Western industrialised nations reacted in almost total disarray. Divided on the type of measures to take, they responded in an uncoordinated manner, implementing emergency measures with very limited effect and often going in the direction of panic in efforts to secure preferential positions. In the event, no real measures were taken … [Ulf Lantzke, "The International Energy Agency", in *European Yearbook*, Vol. XXVI (1978) p. 41, 44].

The institutional lessons of the 1973-1974 crisis are described generally in Volume I of this *History* at pp. 38-40 and need not be reviewed here. However, the durable *energy policy lessons* of the crisis do need to be considered. The most far-reaching lesson was, of course, the need to reverse the "go-it-alone" approach of the industrial countries in the early 1970s and adopt a co-operative approach. In late 1974 this approach found its ultimate expression in the creation of the International Energy Agency, where co-operative and realistic policies on oil and other forms of energy could be developed, adopted, and executed in an intergovernmental forum. One of the key objectives of IEA's founders was to establish and maintain a system of mutual relations which would remove energy as a source of serious competition and conflict among the industrial countries. The far-reaching substantive policy changes, as reflected in the I.E.P. Agreement, covered both a comprehensive short-term oil supply disruption response system (the IEA's Emergency Sharing System) and a number of

longer-term objectives for reducing the Members' oil imports. These policies were also designed to provide the market information, political understanding, and other elements necessary to help the industrial countries avoid the pitfalls of over optimism and policy inaction that had brought them to grief in the crisis of 1973-1974.

The major lessons on policy and the corresponding I.E.P. Agreement policy commitments that were taken in 1974 may be summarized as follows:

- **The World Market for Oil.** Oil market events almost anywhere in the world affect consumers everywhere in the world and will continue to do so in the future. Hence oil policy must be formulated on a broad basis which takes into account the world-wide scope of oil-related actions by individuals, companies, and governments. Operations in the market and its trends must be known to policy makers and be understood by them.
- **Energy Security.** Energy security is the paramount policy objective of the IEA. It requires "secure oil supplies on reasonable and equitable terms" [I.E.P. Agreement, Preamble, paragraph 1] and "common effective measures to meet oil supply emergencies" [Paragraph 2]. In order to respond to short-term oil supply disruptions caused by future embargoes or by natural or other causes, these policy objectives are best achieved by a combination of obligatory response measures, including the maintenance of substantial levels of oil stocks to meet part of the disrupted supply ("emergency self-sufficiency", as appears in Chapter I of the I.E.P. Agreement), the programmed reduction of oil use during supply interruptions (contingent oil demand restraint measures, as appears in Chapter II of the I.E.P. Agreement), and the institutionalized system for allocating oil equitably among the Members (the system for oil allocation, as appears in Chapter III of the I.E.P. Agreement).
- **Oil Sharing Safety Net.** The oil Emergency Sharing System should maintain safeguards against any disruption of the Members' co-operation, in case of rising pressures during an emergency for each country to go its own way without proper regard for the interests of other Members. The arrangements for triggering the System should reflect the policy of requiring all Members of the IEA to respect and apply the Sharing System. Hence policy requires that the trigger decision be an objective one, without being conditioned by prior political agreement among the Members (a condition which was found in the 1973-1974 crisis to be a disabling one). The trigger decisions

would normally be administrative and technical ones made by the IEA Secretariat, rather than political ones made by the Governing Board or the individual Members. The Secretariat's decisions would be based upon objective data showing the level of the disruption, and the system would be triggered when the level reaches or is reasonably expected to reach a minimum of 7 per cent reduction in supplies for the group or any Member. As a fail-safe device, the System would then be activated, and the legal obligations of the Sharing System would become operative unless a strong majority of the Governing Board were to decide otherwise. (These "activation" policies appear in Chapter IV of the I.E.P. Agreement).

- **Information Systems.** Systems should be devised to develop more relevant and detailed information for oil market transparency generally and for the particular information, including confidential and proprietary data, required to operate the oil Emergency Sharing System. Arrangements should be made for the dissemination of such information as appropriate (as appears in Chapter V of the I.E.P. Agreement).
- **The Broader Energy Problem.** Dependence on imported oil is a function not only of direct supply and demand for oil, but also of the establishment or not of conservation and energy efficiency practices, together with the availability and usability of all *other* major energy sources such as natural gas, coal, nuclear, and renewable energy sources (and the more exotic sources which might emerge from energy research and development). Hence the promotion of these energy sectors must also be included in a comprehensive policy on energy security, but such policies cannot all be expected to succeed in the near-term (the resulting long-term policies appear in Chapter VII of the I.E.P. Agreement).
- **Long-Term Energy Co-operation.** The reduction of oil import dependency and the accompanying economic vulnerability should be viewed as a long-term goal. Policy in this sector should increase incentives for developing the supply of oil as well as for enhancing energy conservation and the use of alternative energy sources to reduce oil imports (as appears in Chapter VII of the I.E.P. Agreement).
- **Arrangements with Oil Companies.** Regular and systematic arrangements would have to be made with oil companies not only to provide to the IEA relevant information available to them, but also to advise the IEA on the development and operation of the oil Sharing System (as appears in Chapters IV, V and VI of I.E.P. Agreement).
- **Relations with Non-Members.** Industrial countries should establish arrangements for co-operative relations with non-Member countries

(oil producing countries as well as other consumers) in order to achieve better mutual understanding and to benefit from developments in the energy field (as appears in Chapter VIII of the I.E.P. Agreement).

Combined with the foregoing substantive energy policy notions, the industrial countries made provision in the I.E.P. Agreement for such supportive institutional policies as co-operative arrangements for developing the Members' future energy policies, for establishing the Agency itself, and for agreeing on membership, structure, and the other institutional elements taken up in Volume I of this *History*. Once the Agency was under way on 15 November, 1974, it became the center for developing, applying, adapting, and updating those energy policies which appear in the I.E.P. Agreement and which are summarized above. The remainder of this Chapter will be devoted to a concise discussion of some of the leading policy evolutions which occurred over the first twenty years of the IEA between 1974 and 1994, mainly with respect to energy security long-term energy co-operation energy and the environment, energy R & D, oil market information transparency and dissemination, the globalisation of energy markets, relations with non-Members, freer markets, and IEA Shared Goals.

D. IEA Energy Security: Expansion of the Vital Concept

The search for "energy security" was the main objective of the IEA's founders in establishing the Agency and it remains so twenty years later. Energy security was defined in 1993 by Executive Director Helga Steeg in her statement that

> Our Member countries' common objective remains energy security; i.e., diversified supplies of energy being available at affordable prices to help economies continue to grow [Remarks at The Second World Coal Institute Conference, London, 25 March 1993].

The content of that objective can first be discerned in the 1974 I.E.P. Agreement (as seen in Section B above), particularly in the first four Chapters of the Agreement where the main oil security principles are set forth. Over the ensuing twenty years, the Governing Board's actions focused

sharply upon the specific policies, obligations, and mechanisms designed to realize the energy security objective. In both the I.E.P. Agreement and Governing Board actions, energy security concerns extend not only to responses to short-run emergencies (taken up in this Section), but also to long-term ameliorative solutions to the problems of reducing oil import dependency. In recent years energy security considerations have increasingly influenced energy policy more generally as well. [See Section E below].

For short-term oil emergencies, the IEA maintains a treaty-based system for the physical sharing of oil (the Emergency Sharing System) which requires the Members to build and maintain oil stocks (the IEA stock obligations, to plan for an carry out a short-term reduction of demand for oil (called demand restraint in IEA terminology), and to gather and transmit emergency oil data (to enable the Agency to make knowledgeable and coherent emergency decisions). Arrangements are in place to ensure the assistance of the oil industry (for expertise required in improving, testing, and operating the Sharing System). At the center of the Sharing System there is an institutional mechanism designed to enable these elements to work together smoothly, objectively, and reliably (the IEA role overall). When supply disruptions occur, all of these oil security measures require of Members a spirit of co-operation, a willingness to share sacrifices, and a resolve to avoid "going it alone" at the expense of others. Moreover, the Agency has regularly refined, tested and improved its array of oil disruption response and emergency data systems and has conducted country reviews to ensure the systems' completeness, readiness and credibility.

Over the years the IEA's operating concept of energy security has evolved to reflect the Agency's growing experience, as well as changes in the energy world and in Members' policies. In this continuing process, four major evolutionary shifts have occurred so far. They concern (1) levels of disruption and flexible responses, (2) the security of natural gas supplies, (3) energy and the environment, and (4) global interdependence and relations with non-Member countries.

The first evolutionary shift concerns the level of an oil supply disruption which is considered to present a risk to energy security. In 1974 the IEA's oil Emergency Sharing System assumed that a major disruption of at least 7 per cent of available supply would be required before action would have to be taken. The threshold of 7 per cent accordingly entered the IEA's operational concept of security, and the oil Sharing System was built to this specification. It remains unchanged in that respect today. Within a few years after the founding of the Agency, however, IEA countries realized that this threshold was too restrictive, because serious economic damage could result from

disruptions of lesser amounts of oil. This was one of the most telling lessons of the 1979 oil crisis, when the IEA found that flexible responses and procedures, including the judicious use of oil stocks and demand restraint, should be envisaged in these lesser disruptions. The IEA then created, in part for that purpose, the arrangements called "CERM", which stands for "Co-ordinated Emergency Response Measures". Under the CERM procedures, a wide variety of response measures may be adopted in whole or in part in response to oil supply disruptions, and the operational decisions may now be made and carried out on a *flexible basis whether the supply shortfall is less than or exceeds the level of 7 per cent*.

The flexibility of this multiple approach has been a basic and consistent IEA emergency response policy. It was expressed in 1987 as follows:

> Ministers reaffirmed the high priority given to the IEA emergency preparedness system, including *both* IEP oil sharing and the co-ordinated early response stipulated in the Governing Board Decision of 11th July 1984 [Emphasis added].

The IEA successfully applied a mechanism of this kind during the 1990-1991 Gulf crisis: the IEA's "Contingency Plan", activated by the Executive Director on 17 January 1991, provided for 2.5 million barrels of oil a day to be made available to the market. The building blocks for the Gulf crisis actions had been put in place over the preceding ten years, as the IEA security concept was adapted to a broader range of possible oil shortfall situations. These innovative building blocks remain available as needed for service in future oil supply disruption actions.

Continuing the evolutionary trend of Members' oil emergency response expectations, the Governing Board in February 1995 further emphasized flexibility and effectiveness in IEA response instruments and Member countries' cohesion and capacity in responding to oil crises. Following a review of this subject in 1994-1995, in which oil market changes and continuing vulnerability of IEA countries to oil supply disruptions were examined, the Board agreed that the Agency's crisis response measures "should be tailored to specific circumstances, underpin the efficient functioning of the oil market, and minimize damage to Member countries". When an oil supply disruption reaches the IEP emergency threshold (7 per cent loss of supply), the relatively light-handed CERM measures are to be considered before the full IEP Sharing System would be activated. Thus

> . . . the Governing Board, as a matter of policy, would normally *first give consideration, consistent with the IEP,* to a step-by-step process involving adequate opportunity for the co-ordination and implementation of stockdraw, demand restraint and other emergency measures to be fully effective, in a manner compatible with the timely and effective preparation and activation of oil sharing should that prove necessary [Emphasis added].

In reaching this conclusion, the Board also agreed that even in times of crisis markets should remain "unconstrained by price controls or restrictions other than those consistent with the implementation of IEA emergency measures, and voluntary measures should be encouraged". The foregoing developments represent the most recent manifestation of the first evolutionary shift in the Agency's operational concept of energy security.

In the second shift in the scope of the IEA's security concerns, the focus on security was enlarged to include natural gas as well as oil, which suggests a wider concept of "energy security". The 1974 Agreement had mentioned natural gas as one of the alternative sources of energy, rather than as an energy source requiring security measures. By the early 1980s that focus had evolved to include specific security protection for natural gas because of political risks stemming from the Cold War. In May 1983, IEA Ministers agreed

> . . . on the importance of avoiding the development of situations in which imports of gas could weaken rather than strengthen the energy supply security and thus the overall economic stability of Member countries. They noted the potential risks associated with high levels of dependence on single supplier countries. Ministers stressed the importance of expeditious development of indigenous OECD energy resources. They …Agreed that …steps should be taken to ensure that no one producer is in a position to exercise monopoly power over OECD and IEA countries.

The Agency is now engaged in a new natural gas study that takes into account the changes in geopolitics and potential risks for gas supply which might result from technical breakdowns, management failures, and tensions among the gas producing states and their neighbours [See Section E below].

A third shift in the energy security focus is found in the domain of "energy and the environment". Although the IEA never has been an "environmental protection agency for energy" or a " lobby" for environmental

questions (and this is still so today), environmental concerns have always played a certain role in IEA activities, and in the late 1980s the "interplay between environmental policies and energy policies" entered the main lines of IEA work. One of the IEA's priority policies is the development of "economic non-fossil sources" of energy, along with the "clean and efficient use of fossil fuels". Another priority is to ensure that energy security considerations are properly taken into account when environmental policies on fossil fuels and nuclear power, among others, are being developed. IEA policy on this point found recent expression in the 1993 "IEA Shared Goals" which favours the "environmentally sustainable provision and use of energy" and states that

> Decision-makers should seek to minimise the adverse environmental impacts of energy activities, just as environmental decisions should take account of the energy consequences [Goal 3].

The notion of energy security has thus been broadened to include the need to strike the optimal balance among policies for energy security, environmental protection, and economic growth. It is clear that the environment element will continue as one of the driving forces of energy policy in the years to come [See Section F below, and Chapter IV, Section E for additional discussion of energy and the environment].

In the fourth evolutionary development, the IEA's energy security concept has been enlarged to include increasing attention to the Agency's relations with non-Members. From the beginning, relations with non-Member oil producers and other consumer countries were included in IEA policy objectives, as seen in the oil Sharing System requirement for emergency oil allocation to take into account the situation of non-Member countries. In actions taken since the late 1980s, however, the IEA has given specific policy recognition to the increasing global interdependence in energy. Global interdependence derives from the continuing, if not greater, importance of key non-Member as sources of oil to IEA countries, from the rapidly growing role of non-Members in determining global energy demand, from the perception that a greater portion of global energy-related environmental impacts would arise in non-Member countries, and from the movement of many of these countries towards closer relations with IEA. Recent developments such as the dissolution of the Soviet Union, the Agency's responses to the energy problems of the Central and Eastern European countries, the Agency's recognition of the growing economies of

Latin America, the Asian-Pacific regions, and Africa are requiring the IEA to devote greater attention to global markets and to policies concerning non-Members, as elements of overall energy security.

In sum, over the years energy security has remained the dominant IEA objective, but with evolutionary adjustments made to add security elements flexibly as required and to *realize in fact* the concrete objectives of each. Energy security underlies most of the IEA Shared Goals adopted by IEA Ministers in 1993. Policy for responding explicitly to energy emergencies is stated as follows:

> Energy systems should have the ability to respond promptly and flexibly to energy emergencies. In some cases this requires collective mechanisms and action — IEA countries co-operate through the Agency in responding jointly to oil supply emergencies [Goal 2].

Energy security is the common thread which binds together each of the nine elements of the IEA Shared Goals, including policy on "diversity, efficiency and flexibility within the energy sector", energy and the environment, energy efficiency, R & D, energy pricing, energy trade, energy investment, and co-operation among all energy market participants. Most of these Goals reflect considerations of long-term energy policy designed to reduce IEA Members' dependence on imported oil under the Agency's Long-Term Co-operation Programme, taken up in the next Section. In the future, the success or failure of IEA Members in realizing these Goals and carrying out the associated policies will have a direct effect on IEA oil security and will influence the vulnerability of Members to oil supply disruptions as well as the possible severity and duration of the disruption crisis.

E. Long-Term Energy Policies: Reducing Oil Imports

The IEA's long-term energy policy co-operation objective of assuring the continuous strengthening of protection from oil supply disruptions is expressed in a brief passage of the I.E.P. Agreement declaring that Members "are determined to reduce over the longer term their dependence on imported oil for meeting their total energy requirements" and stating a commitment to "undertake national programs and promote the adoption of

co-operative programs" in a number of areas set out in the Agreement. The Governing Board adopted the IEA's comprehensive Long-Term Co-operation Programme (LTCP) early in 1976, reflecting the IEA Ministers' judgement on the importance of a regular and stable energy supply and the Agency's aim of accelerating the transition to an oil-scarce world economy. Though the LTCP still provides the conceptual basis for the IEA's long-term policies, including conservation, reduction in oil imports, accelerated development of alternative sources of energy, energy investment, and co-operative activities in this sector, these policies have also undergone a continuous process of evolution over the history of the Agency.

1. Conservation

IEA conservation policy as set forth in the LTCP is concerned with reducing the rate of growth of energy and particularly of oil consumption, eliminating waste, promoting more efficient energy utilization, and applying energy price levels to reduce demand for energy. Conservation policy actions moved forward rapidly in the IEA, particularly the sharing of information and experience in this field. In keeping with the Agency's policy during the early years to establish numerical objectives, conservation "targets" were almost immediately fixed, but after a few years Members discontinued this kind of measure.

The Governing Board's early adoption of an indicative list of recommended conservation measures played a role in policy making, in education of the public, and in the IEA's periodic reviews. By 1979 the Agency viewed conservation policy in terms of the "overall energy/economic growth ratio" and of "energy efficiency". The ratio of energy consumption to gross domestic product, known as "energy intensity" was an important policy indicator, but did not prove to be altogether satisfactory. Moving from statements of intention to more specific actions, in 1980 the IEA Ministers adopted "lines of Action for Energy Conservation and Fuel Switching" to be implemented in national policies. Here one of the key provisions was appropriate energy pricing, to allow the level of energy prices to encourage conservation, as well as movement away from oil, and the development of new sources of energy.

Since the mid-1980s the trend in IEA conservation policy has been to place greater emphasis on market forces, although Minister stated in 1985 that the full potential for realizing energy efficiency and conservation gains "can best be realised through market forces and government policies complementing one another in a manner which depends on national

circumstances". In more recent years, IEA conservation policy has emphasized the contributions to be made to environmental objectives, the removal of barriers to efficiency gains, the co-operation with industry, the accelerated deployment of new technologies and the need to strengthen conservation. In the 1993 IEA Shared Goals, Ministers stated that:

> Improved energy efficiency can promote both environmental protection and energy security in a cost-effective manner. There are significant opportunities for greater energy efficiency at all stages of the energy cycle from production to consumption. Strong efforts by Governments and all energy users are needed to realise these opportunities [Goal 5].

Over the twenty year period of the IEA, the energy conservation and efficiency results are impressive: per unit of GDP, OECD energy demand fell 25 per cent, and oil demand fell 43 per cent, although total energy consumption increased over that period [See *Energy Policies of IEA Countries: 1993 Review*, Table A-19, p. 568]. These results are related to structural changes in Member country economies and changing energy prices as well as the effective application of energy efficiency policies and practices developed or promoted in the IEA.

2. Direct Measures for the Reduction of Imported Oil

Since vulnerability to disruption of imported oil was the Members' main policy concern, there was a logical force behind the notion that as a direct response Members should adopt measures tending to restrict their oil imports. In 1977 the IEA Members made a political commitment "to hold their total oil imports to not more than 26 million barrels per day in 1985". This Group Objective was accompanied by the IEA's "Principles for Energy Policy", to be pursued in the formulation and development of national energy policies on a large number of subjects, mostly with respect to development of alternative energy sources [See Chapter IV, Section D-1 below]. An important Principle directly affecting oil imports provided that Members should establish national programmes and policies formulated as specifically as possible for reducing oil imports through the "expansion of indigenous energy sources" (as well as other means).

The setting of an objective for reducing oil imports, first as a group objective and later as individual country ceilings, was the most direct approach to the problem of reducing dependency on imported oil, but in

the end that approach could not produce the desired results. Although this objective suffered from a lack of country-specific precision, it was seen as a first step in a process of establishing co-ordinated control over the levels of total IEA oil imports. In the next step, the IEA sought to break down the group numbers into specific ceilings for each country individually. The country-specific import ceilings were set for the year 1980, but none was set thereafter, for they soon fell into disfavour.

The LTCP sought to encourage and protect investment in the indigenous production of energy and particularly of oil in Member countries. In the so-called Minimum Safeguard Price (MSP) measure, Members agreed to "ensure that imported oil is not sold in their domestic markets below a price corresponding to US$ 7/bbl". The $7 level was adopted at a time when it appeared that oil producers cold reduce prices to make certain domestic oil investments uneconomic. The MSP would maintain the minimum price necessary to prevent that from occurring. Although initially the MSP attracted considerable interest, after a few years this measure became inoperative, and it has never been invoked.

The IEA has also made a number of policy statements favouring enhanced domestic oil exploration, production, and processing, including a strong statement in the "Principles for Energy Policy" supporting the expansion of indigenous energy sources generally. In 1980 the IEA Ministers recognized that "oil prices in general should reflect international oil prices" and agreed on the need for closer monitoring and price transparency, and for the structuring of oil and gas fiscal regimes to encourage timely action. In 1991 the Ministers encouraged the Members "to minimise declines in their own indigenous oil production and to promote diversified investments in worldwide production", and they confirmed this in 1993 when the Agency's oil production concerns reflected the IEA's growing dependence on imported oil once again.

The rise in imports, with most coming from the politically fragile Middle East, was clearly discerned as presenting a new challenge of increased vulnerability to oil supply disruptions. This would inexorably result in "short-term market instability and longer-term investment indecision". In 1993 Ministers concluded that:

> . . . investment requirements in the oil sector will be substantial over the next decades and the supply response to meet the expected upsurge in oil demand could be improved by greater predictability in the policy framework. Recognising the importance of adequate oil production and refining capacity for

achieving security and environmental goals, Ministers call on IEA to closely monitor and analyse capacity developments in particular the effects of environmental constraints on refining capacity, from both a regional and a global perspective.

In the 1993 IEA Shared Goals, parallel lines of policy concerning indigenous oil production are assumed. Measures affecting those lines of policy include the emphasis on free and open markets and on energy security as underlying objectives.

3. Alternatives to Oil: Energy Diversity

The early IEA measures in support of alternative energy sources were heavily influenced by government intervention notions, particularly with respect to the Group Objectives, the country ceilings for the reduction of oil imports, and the minimum safeguard price for imported oil. Although those measures would in effect disappear in the early 1980s, they represented for energy investment policy an altogether different approach from the free market concepts which have since provided the mainspring for IEA policy making. The Members' 1977 Group Objective was accompanied by the IEA's "Principles for Energy Policy", which call for the formulation and development of national energy policies on the following subjects:

- Establishment of national programmes and policies formulated as specifically as possible for reducing oil imports through the conservation of energy, the expansion of indigenous energy sources, and oil substitution.
- Speedy procedures to reconcile conflicts arising between energy policies and other concerns in the environmental, safety, regional and security fields.
- The pricing of energy in domestic markets at levels which encourage conservation and stimulate supply.
- Vigorous conservation policies using price mechanisms, efficiency standards and increased investment.

The Principles also stated Members' commitments on fuel switching, the active promotion of coal, the priority uses for natural gas, the steady expansion of nuclear power, the stronger support for research and development, and the establishment of a favourable investment climate. These comrephensive Principles provided the Agency's leading standing

statement on energy policies until the IEA Governing Board adopted the IEA Shared Goals in 1993.

Coal

Coal has been a leading energy source because of its promise in contributing significantly to the reduction of dependence on imported oil, and particularly because of the ample availability of coal in many industrialized countries. In the IEA's 1977 "Principles for Energy Policy", a "strong steam coal utilisation strategy and active promotion of an expanded and reliable international trade in steam coal" were announced. In 1979 the Agency adopted comprehensive Principles for IEA Action on Coal which stated policies on coal production, use, and trade, together with coal policy review procedures and coal industry advisory arrangements, all of which remain in force today.

The IEA Coal Principles protect the expansion of international trade and investment in coal from new restrictive measures and favour energy pricing policies that would allow coal to "develop its full competitive power". There are also policy provisions favouring long-term supply arrangements, greater certainty about national coal policies, environmental considerations, and restrictions on oil-fired capacity for electricity generation. The Coal Principles also support coal facilities and other policies favouring the expansion of coal use.

Although environmental concerns were quietly but firmly reflected in IEA coal (and other energy source) policy from the outset, in 1985 IEA Ministers adopted the principle that "just as the formulation of energy policy should give due weight to environmental consideration, so should environmental policy give due weight to energy policy considerations". This type of formulation has largely maintained its force in IEA policy with regard to coal and other energy sources since that time. Active environmental opposition to coal expansion policy has been a constant IEA preoccupation.

The Agency has confirmed that the large number of suppliers and other factors assure *adequate coal supply*. However, there exist continuing problems, including those relating to subsidies for high-cost coal production and other protection measures for domestic production, as well as the problem of meeting climate change and other environmental concerns. Yet the overall desirability of adequate production, trade, and use of coal remains a matter of policy concern. Strong support for coal as an alternative to oil is seen most recently in the emphasis which IEA Ministers have placed on the "Diversity, efficiency and flexibility within the energy sector" in the first IEA Shared Goal, as well as in the other Goals adopted in 1993.

Natural Gas

As demand for natural gas increased after the founding of the IEA, security concerns about reliance upon single suppliers of natural gas and about accidents, break downs, and other disruption possibilities attracted Members' policy interest. This interest in natural gas was already rising rapidly in 1979, when IEA Minister stressed the importance of natural gas and agreed on the need to encourage both indigenous production and international trade in natural gas.

Following the dissemination of the Secretariat's policy work on natural gas, the stage was set for the major decisions on natural gas security which were taken in the course of 1983, when IEA Ministers emphasized the importance of gas security, particularly with respect to Soviet source supply to Western Europe [See Section D above]. IEA policy has stressed the importance of expeditious development of indigenous OECD energy resources and has urged that steps be taken to ensure that no "one producer" could exercise monopoly power over Members' supply of natural gas. In 1991 ministers noted that "**natural gas** is a relatively clean fuel and that demand for it is expected to grow rapidly in most IEA countries". They added that " a commercial approach to the development of more open and competitive markets would ensure the exploration, development and production" of natural gas resources. The IEA Shared Goals, adopted in 1993, make no specific reference to natural gas as such, but include a number of general Goals which bear directly on natural gas as an energy commodity. The essential point for natural gas is that it could play a role well beyond its present applications in various energy sectors, such as electricity generation and heating and transport, with clear environmental advantages. As IEA policy aims at overcoming the natural and man-made barriers to such wider use of natural gas and particularly in electricity generation, this fuel may be seen as a continuing subject of IEA policy actions.

Nuclear Energy

Since nuclear fuel supply is assured by the existence of abundant and widespread uranium reserves held mostly in OECD countries, the IEA undertook the accelerated development of nuclear power without serious concerns about the security of supply, although there were concerns about the familiar problems of nuclear safety, waste disposal and non-proliferation. When IEA Ministers in 1977 made the first of a consistent series of statements supporting the expansion of nuclear energy use, there was

evidence of a lack of consensus on all but the most general statements of that support. In recognizing the important role nuclear energy would have to play, Ministers noted that *"some Participating Countries had reservations due to specific domestic political situations"* [Emphasis added]. In 1979 the acceptability of nuclear power was weakened by the accident at the Three Mile Island facility in the United States. This development would later combine with the ChernobyI accident in the Soviet Union in 1986 to impair the acceptability of nuclear power expansion, which continues in 1994. In the intervening years IEA policy emphasized nuclear safety, the environmental advantages of nuclear power, and the need for further education of the public on this energy source. A decline in nuclear power projection levels and a reduction of public confidence in nuclear power combined to stimulate in 1979 a strong Ministerial response for building public support for nuclear energy. The IEA retained the established policy of supporting nuclear power, but it also recognized the urgent need for effective safety systems to minimize the possibility of nuclear plant accidents.

In the diversified mix of fuels for the production of electricity, a need for nuclear power continued, despite the absence of consensus among IEA Members concerning the use of nuclear power in their countries. This is clearly confirmed in the major IEA policy statements of 1991 and 1993, although the focus shifted then to greater emphasis on the environmental advantage of relatively pollution-free electricity production, compared to oil and coal fuelled power stations. Nuclear power is promoted in the 1993 IEA Shared Goals, where Goal 1 refers to the contribution of nuclear power to energy diversity, and Goal 4 includes the statement that "A number of IEA Members wish to retain and improve the nuclear option for the future, at the highest available safety standards, because nuclear energy does not emit carbon dioxide". Other Shared Goals, for example those on R & D, free and open trade, and co-operation among energy market participants, will also have future applications to nuclear energy.

Hydroelectricity and Other Renewables

Renewable sources of energy, particularly hydroelectricity, play an important role in a number of countries and have received considerable policy attention in the IEA. Although other renewables, such as solar, biomass, wind, geothermal, ocean and tidal energy, have played a lesser role, they have all been the subject of intense interest in energy R & D. By 1985, environment concerns had quickened the interest in renewables generally, as seen in the Ministerial commitment to promote "renewable sources of energy which are

environmentally acceptable and competitive". Despite their recognition of the physical limitations and environmental constraints on new hydropower facilities, Ministers continue to support this energy source.

In the future, more important contributions can be expected from the renewables, and Ministers agreed in 1993 "on the need for continued strong government support and international collaboration" in this sector. The IEA Shared Goals speak of the need for diversity, efficiency, and flexibility in the energy sector. Goal 1 refers to *hydro power*, among others, and gives a priority status to economic non-fossil fuel sources. In Goal 4 on environmentally acceptable energy sources, Ministers stated that "Renewable sources will also have an increasingly important contribution to make". Still greater recognition of the possible future role of these energy sources may be expected while they increase in economic viability as substitutes for relatively less benign alternatives.

Electricity

Since 1960 electricity generation in OECD countries has more then quadrupled. Its strong growth continues, giving rise to the need for substantial new generating capacity in the future. While early IEA policy was dedicated to oil, to the other primary energy sources employed to produce electricity, and to efficiency in the use of electricity, since the mid-1980s this focus has broadened beyond the underlying primary fuels and efficiency to the particulars of electricity generally, including its environmental and energy security aspects.

The objective of promoting electricity *trade* and *competition* without endangering security of supply emerged in the 1991 IEA policy statement. Ministers "agreed to remove impediments to electricity trade where present" and also agreed that "flexible generating capacity and diversified fuel sources will be required". Limitation of any generating option would increase demand for other sources "and thus potentially reduce energy diversity and security". The following year the IEA published *Electricity Supply in the OECD*, which referred to the increasing challenges to electricity generators, such as tightened environmental standards, ever-changing rules, and limited supply choices in this sector; and all of these raised questions of availability and price.

The 1993 IEA Shared Goals made no reference to electricity as such, but a number of the Goals affect electricity policy. An important example is Goal 1 on diversity, efficiency and flexibility, where the contribution of non-fossil fuels, "particularly nuclear and hydro power" is noted. Other

Goals also reflect themes which relate to the IEA's electricity policies and actions. The IEA's most recent specific policy statement on electricity was made by Ministers in 1993 as follows:

> Electricity demand in OECD countries continues to grow steadily and substantial new generating capacity and energy efficiency gains from demand-side management practices will be required over the next several decades. Thus, greater efforts are needed to win public understanding and co-operation for the siting of new facilities and investments in efficiency to meet future demand, while continuing efforts to mitigate environment effects. Enhanced electricity interconnection and trade offer many security of supply, economic efficiency and, in certain instances, environmental advantages.

Energy Trade and Investment

Energy trade and investment objectives of the IEA touch all leading alternative energy sectors discussed above. The Agency has considered overall that free and open trade and a favourable climate to investment, in Member as well as in non-Member countries, are vital to the realization of the more specific sectoral objectives and policies. Among the leading IEA energy trade and investment issues in the mid-1970s were "legislative and administrative obstacles and discriminatory practices", which were the subject of Chapter V of the LTCP. All IEA Members except Canada and Australia have accepted Chapter V which remains operational in 1994 and contains provisions on identifying and removing legislative and administrative measures which impair the achievement of the overall objectives of the Programme. These provisions also refer to "national treatment" for all nationals of IEA Members, particularly with regard to energy investments, the purchase and sale of energy, and the enforcement of competition rules.

Most recently, IEA policy in this sector is stated in the 1993 IEA Shared Goals which emphasized the establishment of "free and open markets" for energy, as well as

> Free and open trade and a secure framework for investment contribute to efficient energy markets and energy security. Distortions to energy trade and investment should be avoided [Goal 8].

As provided in Goal 9, co-operation and "flexible energy systems and markets worldwide" are "needed to help promote the *investment*, *trade* and confidence necessary to achieve global energy security and environmental objectives" [Emphasis added].

The European Energy Charter process has produced on these subjects a parallel declaration to which all IEA Members except New Zealand have subscribed, and the Energy Charter Treaty which was successfully negotiated in 1994. The Energy Charter Treaty and its Protocol on Energy Efficiency and Related Environmental Aspects were initially signed in Lisbon on 17 December 1994 on behalf of forty-one and thirty-nine states respectively, including all but five IEA Members, and on behalf of the European Communities. The Charter process grew out of a realization in mid-1990 that special opportunities were arising particularly in Central and Eastern Europe and the Former Soviet Union after the end of the Cold War for IEA countries to enter into mutually advantageous energy relations with governments in those areas. In 1991 and again in 1993, IEA Ministers gave their support to this energy trade and investment process, although the IEA has not itself become a party to either of the two instruments. The Charter states broad policy in terms which are not legally binding. However, the Charter Treaty is "designed to promote East-West industrial co-operation by providing legal safeguards in areas such as investment, transit and trade", to stimulate the flow of investment, capital, goods, and energy, and the Treaty creates a continuing organizational structure for this purpose. Signature of the Charter Treaty is shifting the IEA Members' focus from the essentially soft or non-legally binding nature of their trade and investment commitments to legal obligations taken in a treaty formally binding under international law.

F. Energy and the Environment: A Major Policy Force

The IEA has viewed environment policy across the entire spectrum of energy options, not only to enhance *protection of the environment*, but also to avoid unnecessary or disproportionate *constraints on energy policy* where a potential conflict with environment policy might occur. IEA concerns in this field extend to conditions in IEA countries and in other countries: in Central and Eastern Europe and in the New Independent States in part for historical reasons, and in developing countries facing the environmental problems of rapid expansion of industrial activity and increased energy

consumption. Throughout the world environmental concerns are a potential *constraint* on the use of oil, coal, and other energies presenting adverse effects, while these concerns tend to *support* policies promoting energy efficiency, natural gas, nuclear power, non-polluting renewable energies, and relevant energy R & D programmes. Environmental policies are now a major components of energy policy generally.

Although environmental policy was featured in the I.E.P. Agreement in 1974 and was the subject of early IEA actions, in the coal and nuclear sectors, for example, the Agency maintained a relatively low profile approach to environmental questions until 1985, when Ministers adopted comprehensive policies on "Energy and the Environment". The Ministers first adopted general principles that energy production, conversion, transport, and consumption should be carried out in an "environmentally acceptable manner", that solutions to the environmental problems are fundamental to the maintenance of "adequate, economic and secure supplies of energy", and that "Ministers will therefore promote actively in their energy policies those *lines of action which advance the objectives of both energy and environmental policy*; paying particular attention to the development of new environmentally favourable energy technologies and to the efficient use and conservation of energy". Additional principles referred to "improvement of the energy mix, energy security, and minimisation of costs as well as protection of the environment" as factors to be taken into account in the formulation of energy policy. When these factors conflict, a balance must be struck between them, "both nationally and internationally", and resulting decisions may "differ between countries according to their energy mix and degree of pollution". More specifically the IEA adopted policies on environment, energy efficiency, and conservation (emphasizing "economic energy pricing"), R & D (including improved energy technologies on a economic basis), and the Polluter Pays Principle (and its application to energy). The policy of giving energy due consideration was delineated clearly: "just as the formulation of energy policy should give due weight to environmental considerations, so should environmental policy give due weight to energy policy considerations". Other policies included the principle stating the need for *comparable progress* in all Member countries, taking account of flexibility, environmental conditions, and prior progress over the years. Ministers recognized that the foregoing actions would "affect all aspects of the work on energy demand and the future energy mix, but particularly the work on conservation, coal and nuclear energy".

The next IEA Ministerial policy statement on energy and the environment confirmed the Ministers' earlier work in this field, and in 1989 Ministers stressed "the need for integrated policies which further *energy*

security; environmental protection and economic growth". A major growing concern in 1989 was global warming and climate change. IEA Ministers spoke out on "the complexity and uncertainties of the relationships between greenhouse gas emissions from fossil fuels and atmospheric concentrations and consequent climate change, as well as the world wide dimensions and implications of these issues". Since these emissions arise not only in IEA countries, but also in a large and growing proportion of non-Member countries (with all countries being affected), Ministers stressed a "high degree of international co-operation" and "the need to pursue greater scientific understanding, to assess the kinds of policy responses which may be necessary, and to implement them on a global scale". Ministers also supported the IEA's participation in the Intergovernmental Panel on Climate Change (IPCC) and the IEA's work in the quite different field of "preventing and treating oil spills and other accidents in the petroleum production, transportation and processing system". They pledged to proceed prudently in the face of uncertainty, and cautioned against quick solutions in these areas.

In the ensuing years the basic elements of the IEA's established policies were restated and new features were added. By 1990 the IEA had published the "broad brush" study entitled *Energy and the Environment — Policy Overview* on long-term impacts and policy choices, and it had contributed to the IPCC, to the Intergovernmental Negotiating Committee on a Framework Convention on Climate Change (INC), and to environment work on the economies of Central and Eastern Europe, the Russian Federation, and Asia. In 1993 the global climate change issue continued to pose a challenge to energy policy makers, requiring greater efforts overall and the reflection of "external costs of energy production" in energy prices. Members supported energy efficiency, for which market forces ought to have priority to produce the environmental benefits of energy efficiency gains, and for which "innovative and bold approaches are required by governments, in co-operation with industry".

Ministers noted that some Members favoured the advantage of nuclear power in emitting no sulphur dioxide, nitrogen oxides, or greenhouse gases, yet the division of opinion among IEA countries on the use of nuclear power continued [See Section E above]. Ministers acknowledged "the need to further integrate environmental objectives into national energy technology research, development and demonstration programmes". Co-operations with non-Members received a higher IEA priority because of the expected future role of those countries in CO_2 emissions growth control. This led to a request for the IEA to assess "joint implementation" with non-Member countries in

the process of IEA support to the objectives of the Framework Convention on Climate Change, and Members were asked to strengthen their bilateral co-operation with non-Members to this end.

In adopting the 1993 "IEA Shared Goals", IEA Ministers strengthened the Agency's environment commitment and confirmed its policy approach, as reflected in Goals 3 and 4:

> 3. The environmentally sustainable provision and use of energy is central to the achievement of these shared goals. Decision-makers should seek to minimise the adverse environmental impacts of energy activities, just as environmental decisions should take account of the energy consequences. Government interventions should where practicable have regard to the Polluter Pays Principle.
>
> 4. More environmentally acceptable energy sources need to be encouraged and developed. Clean and efficient use of fossil fuels is essential. The development of economic non-fossil sources is also a priority. A number of IEA members wish to retain and improve the nuclear option for the future, at the highest available safety standards, because nuclear energy does not emit carbon dioxide. Renewable sources will also have an increasingly important contribution to make.

The comprehensive IEA Shared Goals contain other provisions which respond less directly to environmental concerns, yet do affect them, for example: Goal 1 on diversity, efficiency, and flexibility within the energy sector; Goal 5 on improved energy efficiency; Goal 6 on research and development; Goal 7 on undistorted energy prices; Goal 8 on free and open trade; and Goal 9 on co-operation among all energy market participants. These Principles reflect the IEA's policies on energy and the environment as they have evolved and strengthened over the years.

In an informal Ministerial "brainstorming" session early in 1994 on energy and the environment, Ministers gave policy direction for IEA work on energy related greenhouse gas emissions. Policy was seen as moving in the direction of a mix of responses to climate change, in the context of free and open market and without the adoption of new trade restrictions in the name of environmental protection. Within the energy security conceptual framework, environmental considerations must now be seen as likely to continue as a major determinant of IEA energy policy generally.

G. Research and Development: The Still Longer-Term

The case for international co-operation on energy R & D could not be ignored under the conditions prevailing after the 1973-1974 crisis. The long-term policies of Members would require R & D support in the improvement of technologies in energy conservation, nuclear safety, fossil fuels, substitutes for oil and other energy areas. Moreover, major contributions might be derived from a wide range of "New Technologies", including those exploiting hydrogen fuel, advanced geothermal energy, fast breeder nuclear reactors, nuclear fusion, and the renewable energies (solar, wind, ocean and biomass). The many advantages of co-operation in R & D helped to set the stage not only for the increased development of energy R & D in IEA Member countries and in the many IEA R & D collaborative projects, but also for the linkage of energy R & D with the industrial countries' broader energy policies and objectives.

During the period of 1976 to 1980, the Agency developed a "Group Strategy" for energy R & D, designed to guide Members as to the potential contributions and probable time scale of technology options, and to lead to the development of viable and productive energy policy options. The study assessed the relative importance of individual technologies, estimated targets for the energy impacts to be achieved, provided a tool for developing and assessing national R & D policies and plans, and identified non-technology issues which could affect the ability of the new technologies to contribute to energy requirements. The Strategy also recommended specific priorities in the leading areas of energy R & D. This was the first in a series of strategy studies which have been undertaken on a continuous basis in order to maintain the most current analytical support for Members' decisions in this sector.

In 1980 IEA Ministers endorsed this work and declared in the Communique that they would attach greater political importance to energy research, development, and demonstration, as well as commercialization of new technologies. A High Level Group was formed to undertake a study on commercialization and the technology aspects of the policy of transition to minimum oil economies. This Group's report the following year identified those individual commercial scale projects with a high probability of realization that were planned for completion by 1990 in the areas of Tar Sands and Heavy Oils, Oil Shales, Coal Liquefaction, Coal Gasification, New Coal Combustion Technologies, Fuels from Biomass and Liquid Fuels from Natural Gas. Although IEA Ministers, meeting in 1981, endorsed that report,

within one year the marked reduction in many countries in expenditure on commercialization raised questions about "whether private investment would be available to provide adequate and timely development of some technologies that have high costs and long lead times".

In the mid-1980s a new policy study concluded that energy R & D should be geared to energy security objectives and should seek to support oil and gas supplies, to safeguard against supply disruptions, to promote efficiency, to encourage environmental protection, and to support long-term energy options. The Study developed a body of criteria for investment in this sector, and noted the differences between the national interests of governments and the views of industry. *International collaboration* was found to offer particular advantages in a number of technologies, especially where an "active programme of information sharing" best served implementation, high technical risks existed, or the design, development, construction, and operation of a high-cost facility were sought. Other advantageous situations for international work included those in which collaboration would increase the efficiency and/or pace of R & D or those in which unique trans-boundary implications were present. While the Study confirmed the IEA policy of strong government commitments to maintaining overall energy R D & D investment, it concluded that

> Significant energy R D & D initiatives have been undertaken since 1973-1974, with mixed results. Some have resulted in technological advances, some have achieved commercial application, while others have demonstrated the inability of financial resources alone to assure technical or economic success.

The 1985 Ministerial Conclusions also contained decisions on future R & D work in the IEA, which should ensure that an efficient process exists for *joint programme planning discussions*, bilaterally and multilaterally. The IEA should also "identify national barriers to collaboration" and "recommend measures for consideration by Member countries to reduce such obstacles". The IEA Ministerial Communiqué in 1991 reflected the Secretariat's study known as "Energy Technology Strategy 21" in stating that

> Special emphasis should be placed on those technologies which enhance diversity, efficiency and safety, extend and improve prospects for utilising reserves of conventional fossil fuels, and make available new and alternative energy sources.

Ministers also agreed that if the global challenges are to be met, R & D programmes should reflect the "integration of energy and environmental goals", particularly in such areas as renewables, nuclear power systems, innovative conservation technologies, CO_2 capture and utilization, and fossil utilization. The Communique emphasized the need for "development and *diffusion into the market*" of new and improved technologies on a global basis [Emphasis added]. The preparation and dissemination of IEA R & D studies as well as conferences, symposia and workshops continued at a rapid pace during this period, giving a higher priority than before to environmental issues, with particular attention to energy technology dissemination policies and mechanisms and to *market deployment* of new and improved energy technologies.

In 1993 IEA Ministers gave emphasis to the role of energy R & D in contributing to the realization of environmental objectives, particularly technology promotion by governments, intensified energy technology co-operation among Members and with *non-Members* of the Agency, and *further integration of energy and the environment* in national programmes. Ministers declared that "Access by individual developing countries and economies in transition to modern, cost-effective energy technologies appropriate to local circumstances will promote sustainable development". They concluded that the "Adoption of clean, efficient technologies throughout the world" will help reduce greenhouse gas emissions, and they called upon the IEA to step up its development of international co-operation in this technology area.

In 1993 IEA energy R & D policy was also directly stated in the "IEA Shared Goals":

> Continued research, development and market deployment of new and improved energy technologies make a critical contribution to achieving the objectives outlined above. Energy technology policies should complement broader energy policies. International co-operation in the development and dissemination of energy technologies, including industry participation and co-operation with non-Member countries, should be encouraged.

IEA R & D policy analysis is most recently reflected in the IEA/OECD publication *Scoping Study: Energy and Environmental Technologies to Respond to Global Climate Change Concerns* (1994) which broadened previous assessment work and brought a sharper focus on climate

change and related problems. This Study examines factors influencing technological development, technology options and strategies, and national and international efforts to enhance co-operation in this field.

H. The Oil Market: Transparency and Dissemination

The need for Members to have access to international oil market information, reflected in the IEA's "general oil market information system", was one of the compelling reasons why the industrial countries decided to establish the Agency in the aftermath of the 1973-1974 oil crisis. In this market, the founders sought to bring about "transparency" and to make relevant: oil market information available to IEA Members and to the public. The main sources of such information at the outset were the oil industry and the industrial governments, and that remains the case in 1994, although the number and diversity of sources have increased notably over the years. While the Agency *gathers* from these sources the information it requires in carrying out its missions, the IEA also *disseminates* oil industry information. The dissemination, which takes place as required within the Agency and to Members, enables the Agency to do its work in the oil market sector and serves the needs of the general public as well.

With the assistance of the oil industry, the IEA developed in its early years a number of oil market information systems for which information was supplied by industry to governments, which in turn supplied the information with appropriate security arrangements to the IEA. The IEA's 1979 Crude Oil Import Register is the chief survivor of these information systems. Its main objective is to provide data to be used essentially in three ways: (1) for both Members and the Secretariat, to enhance their understanding of oil price developments and patterns in general; (2) when necessary, to contribute to the base for analysis of short-term price developments and oil quality changes; and (3) to be utilized in the IEA quarterly publication entitled *Energy Prices and Taxes* as well as in the monthly *Oil Market Report*. This Register has been updated a number of times to adjust to changes in market structure or to make it more realistic or easier to manage. Important new crude oil streams have been added to the Register as required. The break-up of the Former Soviet Union and the subsequent increase in crude oil export streams from its territory have been reflected in

the provision of separate categories for each of the main exporting Republics. On a broader basis, in 1993 sulphur content data was also introduced in order to provide information relevant to environmental standards and refinery emissions.

Throughout its history, the IEA has followed the policy of obtaining oil market information and advice on information arrangements directly from the international oil industry as well as from Member governments. While industry advice in the Agency's early years was supplied by an Industry Working Party (IWP), and in formal consultations as provided in the I.E.P. Agreement, as well as in bilateral contacts with industry sources, in more recent years the direct bilateral contacts have been enlarged to become a most productive means of obtaining information from industry and other sources.

IEA policy promotes dissemination of oil market information in a variety of ways, with the publication of this information receiving high priority because it normally provides the broadest and most rapid coverage. The IEA publishes the oil and gas and other energy series taken over from the OECD shortly after the formation of the IEA as well as other oil market materials developed by the Agency. The Agency's current oil market assessments are made known notably in the IEA's monthly *Oil Market Report* which the Agency has published for over a decade.

The *Oil Market Report* grew out of the practice of regular Secretariat reports to the Governing Board on the short-term outlook for the international oil market, containing the Secretariat's views on the general situation and major developments, on oil supply and demand, and on prices for crude oil and products. Over the years the Secretariat has refined the Reports in the interest of greater scope, precision, and clarity. Since the April 1991 issue, the Reports on the oil supply/demand balance have been presented on a "truly global basis", as a result in part of the breakdown of barriers between Eastern and Western Europe and the availability of adequate data and estimates. Much greater attention is now devoted to oil supply and demand in Latin America, the Asia-Pacific region, and Africa. The Reports have been expanded to provide greater detail as to countries, regions and products, seasonally adjusted changes in demand, structural changes, cyclical changes, and features of particular topical interest. There is now published detail on world oil production, prices, stocks and other global oil market elements of current interest. The Reports have become a standard for governments and industry, as an authoritative source of the best available oil market information, and the Agency has come to serve as an informal "clearinghouse" for that information.

I. Globalisation and Non-Members

From the outset the Agency's policy approach was outward looking, particularly with respect to relations with the oil producing countries and other consumers, as clearly provided in the I.E.P. Agreement and in other early policy declarations and actions. The IEA bodies responsible for non-Member country relations have functioned principally as the IEA's focal point for exchange of information on this subject among the Members, and as a caucus point for Members to share and develop their energy policies.

There were high hopes for a constructive producer-consumer dialogue in the early years of the Agency, which led up to the Conference on International Economic Co-operation (the CIEC or North-South Conference) held in Paris in 1976-1977. In December 1974 the Governing Board gave top priority to the definition of a common position of Members on the crucial issues in the CIEC, including the general "concept" of the dialogue, the price of oil, and the security of supply. The IEA participated as an observer in the Conference and provided the principal caucus and briefing point for its Members. After almost two years of preparations and Conference meetings, the CIEC produced only meagre and disappointing results. The participants were unable to agree on the most important issues, including the price of energy and the continuing consultations on energy. Despite this disappointing outcome in the CIEC, the IEA continued afterwards to maintain its policy objective of carrying out a constructive dialogue with the oil producer countries, but the focus was shifted by the CIEC to the problems of the developing countries, particularly as presented in the United Nations. In this phase the IEA could offer political support, including the promotion of indigenous energy production, augmented by energy assessments and planning, the conduct of energy data workshops, the granting of access to energy R & D projects, and the provision of information and training, but not costly development assistance. In recent years, energy developments in these countries are taking on still greater IEA policy importance as they play a larger role in energy consumption and contribute increasingly to the global environment problems.

The Agency has continued to broaden its focus to *increase* its already established interest in the global dimensions of energy, as the IEA's pursuit of energy security is enlarged, as non-Member countries play a larger role in energy demand and in environmental questions, as energy supplies come increasingly from those countries, and as many non-Members draw closer to the OECD world. Although this interest extends to the oil producing countries and developing countries as before, the globalisation of IEA policy

has brought greater attention to energy questions in Central and Eastern Europe, Latin America, the Asia-Pacific region and Africa. Systematic IEA policy work increased with the dramatic political and economic changes in Central and Eastern Europe in the late 1980s and has continued to grow through the period of this *History*.

As part of the globalisation of the IEA's outlook during the early 1990s, an opportunity arose for more systematic IEA contacts with the oil producer countries to promote communication and understanding, market transparency, and efficiency. The IEA supported these contacts which were designed not to take up energy production volumes and price determination, for they were to be left to market forces. Inaugurating a new and different pattern of "dialogue" in 1991, three Ministerial or political level meetings of producers and consumers have been convened by host governments, and three meetings of experts from these groups and from other interested participants have been convened in Paris by the IEA. The meetings have considered a wide range of current energy policy subjects, including the global energy policy inter-relationship, the common energy future, energy co-operation among producers and consumers, energy and the environment, energy investment, and energy efficiency. At this stage these meetings have produced useful but not dramatic outcomes. Early in 1995 the continuation of these meetings could be forseen.

Like most other subjects of major IEA policy interest, the Agency's approach to non-Member questions was featured in the 1993 IEA Shared Goals. In the introduction to the Goals, IEA Ministers stated the globalisation policy quite broadly:

> IEA countries recognise the significance of increasing global interdependence in energy. They therefore seek to promote the effective operation of international energy markets and encourage *dialogue* with all participants [Emphasis added].

In Goal 9, Ministers spoke more specifically:

> Co-operation among all energy market participants helps to improve information and understanding, and encourage the development of efficient, environmentally acceptable and flexible energy systems and markets worldwide. These are needed to help promote the investment, trade and confidence necessary to achieve global energy security and environmental objectives.

These objectives in non-Member relations have already given impetus to a thorough policy review within the IEA. In 1992 and 1994, they produced initiatives for bringing non-Members into closer relations with the Agency by means of new and more inclusive approaches to their participation in IEA meetings and other events, their participation in the Agency's energy R & D projects and meetings, and their access to IEA statistical services. The Agency also envisages more extensive contacts to assist non-Members in developing energy strategies and adopting policies that would "contribute to their development and enhance global energy security". In 1993 IEA Ministers saw this as a "balanced approach", which extends to consideration of qualified countries for membership in the Agency, and in 1994 the Governing Board approved procedures and criteria for membership in the Agency. Together with environmental concerns, this inclusive non-Member policy will doubtless continue to provide a strong influence on IEA policy in the years ahead.

J. Looking to the Future: Freer Markets and Shared Goals

Notwithstanding the numerous IEA achievements over the past twenty years, none of the major energy policy problems which gave rise to the IEA has been definitively resolved. The constant evolution of energy markets and of Members' policy demands has changed the economic and political context in which the IEA operates, but the fundamental problems persist. A current example of this process appears in the following passage of the IEA's 1994 *World Energy Outlook*.

> World demand for primary energy will continue growing, at an average annual rate of 2.1 per cent. By 2010, the world will be consuming 48 per cent more energy than it was in 1991. World GDP is expected to be more than 70 per cent higher in 2010 than it was in 1991. It is this underlying assumption of economic growth which, more than any other factor, is the reason for the inexorable increase in energy demand.
>
> In the OECD, energy consumption could increase by 28 per cent between now and 2010; and oil demand could increase to some 45 million barrels per day, up 18 per cent over 1991 consumption of about 38 million barrels. This rise in oil

> demand, at an average rate of 0.8 per cent per annum, occurs entirely in the transport sector. With the long-term gradual decline in OECD oil production expected to continue, imported oil, which met 58 per cent of OECD oil requirements in 1991, could account for close to 70 per cent of OECD oil demand by 2010. This represents a rise in oil imports of some 9 million barrels per day, an increase which will likely have to be met primarily by the major Middle East producers and Venezuela. Production in these countries will have to double over the next sixteen to seventeen years to meet expected world oil demand.
>
> The forecast increase in energy and oil demand in [the rest of the world] is expected to be even more pronounced than in the OECD. In these countries, particularly in China and the dynamic economies of East Asia . . . , growth in energy use could be more than 4 per cent per annum on average over the outlook period [Page 18].

Such rapid growth in oil consumption and increased dependence of the growing number of industrial countries upon imported oil echo the conditions which led to the 1973-1974 oil crisis, suggesting again an unacceptable vulnerability to oil supply disruptions continuing for years into the future. But such vulnerability need not be destructive in the years to come, if the necessary energy policy measures are taken in time. Hence it should come as no surprise that the search for "energy security", the principal objective of the IEA's founders in establishing the Agency in 1974, may be expected to remain firmly established as a main determinant of future energy policies.

The Agency's ever sharpening focus on new energy policy requirements, developed in the forum function of the Agency, is already visible in the Agency's work on freer markets and on IEA Shared Goals. Among the main free market issues being considered in the IEA are deregulation, reduced government interventions in markets and particularly in respect of price, privatization, greater competition, and the increased productivity of undertakings in the energy sector.

The overall policy thrusts for the IEA were stated in the IEA Ministerial Communique in these words: "Ministers believe that global economic development, energy security and environmental protection will be enhanced if all nations of the world subscribe to the goals which the IEA countries share". These words were translated into "IEA Shared Goals" and were adopted by IEA Ministers on 4 June 1993 with the following themes:

Diversity, efficiency and flexibility within the energy sector.

Systems for prompt and flexible responses to energy emergencies and joint responses through the IEA in the case of oil supply emergencies.

Environmentally sustainable provision and use of energy, with minimization of adverse environmental impacts and with energy security considerations taken into account.

Improved energy efficiency.

Continued R & D and marketing of new and improved energies.

Undistorted energy prices.

Free and open energy trade and a secure framework for investment.

Co-operation among all energy market participants.

These Goals constitute the best comprehensive formulation of future policy directions of the Agency and its Members. On a more conceptual level, Mrs. Steeg recently stated these essentials:

> First, it is important to be vigilant — to safeguard our energy security. One can never predict what type of emergency may arise, as the Gulf Crisis demonstrated. In addition, we must continue to have the will and resolve for international co-operation, along with a preparedness for compromising and consensus. It is also clear that the role of governments in the energy sector will continue to be important, since the market *alone* can meet most *but not all* the challenges. Flexible energy sectors in my view are the best guardians against unforeseen challenges and risks. Last but certainly not least, we must not forget the pivotal role that new technologies play and we must continue to pursue their development and public acceptance of them [Remarks at a special seminar on "The IEA in the 21st Century: Challenges and Prospects" in commemoration of the 20th Anniversary of the IEA, held in Kyoto, Japan on 14 April 1994].

IEA Oil Security: The Core of Energy Security

The main objective of the IEA's founders in establishing the Agency was to ensure their "energy security", with emphasis on *oil security*, on a workable and reliable co-operative basis, and this remains the case today. In 1993 IEA Executive Director Helga Steeg defined energy security in terms of "diversified supplies of energy being available at affordable prices to help economies continue to grow" [Remarks at The Second World Coal Institute Conference, London, 25 March 1993].

The initial content of the security objective can be discerned in the 1974. I.E.P. Agreement, particularly in the first four Chapters of the Agreement where the main principles are set forth. Over the ensuing twenty years, the Governing Board's actions focused sharply upon the specific policies, procedures, and mechanisms designed to realize the energy security objective. In both the I.E.P. Agreement and Governing Board actions, energy security extends to responses to short-run oil emergencies (taken up in this Chapter) and to long-term ameliorative solutions to the broader problems of reducing oil import dependence and energy policy which have tended increasingly to the understood and developed as part of energy security policy (long-term policies are taken up in Chapter IV below).

A. Oil Security Policies and Systems

In the Preamble to the I.E.P. Agreement, the founders of the Agency stated quite clearly the importance of policy on short-term oil supply disruptions and the high priority to be assigned to it, as appears in the first two paragraphs:

> DESIRING to promote secure oil supplies on reasonable and equitable terms,

> DETERMINED to take common effective measures to meet oil supply emergencies by developing an emergency self-sufficiency in oil supplies, restraining demand and allocating available oil among their countries on an equitable basis.

The Preamble also stated that IEA governments were convinced that the objectives "can only be reached through continued co-operative efforts within effective organs", and referred to the "special responsibility of governments for energy supply". Moreover, in the arrangement of Chapters of the Agreement (the oil Emergency Sharing System occupies the first four Chapters) and in the intensity as well as detail and binding force of those provisions, the founders highlighted the sense of urgency and priority they accorded oil security in 1974.

These views also appeared in Chairman Davignon's statement published in the *OECD Observer* soon after the founding of the Agency:

> . . . the intention of the Participating Countries was to take out a sort of insurance policy against supply difficulties which might occur. That is why they have established a program of emergency measures, including a system for sharing oil in an emergency. This system is precise, strict and detailed, but it would be a mistake to infer that it is of a more fundamental nature than other aspects of the program or that it constitutes the essence of the program. The sharing agreement is based on equal sacrifice for everybody, and every participant must make a comparable effort. This is worked out in great detail and is very highly organised from a technical point of view. The oil is pooled under the control of governments and thus the system is based on the political responsibility of governments [Davignon, "The New International Energy Agency of OECD", *OECD Observer* No. 73, 1974, p. 20, 21; Ambassador Davignon chaired the Energy Co-ordinating Group which negotiated the I.E.P. Agreement and served as the first IEA Governing Board Chairman; his statement was based upon his report to the Board, see IEA/GB(74)9 (1st Revision), Item 5 and Annex II; see also, Ulf Lantzke, "The OECD and Its International Energy Agency", Daedalus, Vol. 104, Fall 1975, p. 217, 224].

For major international oil disruptions, the IEA founders established a treaty-based system for the physical sharing of oil (Emergency Sharing

System) which requires Members to build and maintain oil stocks (the IEA stock obligations), to plan for and carry out short term reduction of demand for oil (called demand restraint in IEA terminology), and to gather and transmit emergency oil data (to enable the Agency to make sound emergency decisions). Arrangements are in place to ensure the assistance of the oil industry (for expertise required in improving, testing and operating the Sharing System). At the centre of the Sharing System is an institutional mechanism designed to enable these elements to work together fairly, efficiently, and reliably (the IEA role overall). When serious oil supply disruptions occur or may be reasonably expected, the IEA Secretariat is to make a "finding" as provided in the Agreement, which begins a formal procedure leading to the "triggering" of the oil sharing obligations of Members. Unless the Governing Board decides otherwise by a strong majority, the obligations are automatically activated without a prior political decision, and the sharing of available oil takes place on the basis of previously fixed principles and in accordance with established mechanisms. All of these oil security measures require Members to co-operate, to share the burdens of the Sharing System and to avoid "going it alone" at the expense of others [The Sharing System is described in more detail in Section B below].

Over most of the life of the Agency, the IEA arrangements for the physical sharing of oil, integrated with oil stock and demand restraint measures, and the supporting data system, have been called the "Emergency Sharing System" or "Sharing System" or "ESS", and that terminology is retained in this IEA *History:* In recent years the Sharing System and its composite elements have been at times referred to as the "IEP emergency measures". The definitions appear in the current edition of the main IEA emergency response operating manual known as the Emergency Management Manual (EMM), [See EMM, 5th Ed. 1994, Section 1.1, 1.2], and both are generally accurate. In addition to the formal and thoroughly developed Emergency Sharing System, which has not yet needed to be activated as such, the IEA developed in the 1980s an array of *ad hoc* alternative measures which the Governing Board can adopt on a case-by-case basis as required, and this includes the selective use of one or more Sharing System elements such as stockdraw, demand restraint and the emergency data system, when the Governing Board makes the appropriate decisions to do so. The I.E.P. Agreement extends to the Agency quite extensive and flexible powers for such measures, for example the power to act when an oil supply reduction does not rise and is not expected to rise to the level required for triggering the Sharing System (7 per cent of supply).

The Governing Board acted effectively in such a situation in the 1979-1981 crisis [See Section C below] and again in the 1990-1991 Gulf crisis [See Section E below]. The Board has also shaped procedure and other preparations to facilitate and expedite in actions over the entire range of supply disruptions, both I.E.P. trigger situations and lesser disruptions [See Section D below on Co-ordinated Emergency Response Measures (CERM)], and has widened the general scope of energy security policy over the years. In employing the Sharing System or *ad hoc* measures or both, the Agency has the institutional competence and the choice of policy instruments necessary to manage serious disruptions in Members' oil supplies. For a summary of the IEA's February 1995 Decision emphasizing flexibility in the adoption of emergency response measures, see Section D below.

In the oil security sector, many of the Agency's achievements are quite visible to the alert observer, but there may be other security achievements that are not so visible. The *invisible* deterrent effect of IEA readiness to share oil or to release stocks, and to carry out demand restraint or other measures, may have effects which cannot be verified empirically. Meanwhile, the Agency has continued to enlarge, refine, test, and improve its array of oil disruption response and information systems and to conduct systems tests and country reviews to ensure the completeness, readiness, and credibility of these systems.

Energy security has remained the dominant IEA objective, but with evolutionary adjustments made to add security policy and institutional flexibility as required and to *realize in fact* the concrete objectives of each. Energy security concerns appear in most of the IEA Shared Goals adopted by IEA Ministers in 1993 [See Chapter IV, Section G below]. Policy for responding to energy emergencies appears specifically as follows:

> Energy systems should have the ability to respond promptly and flexibly to energy emergencies. In some cases this requires collective mechanisms and action — IEA countries co-operate through the Agency in responding jointly to oil supply emergencies [Goal 2].

The success or failure of IEA Members in realizing their broader energy goals and carrying out the policies associated with them (for example, the Agency's environmental, conservation, alternative energy sources, and other long-term policies) may well have a direct effect on IEA oil security, and ultimately influence the vulnerability of Members to oil supply disruptions, or the possible severity or duration of the disruption crisis. The IEA's treaty-

based and most elaborately developed defence against such disruptions is the oil Emergency Sharing System which will be treated in detail in the next Section.

B. Oil Sharing: The Emergency Sharing System

At the time the Agency was established, the founders considered the oil Emergency Sharing System to be the industrial countries' first line of defence against serious oil supply disruptions. The establishment, development and, in case of need, the operation of Sharing System were indeed the main (but by no means the only) objectives of the Agency. The Sharing System type of response could be effected only through an established co-operative institution, as the lessons of the 1973-1974 crisis taught so well. The operation of an effective oil sharing system would require treaty obligations covering the essential rules and creating the necessary infrastructure, decision process, information services, trained personnel, and procedures, all of which had to be available on a permanent basis for urgent calls to action. Only a set of institutional arrangements like those created in the IEA could meet these requirements.

As will be seen below, the IEA Sharing System comprises a comprehensive network of emergency rules, preparations and responses. While it can be operated on a flexible basis, the System has limitations. It was designed principally to operate only in case of quite serious disruptions, involving an actual or anticipated loss of at least 7 per cent of expected supply. The System involves a complex procedure, taking some weeks to bring fully into operation with arrivals of allocated oil at the destinations directed by the System. Up to the present time, the System has not been activated, although 7 per cent supply shortfalls for particular countries have occurred, and in one case the Agency was formally requested to act (by Sweden, in 1979; in the end, no formal action was necessary). Despite the presence of the formal conditions necessary to activate the Sharing System as written in the I.E.P. Agreement, other solutions have been found case-by-case to deal with the immediate situations as they have arisen so far (as in the 1979-1981 Middle East crisis and again in the 1990-1991 Gulf crisis), and this has proven to be an acceptable approach.

In the early 1980s, the *ad hoc* approach was institutionalized in Governing Board decisions arranging for flexible procedures [See Section

C below] and early use of oil stocks [CERM, see Section D below]. These alternative arrangements could be invoked together with the Sharing System or quite independently of it, as the Governing Board might decide. The Sharing System remains fully available, not only in the formal treaty sense, but also in terms of infrastructure and readiness; it continues to be developed, tested, and maintained in place. It now appears that the Sharing System is less likely to be needed than the founders foresaw in 1974, although rising net oil imports may again change this situation. The Sharing System continues to serve the purpose of providing elements that could prove essential on a selective basis in *any* disruption (for example, the readiness to use oil stocks and demand restraint in the market, the emergency data system, trained personnel, and high performance expectations). And in cases where stockdraw, demand restraint, or other *ad hoc* measures prove insufficient or unsuitable for any reason, the Sharing System provides the ultimate backup System for sharing the available oil.

Turning to the Sharing System itself, the System provides mechanisms offering short-term protection against serious disruptions of oil supply, following a number of classical preparatory or responsive measures available in everyday situations for consumers to ensure sufficient supply of a commodity at affordable prices. The first of these measures is to build up a reserve of supplies of the commodity in the possession or under the control of consumers to supplement supply still available in the market. Another is to reduce or eliminate consumption of the commodity during the period of short supply in order to lengthen the period in which available supplies would continue to meet consumers' minimum needs. A third measures is to share the available supply among the consumers in such a way as to distribute the loss on the basis of an equitable formula (either prearranged or *ad hoc*), in order to avoid scrambling for supply and unacceptable price increases. Taken together, these constitute co-operative measures to ensure a swift and effective response. In the case of oil and the IEA, *all* of the foregoing short-term response measures are written into the I.E.P. Agreement. The establishment of co-operation among consumers, the fourth response in the above enumeration, is the subject of Volume-I of this *History*; especially Chapters II, III and V. The three other responses, on Oil Stock Building, Demand Restraint, Allocation (including Activation and the Trigger Calculation) are the subjects of the current Section of this Chapter.

Reflecting the immediate concerns which led to the establishment of the Agency in 1974, Chapters I to IV of the I.E.P. Agreement address these emergency oil supply problems. The Agreement adopts provisions for emergency self-sufficiency in oil supplies, demand restraint commitments, and rules for allocation of oil in times of shortage, together with a trigger

mechanism for bringing the emergency system into operation. Under those treaty provisions, IEA Members take legal commitments on the essential elements of the International Energy Program, and Agency organs are empowered to undertake the necessary preparatory work to translate these Agreement provisions into a workable administrative system and to put them into operation when the occasions arise.

1. Oil Stock Building

The basic oil stock obligation of each IEA Member as formulated in 1974 is to "establish a common emergency self-sufficiency in oil supplies". In order to meet that objective each Member agrees, with immediate effect, to "maintain emergency reserves sufficient to sustain consumption for at least *60 days* with no net oil imports" [Article 2.1; emphasis added]; and, at a date to be determined, to maintain 90 days of emergency reserves (Article 2.2). The Members undertake to "endeavour" to achieve the 90-day emergency reserve level by a date which was to be fixed by the IEA Governing Board. In 1975-1976 the Governing Board raised the level from 60 days by steps over a period of about five years, increasing to the 70-day level with effect from mid-1976, followed by suggested increments of 6 days each year until the 90-day level was reached on 1 January, 1980 [IEA/GB(76)53, Item 2], and it remains at that level today.

Since 1974 the treaty provisions have been supplemented by Governing Board actions, such as those taken in the 1979-1981 and the 1990-1991 crises, usually to meet the demands of the immediate situation, but there have been longer-range supplementary actions as well. In 1982 the Board was concerned about the decrease in the stock commitment due to declines in consumption and in net imports over the previous years. To remedy in part the resulting commitment reduction, the Board decided this:

> IEA Member countries will make efforts not to let stocks fall below 90 days of the average net imports during the preceding three calendar years, if this is higher than the existing commitment of 90 days of net imports during the previous calendar year, except where oil consumption had declined because of clearly established long-term structural change [IEA/GB(82)92, Item 2(e) and Annex II].

While this was a decision for Members to "*make efforts*" rather than to *reach the ultimate objective*, the decision did reflect the need to adjust the

commitment upward to maintain stock coverage at close to a constant level during the down-side of the economic and oil import cycles, so that reduced commitments would not apply during the early years of the up-swing of the cycles when there might be greater vulnerability than during the few previous years.

Whatever the applicable level of required stocks might be, the emergency reserve measures are designed to aid Members to maintain economic activity during the supply emergency. With the advantage of a buffer period based on co-ordinated stock levels, Members should be capable of relying securely upon their own energy resources, notwithstanding a significant shortfall in oil supply, whether or not the Sharing System is activated. When the Sharing System is activated, Members would be permitted to draw upon stocks at a calculated level, which should reduce the pressure on the group as a whole, even though the draw on stocks is not mandatory. Since the oil supplies available to a Member country might thus depend upon the stock position of other consumer countries as well as the existence of sufficient reserves in its own country, the performance of each country in maintaining reserves is essential to the security of the group as a whole.

For this reason, it was important that the I.E.P. Agreement state in mandatory terms the obligation to maintain emergency reserve stocks and provide for IEA monitoring and administration. The Standing Group on Emergency Questions (SEQ), a plenary committee of the Agency [See Volume I, Chapter V, Section B], is required under Article 4 to review on a continuing basis the effectiveness of the measures taken by each Member to meet its emergency reserve commitment. Members systematically report stock levels to the IEA, which reviews stock developments regularly and reports to the Governing Board on the stock levels of all Members with particular attention to the situation of any Members which fail to meet the commitment. The Governing Board is empowered to adopt recommendations to Members on their compliance with the emergency reserve commitment, and does so as the need arises. The IEA's emergency response reviews provide the Agency with a systematic means of monitoring stock policies of Members and of discerning the underlying reasons for the levels of their compliance, satisfactory or otherwise. To meet the need for information exchange and training for oil stock management, the IEA has also conducted workshops on practical aspects of stockholding and stockdraw, bringing together participants with responsibilities for stock policies and operations in Member governments, stockholding entities, and industry [See Workshop on Practical Aspects of Stockholding and Stockdraw, Paris, 27-29 September 1989, *Proceedings*

(1989); Workshop on Stockdraw and Emergency Response Policies and Management, Kagoshima, 21-24 February 1994, *Proceedings* (1995)].

Although this emergency reserve commitment is seen essentially as an arrangement to maintain *oil stocks* (and in fact has been met by oil stocks), the Agreement provides that the commitment may also be satisfied by "fuel switching capacity" and by "stand-by oil production" [Article 3], and nothing would prevent the use of a combination of these measures. While these alternatives to oil stocks are theoretically available and physically exist in a number of Member countries, the Agreement provides for the Governing Board to decide the extent to which the commitment might be satisfied by them (and the date 1 July 1975 was mentioned). Since no decisions of this kind have yet been made, the role of those elements remains uncertain and the commitment has in practice been satisfied by oil stocks alone.

Over the years the performance of most IEA Members has been fully in compliance with the emergency reserve commitment. A few countries foresaw difficulty in immediate compliance at the time they became Members of the Agency (Austria, Turkey and France), and the need for additional time in those cases was recognized by the Governing Board [See Volume I, Chapter IV, Section B-5(a)]. There have sometimes been a few countries not in full compliance. However, the performance of the group as a whole has been more than satisfactory, with the aggregate oil stock holdings of all Members exceeding their total commitment level, as appears in the following table.

Development of Stocks in IEA Countries on the 1st of July each year in the period 1975-1994

As of 1st July	Days of Net Imports
1975	109
1976	115
1977	113
1978	112
1979	113
1980	138
1981	159
1982	165
1983	168

Development of Stocks in IEA Countries on the 1st of July each year in the period 1975-1994

(continued)

As of 1st July	Days of Net Imports
1984	182
1985	182
1986	193
1987	181
1988	186
1989	176
1990	174
1991	169
1992	173
1993	174
1994	168

Notes:
Includes emergency reserves for all current IEA Members for each year although they have not all been Members for the whole period. Includes stocks held by net oil exporting countries (Canada, Norway and the United Kingdom).
Stocks are measured in terms of net imports of the previous year.

The drop in relative stocks since the mid-1980s has been disquieting but not so far alarming. Nevertheless, the Governing Board has acted on numerous occasions to strengthen the situation. The Board regularly receives reports on the state of Members' stockholding, and makes recommendations to Members who are not meeting the obligation. For example in 1993, some Members found themselves in that position and explained their particular situations. The Board then noted the explanations and

> urged the countries concerned to make every effort to meet their emergency reserve commitments at the earliest possible date and to provide definite timetables ensuring compliance [IEA/GB(94)13, Item 7].

Moreover, IEA Ministers at times call for full compliance by those not meeting the commitment or for vigilance to ensure the continuing adequacy of stocks in terms of amount, structure, and flexibility [See IEA/GB(83)36(Final), Annex I, paragraph 10]. This has been done in laconic terms, for example, by Ministers simply agreeing to the "Fulfillment of IEA stock-holding obligations" [IEA/GB(85)46, Annex I, paragraphs V.4) and 5) with respect to stock levels for CERM]. Calls for compliance have been made more comprehensively, as in 1987 when IEA Ministers assessed the situation as follows:

> Ministers reaffirmed the high priority given to the IEA emergency preparedness system, including both the IEP oil sharing and the co-ordinated early response stipulated in the Governing Board Decision of 11th July 1984 [Note that this is the CERM Decision, discussed in Section D below]. Total stocks held in IEA countries are now equivalent to more than 160 days of 1986 net imports, which is considerably more than the minimum legal obligation of 90 days by each country. Ministers welcomed the further progress made since they last met in July 1985. Procedures to co-ordinate, carry out and monitor stockdraw and other measures early in an oil supply disruption are being further enhanced. However, a small number of countries is still required to continue efforts to achieve their individual obligations. Ministers emphasized the necessity of complying with the legal obligations of the IEP concerning emergency oil stocks and demand restraint measures [IEA/GB(87)33, Annex, paragraph 17].

The year 1987 was also a time for Ministers to warn against "complacency" because of the prevailing market conditions. Ministers supported Members efforts to raise stock levels and acknowledged the benefits of having stocks held in accordance with the I.E.P. Agreement exceed the required level. They welcomed action by countries "to improve the ability to bring about stockdraw by government initiative" [Paragraph 18] "under clear and definite authority" [Paragraph 19] and favoured the increasing "level of government and public entity stocks" [Paragraph 20].

These Ministerial pronouncements were reconfirmed in 1989 [IEA/GB(89)36, paragraph 4(a)], and their impact was strengthened in 1991 and again in 1993, in part to fulfil the treaty commitment on emergency reserves, in part to provide greater flexibility in CERM-type operations, and in part as a result of experience gained in dealing with the 1990-1991 Gulf crisis. At their 1991 meeting

> Ministers recommended that Member countries with stock obligations strengthen, where necessary, government control over emergency industry stocks and/or increase government-owned or controlled stocks. Given the unpredictable nature of supply disruptions, Ministers urged all IEA countries to meet fully their emergency reserve commitments, and encouraged Member countries to *increase their emergency reserves above the 90-day level, as appropriate* . . . [IEA/GB(91)42/REV2, paragraph 6; emphasis added].

The sense of the last sentence was repeated in 1993 [IEA/GB/(93)41, paragraph 7]. Oil stocks were not mentioned specifically, but the IEA stock policies were indirectly reconfirmed in Goal 2 of the 1993 Shared Goals, quoted above, on the subject of the joint response of Members to oil supply emergencies.

In 1994 stock management issues received considerable IEA Secretariat, Member government, and industry attention in the IEA Workshop on stockdraw and Emergency Response Policies and Management, held in February at Kagoshima, Japan. Although the Workshop was not directly charged with developing stock policy recommendations, a number of policy concerns did emerge from the Workshop and were taken under consideration by the Agency. Some of these, with potentially far-reaching consequences, were:

- The major effort required from IEA countries to maintain stocks proportionate to rising imports, notably from the politically fragile Middle East.
- The fact that the IEA's stocks have dropped from some 170 days import coverage in the mid-1980s to less than 140 days in 1993.
- The existence of the political will as well as the technical ability to use stocks [IEA/GB(94)19].

Other concerns included the need to present a strong policy response to the public of IEA countries during a period of low oil prices and to improve response mechanisms (including flexibility and stockdraw enhancement). Also noted were deficiencies of legal underpinning in some countries (particularly concerning CERM), more constraining environmental regulations, as well as the need for closer international co-operation on information exchange and technology transfer, and an IEA Implementing Agreement to help Members on technical issues. These concerns and others

developed at Kagoshima may indicate some of the future directions of IEA policy work in the field of stockdraw and emergency response management.

IEA oil stock policy, which began with the I.E.P. Agreement commitment to maintain emergency stocks at the agreed level for use pursuant to the Emergency Sharing System, has evolved not only pursuant to the technical rules described above but also in relation to the types of situations in which stocks would be employed. Almost from the outset of the Agency it became clear that stocks would play a role in any IEA response to oil supply disruptions, whether or not the disruption met the formal requirements of the Emergency Sharing System. As will be seen below, stocks played an important role in the response to the 1979-1981 crisis, when the Sharing System was not activated. From that time forward oil stocks assumed greater importance in IEA oil disruption preparations, leading to the 1984 CERM Decision which emphasizes early use of stocks. During the 1990-1991 Gulf crisis, the IEA mounted an *ad hoc* response with great reliance on oil stockdraw. The important question of the relation between the Sharing System and CERM approaches is discussed below in Section D.

The adoption of CERM has strongly influenced IEA policy statements on stocks since 1984. Both the emergency reserve commitment and the preparation for CERM responses have been combined in many IEA policy statements, as seen in the Ministerial statements quoted or noted above. In one situation, the *ad hoc* CERM approach has a potentially direct effect upon the emergency reserve commitment, and that is the possible release of Members from the 90-day commitment, where necessary, to free-up stocks to be employed in the *ad hoc* response. This has actually occurred only once in the history of the Agency to date. Ministers agreed in 1980 in relation to the IEA response to the 1979-1981 crisis that "Reduction in stocks below the I.E.P. 90-day emergency level might be considered in countries with particularly difficulties" [IEA/GB(80)97, Item 2(f) and (g)(i)]. One can characterize this action as the Members' waiver of their legal right to insist upon preservation of the 90-day stock level and as a proper response to a particular situation [See Volume-I, Chapter IV, Section B-5(a)].

Certainly one effect of the policy movements described above has been to increase the role of stocks in IEA oil supply disruption planning. The basic 90-day emergency reserve commitment remains, of course. It now serves the Sharing System directly and the CERM indirectly. The overall emphasis on stocks and demand restraint enhances the Agency's ability to respond rapidly and flexibly, whether the measures employed be the Sharing System or the CERM or both. In each of these cases stocks

and demand restraint reinforce each other as vital elements of the Sharing System, as will be seen in the following Section.

2. Demand Restraint

Another security element in the Sharing System is found in the measures which Members are to take in preparation for the restraint of demand for oil supplies during an emergency, and in the application of effective measures of restraint during oil emergency situations. Since effective measures are quite specific to demand patterns, legislation and other factors in individual countries, no specific demand restraint measures are adopted in the Agreement. However, in recognition of the need for preparedness, each Member undertakes legal obligations to prepare for and to restrain demand in accordance with the Agreement. These obligations refer not to specific measures as such, but rather to the achievement of the objective expressed in terms of a specified percentage reduction of consumption.

The demand restraint obligations are different for cases of the "general trigger" (shortfalls for the group of IEA countries as a whole) and for the "selective trigger" (shortfalls suffered by one or more IEA countries). Article 13 of the Agreement provides that in the event of an oil supply reduction equal to 7 per cent of the group's consumption, the obligation of each Member is to implement measures sufficient to produce a corresponding 7 per cent reduction in consumption. Under Article 14, if the supply of the group is reduced to the 12 per cent level, each Member's measures must reduce consumption by 10 per cent. Although in these situations the shortfall is measured for the group as a whole, the 7 per cent or 10 per cent reductions refer to oil demand in the individual Member country. In certain disruptions of long duration, the Governing Board is empowered, by special majority, to increase the "level of mandatory demand restraint that may be necessary" [Article 20.3]. In the case of the selective trigger, the country affected is required to reduce its demand by 7 per cent, but the other Members are under no obligation to do so.

The objective of the demand restraint provisions is to reduce oil demand in the circumstances of a specific shortfall in oil supply. Members thus agree that they will at all times have ready a programme of contingent oil demand restraint measures. Article 5.1 provides this:

> Each Participating Country shall at all times have ready a program of contingent oil demand restraint measures enabling it to reduce its rate of final consumption in accordance with Chapter IV.

The reduction in rates of final consumption, defined in Article 7.8 as "total domestic consumption of all finished petroleum products", are continued in Articles 8, 13 and 14. Under Article 16, a Member is entitled to substitute for demand restraint measures the use of *stocks* held in excess of its emergency reserve commitment, as discussed above in Section B-1.

The precise measures to be taken are to be determined freely by each Members, *which would normally adopt the measures best suited to succeed in the circumstances of its particular country*. The Governing Board has decided that the objective of oil emergency "demand restraint can be achieved by measures which either reduce the amount of oil actually used by consumers or limit the amount of oil supply available to consumers" [IEA Emergency Management Manual (EMM) 5th Ed. 1994, Section 4.2]. Demand restraint does not mean the long-term "conservation of energy as provided in the Agency's Long-Term Co-operation Programme to reduce dependency on imported oil. Instead, the Board said, "Demand restraint acts on a level of oil demand which should already reflect high standards of efficiency in energy use. To achieve demand restraint, emergency measures will be required". In any case, each Member remains free to adopt measures which it finds appropriate to its country's circumstances.

Demand restraint measures are *emergency* measures, adapted to the particular emergency on an urgent and short-term basis. These measures fall broadly into three categories: (1) persuasion and public information, (2) administrative and compulsory measures, and (3) allocation and rationing. Typically, demand restraint programmes may include measures to reduce the consumption of transport fuel (by speed limits, car pooling, restriction of weekend or holiday driving, odd day/even day driving limitations, fuel rationing and increased surveillance), of heating and cooling (by temperature rules, start and end dates for heating and cooling, fuel rationing), of public and private residential and commercial lighting (by power reductions, operations hours, wattage restrictions), and the like. Tax increase on petroleum products, as well as the rationing of deliveries to bulk users, retailers, and consumers, are other possible measures. In addition, some programmes include more light-handed and qualitative measures, such as educational campaigns designed for the public or specific oil users, government "example setting" (highly visible lighting, heating and cooling, driving and other restrictions concerning government owned or controlled facilities), and removal or moderation of price controls which may permit demand-driven price increases during the period of short supply. Such measures are not of uniform effectiveness, and there is no consensus on whether all of them should be considered effective parts of the

government "measures" required by Article 5. Nor are they fully comparable one with the other as far as the achievement of results is concerned. Thus, Article 5 presents firm obligations, but in practice the uncertainties of operation of the measures may soften considerably the effectiveness of the demand restraint commitment. The ease of assessing the self-evident degree of performance and compliance for some of the other IEA obligations gives way, in the case of demand restraint, to the difficulties of institutional fact gathering and of reviewing, measuring, and assessing a body of the sometimes obscure and vague measures implemented by Members as well as a body of disparate responses by consumers. However, the demand restraint system has been strengthened by the experience gained during the oil crises of 1973-1974, 1979-1981 and 1990-1991, by the Systems Tests and country reviews [See Section F below], and by the IEA's Workshop on Demand Restraint in 1987.

When the emergency measures are activated, the demand restraint provisions become mandatory. Since a commitment of this nature should not be left to the mere statement of an abstract obligation to reach a numerical objective (for in the short-run it might be difficult to measure success), there is clear need for reporting, monitoring, and assessing results. Hence the Agreement charges the Standing Group on Emergency Questions (SEQ) with the responsibility to review and assess each country's demand restraint programme on a "continuing basis" (i.e. even in the absence of a supply disruption). When a disruption occurs, the SEQ is responsible for reviewing and assessing "the effectiveness of measures actually taken" by each Member. The SEQ's reports on demand restraint are reviewed by the Governing Board, which may make recommendations to Members on this subject. Demand restraint, like stocks, is a particularly active subject in the IEA's emergency response reviews [See Section F below]. In 1987 IEA Ministers referred specifically to demand restraint:

> Mutual exchange of information and experience and the new round of emergency response reviews would also identify areas for further improvements in the effectiveness of national demand restraint programmes [IEA/GB(87)33, Annex, paragraph 23].

In these reviews the Member's array of demand restraint measures is examined closely, and the review team at times investigates with the Member's representatives the scope of the measures, their application and their expected effectiveness. Following the SEQ's examination of the report on the review, the Governing Board is informed of the results of the review.

Opportunities to discuss compliance issues exist in both the SEQ and the Governing Board where the other Members' views, as well as the views of the country under review, may be taken into account. Additional support for demand restraint is provided regularly by the Governing Board, usually by references to the need to strengthen measures [See for example, Ministerial statements in IEA/GB(81)34(Final), paragraph 5; IEA/GB(85)46, Annex I, paragraph V. 5); IEA/GB(87)33, Annex paragraphs 18 and 22; IEA/GB(89)36, Annex, paragraph 4(a); IEA/GB(91)42/REV2, paragraph 6; IEA/GB(93)41, paragraph 7].

During an oil supply emergency, a Member cannot ignore its demand restraint obligation with impunity. Like the sanction for non-compliance with the stock obligation, a Member's oil supply rights during the disruption will be calculated upon the assumption that the Member's demand restraint obligation has been satisfied in full, with the result that the Member will be considered to have saved the applicable percentage of its consumption (7 or 10 per cent or more) and will not receive the corresponding amount from allocated oil. The Member then suffers the consequences of the absence of the oil which would have remained available to it if the requirements of the demand restraint rules had been fully satisfied. The more technical rules on demand restraint are contained in the EMM, 5th Ed. 1994, Section 4.2.

The history of demand restraint in the IEA is similar to the history of stocks, in that almost from the outset of the Agency it became clear that demand restraint as well as stocks would play a role in almost all IEA responses to oil supply disruptions, whether or not the Emergency Sharing System would be activated. Demand restraint played a vital role in the response to the 1979-1981 crisis, when the Sharing System was not activated [See Section C below]. In the 1990-1991 Gulf crisis, an *ad hoc* CERM-type response was mounted by the IEA, with significant reliance on both demand restraint and stockdraw. Demand restraint and stockdraw can be expected to play a significant role in future oil crisis management, either in the Sharing System or in CERM responses [See Section B-1 above for further discussion of these questions].

3. Allocation

After stocks and demand restraint, the third element of the Emergency Sharing System is the actual *allocation* of the available oil. Under the allocation provisions set forth in Chapter III of the Agreement, each Member is entitled to a " supply right " representing its fair and equitable share of the oil supplies available to the Agency countries as a group (those supplies

are defined in Article 7.7). The "supply right" is equal to a country's permissible consumption (which takes into account the country's demand restraint) reduced by the amount of its emergency reserves (the oil stocks) it may draw in accordance with the rules. These concepts and the mechanics of the calculations appear in detail in Chapter III of the Agreement and are explained in the EMM, 5th Ed.1994, Section 2 . The essential point is that each Member's "supply right" is the amount of oil the country is entitled to, for purposes of calculating whether in the allocation the country is to receive oil from other Members or give up oil to them.

In cases of a qualified disruption of oil for the group *as a whole*, the allocation of available oil is made on the basis of calculations applying the foregoing principles. If a Member's supply right exceeds its domestic oil production and the net available imports during an emergency, the member's oil position is on the *short* side, and it enjoys an "allocation right", a right to receive additional net imports of oil equal to the amount of that excess. The additional imports for that country are to be supplied from the domestic production or imports of other Members, those which are found to have an "allocation obligation" determined pursuant to similar principles. An "allocation obligation" arises for a Member whose position is on the *long* side of oil supply, when the sum of its normal domestic production and actual net imports of oil exceeds its supply right, calculated as indicated above.

In the case of a reduction of oil supply of a *single* Member country, that country would have an "allocation right", and the other Agency countries together would have a corresponding "allocation obligation". Under Article 17.1 allocation of oil to that member takes place when the reduction exceeds 7 per cent of its normal consumption. The country concerned is required, in accordance with Article 8.1, to absorb the first 7 per cent of its reduction in oil supplies; its supply right is limited to the amount by which the shortfall exceeds the amount required to be absorbed. The obligation to allocate is shared among the other Members proportionately on the basis of their historical consumption. These Members may balance their oil supply by making up for their allocation obligation through means of their choice, including demand restraint measures or the use of stocks. In this way, the single Member (i.e. one or more Members, but not the group as a whole) which suffers a supply shortfall is supported by the entire group's sharing of the available oil. There is no provision in the Agreement specifically *requiring* the Members actually to draw upon their oil stocks, but of course each remains free to do so within I.E.P. limits, if it wishes.

The allocation system is subject as well to certain equitable "rules of the game", as respects other countries and industry. Article 9.3 of the Agreement provides for the maintenance, insofar as possible, of "*normal channels of supply*" [All emphasis in this paragraph has been added], as well as "*normal supply proportions*" between crude oil and products and among different categories of crude oil and products. Under Article 9.4, one of the objectives of the Program is to maintain *historical supply patterns* within the industry. Article 10.1 provides for "*fair treatment* for all Participating Countries and basing the price for allocated oil on the price conditions prevailing for *comparable commercial transactions*". The important formulation of price rules, developed with the advice of industry, is considered in the Section below. Article 11.1 provides this:

> It is *not* an objective of the Program to seek to increase, in an emergency, the share of world oil supply that the group had under normal market conditions. *Historical oil trade patterns* should be preserved as far as is reasonable, and due account should be taken of the position of individual *non-participating countries*.

Each Member's actual supply of indigenous and imported oil thus falls under international allocation rules in time of an emergency. Each Member has in effect surrendered its right to determine unilaterally the amount of oil which would be made available for its own use. The oil available to the Member is determined pursuant to the allocation principles noted above, not by its own perceptions of need or by the political or economic judgements of the oil companies or of the oil producer countries outside of the Agency. In that way, the IEA countries have organized themselves into a cohesive group in which indigenous oil and imported oil could be shared and used on a rational basis.

The centrepiece of the emergency system is the oil sharing obligations summarized above. The essential rules are stated not as recommendations or requests to Members but rather as firm legal obligations. In addition to the commitments taken in the Agreement, Members have adopted in the Governing Board a number of refinements in the system, which the Board is empowered to adopt by majority vote under special provisions contained in the Annex to the Agreement and in the emergency Chapters. Moreover, the Governing Board has been granted general powers to decide on practical procedures for the allocation of oil and for the participation of oil companies in the emergency system [See Section B-5 and B-7 below].

In Article 6.1 of the Agreement, IEA Members have accepted the basic commitment to ensure that the allocation of oil will be carried out pursuant to the relevant Chapters of the Agreement. The administration of the commitment is provided by Article 6.2 which requires the SEQ to review and assess on a continuing basis each Member's emergency measures and the effectiveness of measures actually taken. The work of the SEQ is in turn reviewed by the Governing Board, which has adopted in the Emergency Management Manual detailed procedures for the application of the emergency system.

4. Activation and the Trigger Calculation

The IEA's oil Emergency Sharing System as set forth in the I.E.P. Agreement and Governing Board actions has been for many years fully developed and ready for action. It is not, however, a regularly running machine. It is kept on "stand-by" status, ready to go forward but in need of being "switched on". Because of potentially far-reaching effects, the "switching on" process is not a simple one. In IEA terminology this process is called "activation", and it occurs when the qualifying factual situation is determined and when the procedural process is completed. Activation is carried out through either of two quite different procedures, sometimes called the "triggers". The System may be triggered by the operation of a "finding" by the Secretariat, unless the Board makes a different determination after the finding is made. Or the Governing Board can, without a Secretariat finding, make the necessary finding itself and thereby trigger the System. The delegation of responsibility to the Secretariat to make the operative find represents a significant innovation in international organization practice and merits particular attention.

While the oil Emergency Sharing System established by the Agreement is not a fully self-executing one, the "finding" process is a procedural safeguard to ensure that in major disruptions the System will be implemented *without a prior political decision of IEA governments* on the particular situation. The emergency sharing obligations are subject to a determination of the existence of certain qualifying events set forth in Chapter IV of the Agreement. Article 12 provides this:

> Whenever the group as a whole or any Participating Country sustains or can reasonably be expected to sustain a reduction in its oil supplies, the emergency measures, which are the mandatory demand restraint referred to in Chapter II and the allocation of available oil referred to in Chapter III, shall be activated in accordance with this Chapter.

The qualifying events for triggering the Sharing System and for bringing its legal obligation into play are the following [Article 19.1]:

- Whenever *the group* sustains or can reasonably be expected to sustain a 7 percent reduction in the daily rate of its oil supplies [Article 13], referred to as the "general trigger" because it relates to the IEA as a whole.
- Whenever *the group* sustains or can reasonably be expected to sustain a 12 percent reduction in its daily rate of oil supplies, which triggers a higher demand restraint commitment than does the foregoing trigger [Article 14].
- Whenever any *particular Participating Country* sustains or can reasonably be expected to sustain a supply reduction exceeding 7 percent of its normal consumption [Article 17], referred to as the "selective trigger" because is relates to one or more Members' individual situations and not to the group as a whole.

Each of the triggering events noted above involves necessarily a finding of fact as to the specified reduction in the daily rate of oil supplies. The calculation of the general trigger finding is essentially a determination that the IEA group of countries as a whole has in fact suffered or is expected to suffer a 7 per cent oil supply reduction. The calculation includes several elements involving the application of the I.E.P. Agreement's concepts of "normal supplies" and "disrupted supplies". The difference between the two represents the amount of the loss to the group, and when that level is at least 7 per cent of the normal supplies, the trigger finding as a rule is to be made as provided in the Agreement. This calculation may not be as simple as it might appear, for it involves a mass of data, the application of a complex network of Agreement concepts and computations, as well as some elements of judgement. The process is outlined in detail in the EMM, 5th Ed. 1994, Section 2 and Format 3A.

What are the sources of this vital data? The "normal supplies" data is derived from the Agency's Base Period Final Consumption calculations made from the Monthly Oil Statistics Questionnaires, data supplied by all OECD governments to the IEA. The data reference period is the most recent four quarter period established under Article 18 of the Agreement. While the reference period is subject to adjustment in appropriate cases, the determination of "normal supplies" is generally a straightforward mechanical process. However, the calculation of "disrupted supplies" is more complex. When the detailed Questionnaire A and B data are available from

co-operating oil companies and Member governments [See Section B-6 below], these data are employed. Otherwise

> "disrupted supplies" are derived from the most recent assessment of forward industry supply contained in the SEQ Quarterly Oil Forecast (in turn derived from data supplied by a number of oil companies at IEA request) available immediately before a potential emergency situation occurs, adjusted for the estimated effect of the supply disruption on Participating Countries by assuming a supply cut proportionate to the disruption in world-wide supplies [EMM, 5th Ed. 1994 Section 2.1.2].

The determination of the net supply reduction can only be an estimate, in this case an estimate made by the Secretariat

> by quantifying the information received through, a variety of means including governments, diplomatic channels, and the oil industry and the IAB (Industry Advisory Board) [EMM, 5th Ed. 1994. Section 2.1.2].

The worldwide net supply reduction is then deducted from the forecast worldwide supplies prior to the emergency to determine the figure for the total worldwide disrupted supplies. It is the latter number which is deducted from normal supplies to determine the amount of the shortfall employed in the 7 per cent trigger calculation mentioned above. It will be noted that elements of good judgement must be employed in determining two of the numbers employed in these computations: the SEQ forecast of forward supply and the Secretariat's estimate of the net supply reduction. These reliable but not mechanical elements involve judgements which the Secretariat needs to consider in making its final decision on whether or not to make the "finding", i.e. the trigger decision to activate the Sharing System. Once the Sharing System is triggered, the Secretariat continues to make the trigger calculation once each month in order to determine whether the emergency conditions continue, or whether they do not, in which case the System would be deactivated as provided in Article 23 of the Agreement.

The foregoing applies to the "general trigger" for disruptions of supply of the entire group of IEA countries. When a supply disruption affects any individual Member but not the entire group, the calculation of the trigger, called the "selective trigger", follows the same principle as the general trigger in measuring the affected country's actual or expected supply reduction. The

system is to be triggered for that country when the reduction exceeds 7 per cent of the country's previous supply (i.e. its Base Period Final Consumption). The disrupted supplies are taken from the individual country's Questionnaire B submission. If the activation is upheld by the Governing Board, the Secretariat then calculates the supply right of the affected country and the supply obligations of the other Members, and allocation is carried out [See EMM, Section 2.1.7].

Even when the foregoing general or selective trigger requirements are fully satisfied, the triggering of the Sharing System is not altogether automatic, for the founders of the Agency considered that some types of cases were intended to be the subject of action, and others were not. On this subject Executive Director Ulf Lantzke reported to IEA Heads of Delegation by letter on 2 June 1980 (following a request from the Governing Board), concluding that

> Under IEP Agreement Article 19.1 the types of cases in which the allocation system is intended to be activated include curtailments of oil exports from producing countries where economically or politically motivated, or interruption of production or transportation due to war or other hostile acts or major natural disaster, and do not include fluctuations of supply attributable to normal market forces, ordinary operational difficulties of the industry, interruptions of supply due to strikes or cases in which activation would shortly become unnecessary because of an anticipated resumption of sufficient supply to the affected country or countries [See EMM, 5th Ed. 1994, Annex III, containing the text of the letter which elaborates on the foregoing statement].

In the EMM provision on the trigger mechanism, the Governing Board stated that the Secretariat would make the determination under Article 19 "in accordance with the IEA Executive Director's letter of June 2nd, 1980 to Heads of Delegation of IEA Participating Countries" [EMM, Section 1.2.2.]. Judgements to be exercised in the foregoing situations reduce somewhat the automaticity of the triggering of the Sharing System, although the decisions rest with the Secretariat, a politically neutral group of international civil servants [See Volume I, Chapter VI]. The founders considered that the trigger decision should be a technical and administrative one in the first instance, with the political safeguard that ultimate authority rests with the Governing Board, which could act by a strong majority to reverse the Secretariat's decision to activate or not to activate.

If the trigger findings were left for decision by each Member government or even by the group as a whole, political elements could influence the determination, and this precisely at a time when the System should be free of political elements if it is to function effectively in the uniform interest of all Members. In this process the framers of the Agreement sought a means to minimize non-technical considerations in the activation of the System. The administrative rather than political approach to triggering the System stemmed directly from Members' experiences in the 1973-1974 crisis, when the need for a *prior political decision*, as in the OECD, was necessary before co-operative responses to that crisis could be mounted. Since that decision would have required unanimity of OECD Members, the presence of opposition would have made any effective response of the industrial countries impossible [See Volume I, Chapter II, Section A and B, and Chapter II above].

Insulation from political considerations is achieved for the Sharing System by a process which includes a certain delegation of power to the impartial Secretariat of the Agency. Article 19.1 of the Agreement delegates to the Secretariat the responsibility to make the initial emergency "finding" which launches the formal process:

> The Secretariat shall make a finding when a reduction of oil supplies as mentioned in Article 13, 14 or 17 has occurred or can reasonably be expected to occur, and shall establish the amount of the reduction or expected reduction for each Participating Country and for the group.

By satisfying the condition precedent to the obligation to implement the emergency measures, the Secretariat's finding leads inexorably, in the absence of blocking action by the Governing Board, to the activation of the System within twenty-four days (under the formal rules of the I.E.P. Agreement, Article 19), and most probably within a much shorter time period. Nor is it an easy matter under the IEA's voting rules to block the implementation of the Sharing System once it is triggered. Under the applicable "First Special Majority" voting rule, a blocking decision requires the support of approximately 75 percent of the Agency countries holding at least 60 percent of the voting power in the Governing Board, as provided in Article 62.4 [On the voting rule, see Volume I, Chapter V, Section A-13 (c)]. In practical terms this means, on the one hand that neither the United States nor the European Union countries as a group (as constituted at the end of 1994) could block the trigger, and on the other hand that such blocking

action could be *prevented* by the European Union Member States acting together, or by the United States with the support of a few other Members, depending on their respective voting power. Thus it may be seen that since blocking action is very difficult to achieve, the system ensures that in the absence of significant opposition, the Secretariat's finding would be given operative effect under the Agreement.

The twenty-four-day trigger mechanism mentioned above is the "worst case", however, in terms of the timing of the obligation to implement emergency measures. The procedure outlined in the Agreement could be shortened substantially, when the need for urgent response appears. Theoretically, implementation could arise on the first day of a crisis if all the Members agreed and in cases of urgency it is highly unlikely that the full period of time allowed by the Agreement would be required, in any event. The Agreement does contain procedures which might be employed to reduce these activation periods. Under the longer procedure, when the Secretariat's finding reaches the Governing Board for its consideration under Article 19.3, one of the options specified in the Agreement is for the Board "to fix another time limit" (i.e. other than the limit specified in the Agreement) for the implementation of the emergency measures. Article 22 provides still another means by which the activation process could be shortened, and this at *any* stage of the proceedings, by as much time as might be desired, irrespective of the foregoing timing rules. Article 22 provides this:

> The Governing Board may *at any time* decide by unanimity to activate any appropriate emergency measures not provided for in this Agreement, if the situation so requires [Emphasis added].

Under that provision, the Governing Board is enabled to shorten the procedure at will when it can act by unanimity.

Emergency measures which are activated must of course at some point be phased-out. The Agreement provides procedures for deactivating the emergency measures, parallel to the finding procedure for activating the system [Article 23 and 24]. The Secretariat first makes a finding that the conditions for activation of the System under Articles 13, 14 or 17 no longer exist. A report is made to the Governing Board and deactivation takes place automatically unless, within a specified time period after the Board meets it decides to maintain the emergency measures or to deactivate them only in part. If the Secretariat has not made a deactivation finding, the Governing Board may at any time decide by "special majority" to deactivate the measures either wholly or in part.

The Agreement does not deal expressly with the problem of sanctions when Members fail to fulfil their obligations, although it is clear that under Sharing System operations a Member which does so may be denied the benefits of certain rights under the Agreement. Provision is made for this type of sanction, without designating it as such, with respect to demand restraint and the emergency reserve obligations, since a Member's "supply right" in an emergency is calculated upon the assumption that those obligations are fully satisfied, whether in fact they are or not, and there are doubtless other situations where sanctions of that nature could be imposed by the Governing Board in the course of a crisis. The monitoring function of Agency organs may be expected to reveal implementation problems for which remedial action might become necessary. Yet the formalization of sanctions was not contemplated in the Energy Co-ordinating Group discussions on preparation of the draft Agreement, and therefore words like "enforcement", "sanction", or "penalty" are not employed in the text.

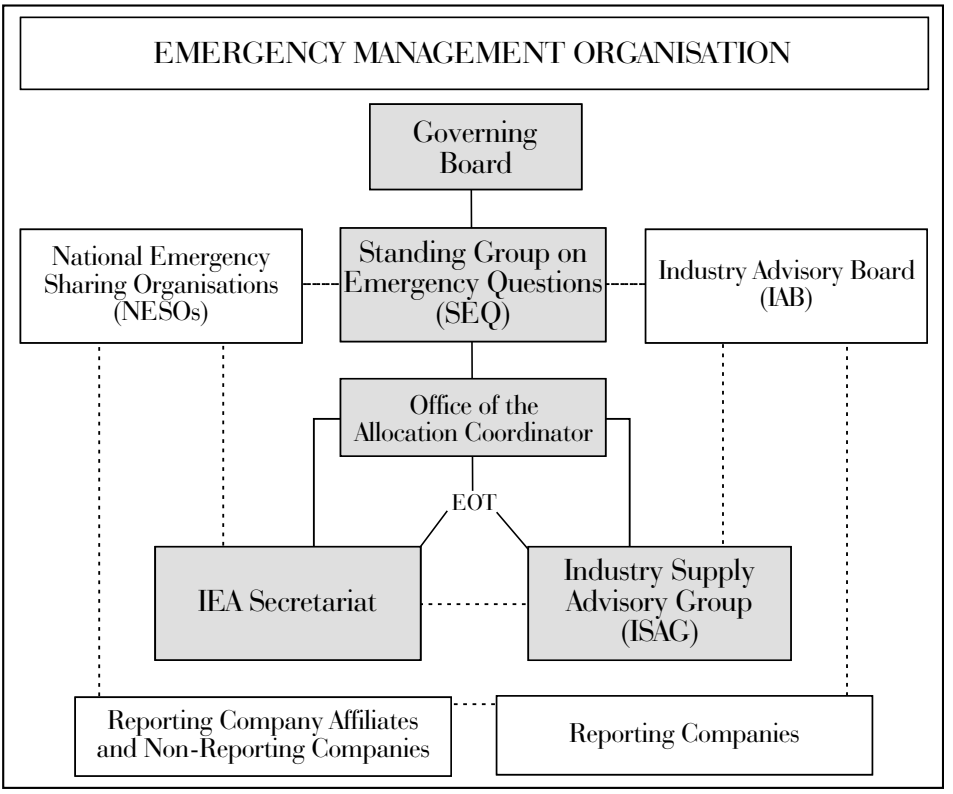
Though there is no formal sanction system, a still effective incentive for compliance is found in the inherent value of the system to Agency countries. So long as the I.E.P. Agreement provides a viable system of protection, the Members are likely to respect their obligations. Serious failures of performance by one or more countries would doubtless bring a weakening of resolve and possibly failure of performance by the others. A powerful sanction is thus the possible cost of a full break-down of the Sharing System. That would almost certainly mean an increase in the Members' vulnerability to external situations, including political developments beyond the control of industrial countries, returning them to the crisis management vacuum experienced during the 1973-74 crisis. In the worst case the Agency might be so weakened by inaction that continuing co-operation in other sectors of the Agency could be impaired, with adverse effect on Members' vital interests in oil market information systems, in long-term policy, in research and development, and in international energy relations, conducted in the IEA or under its auspices. Members thus have a clear overall interest in ensuring that their obligations under the Emergency Sharing System are fully carried out.

5. Operations

(a) Operation of the Sharing System

In the operation of the Sharing System, the available oil supplies subject to Members' commitments under the Agreement are physically redirected as

required to match each member's supply right in order to realize the Agency's objective of an equitable distribution during the supply disruption. Despite the Sharing System's elaborate timing arrangements mentioned above, it can be expected that from the beginning of a crisis, the System would be operated as far as possible provisionally or on an *ad hoc*, pragmatic basis by the Secretariat, the co-operating oil companies and Member governments. Once the trigger finding has been made and the confirmation proceedings under Article 19 are complete, however, the Sharing System enters formally into operation. Institutionally, the function of managing and operating the Sharing System is then conferred upon the Emergency Management Organisation, constituted as follows:



Each of these elements in the Emergency Management Organisation is described in the EMM, Section 1.2.1, where the above diagram appears. Most are described briefly in Volume I of the *History* [the Governing Board (p. 157), the Standing Group on Emergency Questions (SEQ) (p. 230), the Industry Advisory Board (IAB) (p. 220), and also Section 7 below], but several need further identification in this context. In the case of a crisis, the Allocation

Co-ordinator is the IEA Executive Director, responsible for the supervision and guidance of the allocation process. The National Emergency Sharing Organisation (NESO) of each Member provides information, organizes national oil sharing, and conducts the necessary liaison. The Industry Supply Advisory Group (ISAG) is an *ad hoc* group of the IAB. Under the guidance of the Allocation Co-ordinator, ISAG provides expertise on emergency supply matters and communicates with co-operating companies on voluntary offers and other matters. The Emergency Operations Team (EOT) is comprised of the Allocation Co-ordinator, the IEA Secretariat, and the ISAG; they are expected to function at the IEA's Paris offices throughout a crisis. The Reporting Companies (RCs) are the co-operating oil companies operating in Member countries; they advise, consult, and co-operate with the Agency. They also supply Questionnaire data and make voluntary offers to reallocate oil. The Reporting Company Affiliates transmit data and co-operate with the IEA, not directly but through their respective Reporting Company headquarters. Non-Reporting Companies do the same through their respective NESOs.

These are the main allocation actors. Their overall function in allocation is to provide information, to develop solutions to the problems of balancing supply rights with the available oil, and to see that those solutions are converted into oil supply actions that bring about the necessary reallocation. For the IEA much of the incoming information is provided by Reporting Companies in Questionnaire A submissions and by Members in Questionnaire B submissions [See Section 6 below]. The solutions to allocation problems are developed by all of the participants described above, but especially by the Allocation Co-ordinator, the Secretariat, the ISAG, and the Reporting Companies. The supply actions are of three types, which may be taken simultaneously:

> TYPE 1: Reporting and other companies "will voluntarily and independently of any requests by the IEA" re-arrange their own supply, including commercial transactions, in response to the emergency situation, taking into account Members' allocation rights and allocation obligations as they are informed of them by the IEA.
>
> TYPE 2: Companies will voluntarily re-arrange supplies and develop possible supply transactions with other companies in response to a specific request by the Emergency Operations Team, to assist in meeting Members' calculated supply rights, i.e.

to balance allocation rights and obligations including the removal of significant product imbalances. The Allocation Co-ordinator must approve Type 2 transactions before they are implemented.

TYPE 3: If, in spite of the best voluntary efforts of the industry, additional actions to meet countries' supply rights are required, Members acting together through the SEQ will establish what further measures are required and how they will be implemented. This might include "direct instructions from individual governments to companies".

While these actions need not be taken in the order in which they appear above, and while the Agency would expect Type 1 actions to be taken continuously without direct IEA requests but in the knowledge of the needs developed in the Sharing System, Type 2 Voluntary Offers would be solicited by the Agency when Type 1 actions are insufficient. Voluntary Offers would come in a number of different forms. They could be in "Closed-Loop" form, where the supplier and receiver of oil have arranged the transaction (in either of two ways, as between affiliates of the same company or as between two non-affiliated companies) in advance of the submission of the offer. When a transaction has not been "Closed" or matched ahead of time, the companies supply "Open" Voluntary Offers, either a Supply Offer or a Receive Offer, and it is a function of the ISAG to find a suitable match of the Offers for the Allocation Co-ordinator's approval. In 1986 the Governing Board modified the operational arrangements for handling Closed-Loop Voluntary Offers, to lengthen the period of time for the submission of such offers, in what became known as the "Wider Window" concept, and to accelerate IEA processing and approval. The purpose of this arrangement was to reduce antitrust risks [See Section 7 below] and to encourage companies to make as many Offers of this type as possible and as early as possible. Instead of a brief period for these Offers to be submitted to the Allocation Co-ordinator and to be approved (or not), the "Wider Window" concept allows the Offers to be made and to reflect IEA allocation needs at almost any time during the monthly allocation cycle [See IEA/GB(86)31(1st Revision), Item 2(d)(ii)]. The allocation process moves in successive monthly cycles until the disruption is resolved and the System may be deactivated.

One question which falls across all types of emergency transactions is the determination of the *price* to be paid for allocated oil. The I.E.P. Agreement anticipated this question by the basic but not fully developed price provision in Article 10.1:

> The objectives of the Program shall include ensuring fair treatment for all Participating Countries and basing the price for allocated oil on the price conditions prevailing for comparable commercial transactions.

Prices are likely to be volatile in an emergency, as they had been during the 1973-1974 crisis, but the standard had essentially to be either market price (with its volatility) or some sort of managed price system. Both notions have been cited when price questions have been considered. The fact that oil prices were being quite deliberately and openly managed by the oil producers' organization did not simplify the problem. The Governing Board's first formulation of more detailed rules provided for continuity in governments' price policies, for the emergency not to result in higher prices or abnormal profits, for similar prices to affiliates and to non-affiliates, and for term rather than spot prices [See EMM, 4th Ed. 1982, p. 20]. As experience was gained through the Systems Tests or other developments, the managed price flavour of parts of this formulation did not sit well with many governments and oil companies. In the early 1980s there began a movement, initiated by the Industry Advisory Board (IAB), to revise the price formula to give greater weight to market prices, in part also because it became increasingly difficult to imagine that oil would flow under voluntary IEA allocation actions at lower prices than might be applied in fully free market transactions directing the oil to other destinations. In 1983 the SEQ and the Governing Board became convinced that the formulation should be changed to provide this:

> the price for allocated oil shall be based on price conditions prevailing for comparable commercial transactions; comparable transactions do not exclude any types of transactions in the market.

Moreover, the earlier references to "abnormal profits" and losses and to "term prices not spot prices" were deleted [see the 1983 amendments in IEA/GB(83)69, Item 2(b) and Annex I; and Corrigendum]. The most clearly market oriented concept was adopted by the Board in October, 1994 when the formulation was reduced to two clear statements:

> With regard to pricing policies of companies and governments, the following principles apply to oil trading in an emergency:

- governments have autonomy in price policies, and retain their right to continuity in these policies with due regard to Article 10.1 of the IEP;
- the price for allocated oil shall be based on price conditions prevailing for comparable commercial transactions and shall be negotiated by the parties involved [See EMM, 5th Ed. 1994, Section 4.4.7].

The operation of the Sharing System proceeds in an orderly fashion step-by-step. Provision is made in the EMM [5th Ed.1994, Section 3] for a series of ten basic Sharing System steps which can only be summarized briefly here. In Step I, the Secretariat communicates the allocation rights and obligations to the Allocation Co-ordinator and to the ISAG. In Step 2 the corresponding advice is given to the Reporting Companies and to the Members. Voluntary offers are then received by the Emergency Operations Team (Step 3). These offers are evaluated by the Team (Step 4) before selected offers are approved by the Allocation Co-ordinator (Step 5) for implementation. The Offering Company or NESO reports on the implementation of the approved offer (Step 6); the ISAG consults with the Allocation Co-ordinator on any further action which might be required, by reason of non-implemented offers or other reasons; and the ISAG advises the Companies and NESOs as necessary to ensure the fullest exploitation of the voluntary offer potential of the situation (Step 7). In Step 8, if no substantial discrepancies remain, ISAG reports the situation to the Allocation Co-ordinator, who in turn reports the SEQ, to draw the cycle of actions to a close. If substantial discrepancies do remain and cannot be resolved by further voluntary offers or in future cycles, then following the ISAG's report to the Allocation Co-ordinator, the SEQ is informed, and if the SEQ so requests, the Allocation Co-ordinator consults the IAB on ways to resolve the discrepancies. If this does not lead to the resolution of the discrepancies on a voluntary basis, the Allocation Co-ordinator so advises the SEQ (Step 9), and the process moves to possible compulsory action under Step 10. In Step 10 there is provision for considering the companies' reasons for declining to undertake on a voluntary basis the suggested corrective actions and for intergovernmental consultations to resolve the discrepancy. If in spite of this consultation, the SEQ still considers that there is need for corrective action and that this can be done only by direct instructions from governments to the companies, then the governments concerned must instruct the responsible companies as to the disposition of oil under the I.E.P. Agreement. This determination by the SEQ is legally binding upon the governments concerned [See Volume I, p. 213]. At the end of this ten step procedure,

and after the needed number of successive allocation cycles is completed, the allocation process is concluded and the Sharing System may be deactivated and shut down.

This description of the operation of the Sharing System requires reference to the legislative authority of Members to take the necessary commitments and actions. When the IEA was established in 1974, not all Members had in place the necessary legislative measures to enable their governments to take all the actions which they might be called upon to take under the Sharing System. Before giving their consent to be bound by the I.E.P. Agreement. Members had to hold the legislative authority to take all of these actions, and all eventually did so. In a number of cases, measures geared directly to the IEA were adopted. Members report periodically on the readiness of their legislative measures under the Agreement and specifically under the Sharing System. These reports have been summarized in IEA documents, the most recent being the "Draft Summary of Energy Emergency Legislation of IEA Countries" [IEA/SEQ(89)25(1st Revision)] and "Member Countries' Legislation, Administrative Procedures and Policy Attitudes Concerning the Use of Stocks in Supply Disruptions" [IEA/GB(89)26(2nd Revision)]. The effect of the I.E.P. Agreement in the national law of IEA Members is discussed in Volume I, Chapter III, Section B.

(b) European Communities (EU)

The extensive co-operative relations between the IEA and the European Communities are described in Volume I, Chapter IV, Section D-3, where it is noted that the European Commission participated in the general preparatory work and in developing, refining, and testing the Emergency Sharing System over the years. The Commission is regularly represented in the Governing Board on emergency and other questions as well as in the Standing Group on Emergency Questions which bears a principal responsibility in this sector. The Commission has adopted two decisions granting oil companies a necessary exemption from the competition rules of Article 85 of the Treaty of Rome [See Section 7(c) below]. Commission representatives have met regularly with the IEA's oil Industry Advisory Board, have participated in the Agency's tests of the Sharing System [See Section F below], and have contributed to the development of the Dispute Settlement Centre [See Section B-8 below].

Perhaps the closest co-operation between the two institutions has taken place in connection with the so-called "interface" between the IEA and EU oil emergency systems. There are links to be made in the decision making,

political monitoring, and crisis management structures of the two institutions, as well as in their approaches to crisis operations, industry assistance, stockholding rules, demand restraint, data sources, trigger calculation, allocation concepts (total energy sharing concepts in the EU, and oil sharing concepts in the (IEA), and a number of technical elements. In the late 1970s, it became clear that there was nevertheless a great deal of potential overlap, and that a means should be developed for the two systems to operate together, despite the fact that one EU Member, France, was not then a Member of the IEA. The IEA had the data system and industry co-operation mechanisms which might be put to use for both the EU system and the IEA to avoid unnecessary duplications and costs. Hence the stage was set for an "interface" arrangement which the Governing Board adopted on 13-14 March 1980 [IEA/GB(80)21, Item 10; IEA/GB(80)27] in the form of amendments to the EMM [The current text is found in the EMM, 5th Ed.1994, Section 2.2.10].

The interface applies to the IEA Emergency Sharing System (not to the CERM or other response measures) on the IEA side, and to the "Phase II" sharing system on the EU side. The interface involves essentially a recomputation of the EU Members' supply rights, as well as their allocation rights and obligations, after adjustment among the EU countries on the basis of the EU concepts. It can also accommodate within the EU group an EU Member State which is not a Member of the IEA, such as France until 1992. At the time of writing there are no countries in that particular situation.

(c) Non-Member Countries

Although the IEA has not entered into any co-operative relations with non-Members on the application of the Sharing System, there are provisions in the I.E.P. Agreement which establish IEA policy on certain interests of non-Member countries. Thus Article 11.1 of the I.E.P. Agreement makes it clear that "It is not an objective of the Program to seek to increase, in an emergency, the share of world oil supply that the group had under normal market conditions". This means simply that no advantage would be taken of opportunities of the IEA group to receive proportionately more oil than they had before the crisis, and the non-Members as a group would not suffer at the hands of IEA countries. Article 11.1 goes still further in stating as well that "Historical oil trade patterns should be preserved as far as is reasonable, and due account should be taken of the position of individual non-participating countries". Thus traditional trade patterns would not

become IEA targets. These patterns could be adjusted if necessary, or if adjustment would be reasonable under all of the circumstances, but otherwise they would not be disturbed. The position of individual non-Members would have to be taken into account by the Agency in the absence of compelling reasons for making this impossible or impracticable. While the Governing Board has been empowered to make decisions on these questions, up to the present the Board has not had occasion to adopt concrete measures of this sort. However, the Board has been attentive to the oil supply problems of non-Members, not in relation to their possible participation in the Sharing System, but in relation to the possibility of their benefiting from the IEA's experience in this sector. Thus in 1993, "given the increasing importance of non-Member countries in international oil markets", IEA Ministers asked "the IEA to make available its expertise in emergency response strategies to appropriate non-Member countries [IEA/GB(93)41, paragraph 7]; this is occurring on a bilateral basis with prospective new Members of the IEA, and on a multilateral basis with many non-Members, as in the Kagoshima Workshop discussed in Section B-I above.

From the time of the founding of the IEA, the Member countries have kept under consideration the needs of non-Members in times of oil supply disruptions. There is nothing in the Sharing System to prevent Members in such times from exporting oil to non-Members, whether or not the Sharing System is activated. Nor does the I.E.P. Agreement restrain Members from entering into bilateral agreements with non-Members to export oil to them, even agreements which might provide for the amounts of such exports to be calculated in accordance with Sharing System principles. At the time of the second oil shock, the United States, for example, entered into such agreements with Israel which provide for the supply of oil by the United States to Israel [See the Memorandum of Agreement (MOA) of 26 March 1979, 30 U.S.T. p. 5989, T.I.A.S. No. 9533, U.N.T.S. No. 19923, Vol. 1234, p. 221 and the Contingency Implementing Arrangement of 17 October 1980, 32 U.S.T. p. 3667, T.I.A.S. No. 9908, U.N.T.S. No. 19923, Vol. 1266, p. 370]. Section (b) of the Annex to the MOA provides that if the oil needed to meet normal requirements for domestic production is unavailable to Israel, under stated conditions

> the United States Government will promptly make oil available for purchase by Israel in accordance with the International Energy Agency Conservation and allocation formula, as applied by the United States Government, in order to meet Israel's *essential* requirements [Emphasis added],

and pursuant to the Contingency Arrangement,

> Should the IEA General Trigger emergency procedures be activated the U.S. Government would make oil available for purchase by Israel in accordance with the IEA General Allocation formula [Paragraph 6].

Since the IEA Sharing System has not been activated to the time of writing, there has not been an occasion foregoing provisions of the arrangements between the United States and Israel to be applied.

6. Information Systems

The Agency's work in the emergency response sector, as well as the general operations of the IEA, are supported by legal commitments on the establishment and operation of the Agency's Information System as provided in Chapter V of the Agreement. The "General Section" of this Information System. Concerned with information about the operation of the international oil market and activities of the oil companies, is established under Article 25.1 of the Agreement [See Chapter VI below]. Separate provision is also made for the so-called "Special Section" devoted to the efficient operation of the Emergency Sharing System. Both Sections of the IEA Information System are operated on a permanent basis under the responsibility of the Secretariat. As will be seen below, some elements of the Special Section concerning particularly sensitive information are activated only in connection with actual or expected oil supply disruptions.

The Special Section provisions obligate Members to make available to the Secretariat "all information which is necessary to ensure the efficient operation of emergency measures" [Article 32]. Each Member agrees to "take appropriate measures to ensure that all oil companies operating within its jurisdiction make such information available to it as is necessary to enable it to fulfil its obligations" under the Special Section. On the basis of this information and other sources of information, the Secretariat is required to survey continuously the supply and consumption of oil within the IEA group and within each Member country.

Article 33 lists the subjects on which Members are to provide information, as follows:

- oil consumption and supply,
- demand restraint measures,

- levels of emergency reserves,

as well as relevant aspects of transportation, international levels of supply and demand, and other subjects as decided by the Governing Board. Under Article 34, the Standing Group on Emergency Questions (SEQ) identifies "the precise data within the list of subjects in Article 33 which are required under the Special Section". In preparing its reports on this subject, the SEQ consults with oil companies and works out precise standards of harmonization and procedure to ensure confidentiality [Article 35]; the decisions on this information system are made by the Governing Board, and the SEQ is charged with the responsibility for reviewing the operation of the system on a continuing basis and to report on its reviews. The Governing Board again has the power of decision on proposals concerning the emergency information system. The Board's decisions on the more precise data requirements for the efficient operation of the Sharing System and other major data system decisions are indicated in the EMM, 5th Ed. 1994, Section 1.2.6.

Over the years, the data system has been developed by the SEQ and the Secretariat, with the advice of the oil industry. The data consists of the following:

- Monthly historical oil supply and demand used in key emergency calculations; this data is collected from Members on the Monthly Oil Statistics Questionnaire.
- Quarterly IEA world oil supply and demand forecasts, prepared by the Secretariat from data provided voluntarily by some oil companies and governments, for preparation of the SEQ Quarterly Oil Forecast which is used to establish "Disrupted supplies" in the trigger calculation described above.
- Monthly emergency oil supply data (Questionnaires A and B, discussed below).
- Demand restraint, stockdraw, and other information supplied by the NESOs to the Secretariat during a crisis.
- Advice received from Reporting Companies and the IAB.
- Supplementary information available to the IEA, including the IEA monthly *Oil Market Report*.

In responding to the problems of the 1979-1981 crisis, the Governing Board initiated another system (called Questionnaire C), which was intended to provide more detailed and extensive data than that which had been available in non-emergency periods, and to give the Agency a better

understanding of pre-emergency supply conditions [this was part of the 1981 Decision on Preparations for Future Supply Disruptions, IEA/GB(81)86, Item 2(b) and Annex I, paragraph 2 and Attachment; see Section C-2 below]. It called for Members to provide three months of data centered upon the reporting month, with the third month therefore being a forecast. Questionnaire C was employed for over a decade, but the usefulness of the transmitted data did not live up to expectations. After careful review and attempts to correct the situation, in December 1993 the Governing Board approved the SEQ's recommendation to discontinue Questionnaire C [IEA/GB(93)65, Item 5(b); IEA/GB(93)61].

Questionnaires A (QuA) and B (QuB) have, however, proven to be quite useful and successful. When activated during an emergency, they provide month-to-month data on the current and scheduled oil supplies to and from Members. Questionnaire A information is provided by each of the Reporting Companies, while Questionnaire B information is provided by each Member's NESO (and covers its non-Reporting companies as well). The data supplied under Questionnaires A and B include:

- Indigenous production of crude oil and natural gas liquids (NGLs).
- Imports of crude oil and products.
- Exports of crude oil and products.
- Closing stock levels and stock changes.
- Stock levels and changes by category.
- Stocks held for other countries and stocks held abroad.
- Stocks at sea.

Each of the Questionnaires covers a five month period, including the current month in which the Questionnaire in submitted, the two previous months, and two forward months. Data for the future months consists of realistic assessments of the IEA countries' oil supplies, including scheduled movements which are expected to take place.

This QuA/QuB data is essential to the monitoring and assessment of the supply situation, to the trigger determinations, to the calculation of country supply rights, allocation rights and obligations, and to the implementation of allocation procedures. Reallocation of oil to balance allocation rights and allocation obligations is not possible without such operational data. The EMM [5th Ed. 1994, Section 1.2.6] concludes on this point that "The questionnaires have been designed to obtain detailed data on as large a proportion of oil supplies as possible within the limits of practicability".

Since the preparation of the Questionnaires represents a sizeable responsibility for the co-operating oil companies and for Members, the triggering of the information gathering process through the Questionnaires is not automatic. The Executive Director has been authorized to activate the Questionnaires, and indeed did so during the 1979-1981 crisis and in the Gulf crisis in 1990. In the early EMM, the Executive Director was authorised, after consulting the Chairman of the SEQ and contacting Member governments, to "request" the submissions of the Questionnaires "if developments in the international oil supply situation call for a more detailed monitoring through the Agency" [See EMM, 4th Ed. 1982, pp. 15-16; EMM, 5th Ed. 1994, Section 1.2.6]. Once the Questionnaires were activated in the 1979 crisis, the Governing Board agreed to continue the submissions in October 1979 [IEA/GB (79)64, Item 2(h)], in December 1980 [IEA/GB(80)97, Item 2(g)(v) and Annex I, Paragraph 2], and in March 1981 [IEA/GB (81)21, Item 2(d) and Annex]. In the 1981 Governing Board Decision on "Preparation for Future Supply Disruptions" [See Section C-2 below], the following formula was adopted in paragraph 2(d):

> In the event of a supply disruption, the Executive Director may also decide (after consultation with the Chairmen of the SEQ, the SOM and the Governing Board and contact with Member governments) to activate submission of Questionnaires A and B, consistent with procedures established for the emergency allocation system.

The most recent activation of the Questionnaires occurred during the 1990-1991 Gulf crisis. Following completion of the foreseen consultations at the beginning of the crisis, the Executive Director activated the Questionnaires, and the Governing Board on 9 August 1990 "noted" and thus approved this action [See IEA/GB(90)24, Item 2 Annex; see Section E below]. In this instance of the emergency data system in action (this was not merely a test, which imposes a number of artificial conditions), the QuA/QuB emergency data system proved to be quite successful. The Gulf crisis confirmed that the continued readiness of the emergency data system is indispensable to the effective operation of the Emergency Sharing System overall.

In 1994 the Governing Board confirmed the Executive Director's authority to request the submission of emergency data and introduced an element of flexibility. This decision is contained in the 1994 Emergency Management Manual as follows:

> The Executive Director may, after consultation with the Chairman of the SEQ and contact with Participating Countries, request of RCs [Reporting Companies] and Participating Countries to submit questionnaires A and B or, in situations which do not require the full submission, may introduce a reduced or limited form of Questionnaires A and B or introduce the questionnaires in a staged manner. Submissions will be requested periodically for test purposes [EMM, 5th Ed. 1994, Section 1.2.6].

7. Co-operation with the Oil Industry

(a) Oil Company Co-operation

As is evident from the foregoing discussion, the IEA depends heavily upon the assistance which the oil industry provides directly to the Agency. In quiet times as well as during periods of oil supply emergencies, the co-operation of oil companies is essential to the development and operation of the Emergency Sharing System.

The governments of the major oil consumer countries learned during the 1973-1974 oil crisis that they were dependent upon oil companies for assistance with respect to oil supply emergencies because the companies alone had:

- The information on oil imports, exports, indigenous production, inventories, etc., which would be necessary to make an allocation system function properly in an emergency.
- The oil industry expertise necessary to design in detail a workable system of allocation in the complex oil market serving consuming countries.
- The knowledge of the industry and markets necessary to advise the Secretariat, when making the emergency "finding", about the actual state of the oil supply situation and the appropriateness of the measures which might be taken.
- The expertise to operate an international allocation system and to advise on particular movements of oil that would become necessary in the course of allocation.
- Control over a large part of the oil itself as well as the relevant transport, refining, and distribution systems.

Industry co-operation largely on a voluntary basis has been established, upon the invitation of IEA governments, with respect to each of the foregoing elements. The group of co-operating oil companies, which now consists of about forty companies covering an estimated seventy per cent of the international oil supply, provides data in normal times to IEA governments for compilation and transmission monthly to the IEA. The governments, in turn, will supply to the Agency data received from these and other companies operating within their territories. In times of supply disruption, the companies will supply data directly to the Agency and to the governments. By these channels the Agency will receive confidential and proprietary data concerning consumption, supply movements, indigenous production, and stocks necessary for the operation of the Sharing System. General advice on the design of the Sharing System and related matters is provided to the IEA regularly by the Industry Advisory Board (IAB). The IAB has systematically aided the Agency in developing the mechanics of allocation.

The Industry Supply Advisory Group (ISAG) provides the industry operational assistance in the course of an emergency. The ISAG oil company supply experts provide operational and technical expertise to the IEA in Paris to operate the sharing system under IEA direction. They retain their status as company employees but are solely responsible to the IEA while carrying out their ISAG functions. These functions include analysing data and supply problems, developing voluntary offers of companies to meet allocation rights and allocation obligations, providing advice to the IEA Allocation Co-ordinator on the acceptability of voluntary offers, and monitoring company implementation of approved voluntary offers.

The most visible and important industry functions in the System consists of company supply actions, the execution of IEA approved voluntary offers (Type 2 activity), as well as independent trade operations which may take into account countries' allocation right and obligation information supplied by the Agency (Type 1 activity), and the latter particularly is growing in importance. These company activities ultimately involve the diversion of oil cargoes from destinations in countries with allocation obligations toward destinations in countries with allocation rights. All of the industry functions and supply activities described above are performed on a voluntary basis and may be supplemented by mandatory supply activity (Type 3) as necessary.

(b) Industry Advisory Board (IAB)

Much of the oil industry co-operation described above has been carried out by the IEA Industry Advisory Board, which was established by the

Governing Board for that purpose early in 1975. The IAB membership of nearly twenty companies is drawn from the group of Reporting Countries in a fashion which maintains a balance between major international and other companies, with some degree of rotation of membership. The IAB meets when convened by the IEA, at the level of senior officials of its member companies, and provides advice and operational assistance but not operational decisions, which remain fully in the hands of the IEA itself. The Secretariat participates in IAB meetings, but government Members of the IEA do not, except as may be required under the law of the Member. So far this has resulted in the participation of antitrust monitors, as required by United States law, and EU competition monitors, as required under EU rules. A few members of the IAB meet regularly with SEQ, and when required, as in the 1990-1991 Gulf crisis, the IAB Chairman has participated as an observer in Governing Board meetings during consideration of a matter on which the Board wished to have IAB advice. Effective operation of the Emergency Sharing System depends upon IAB advice, and upon IAB staffing support through the ISAG. The ISAG consists of oil supply experts drawn from the companies; in an emergency, they provide much of the industry expertise for advising the IEA in detail on the operation of the Sharing System. The IAB has been the source of a number of useful Sharing System developments, innovations and improvements over the twenty years that the companies have been co-operating with IEA, and this co-operation has contributed significantly to maintaining the Sharing System as a ready and effective instrument.

(c) U.S. Antitrust Defence and EU Competition Exemption

Antitrust and competition questions about oil supply emergency actions arose during the 1973-1974 crisis before the IEA was established. The oil companies dealt with the crisis as best they could on an individual company basis, but they considered that they could not *co-ordinate* their actions either directly or indirectly. This was because private companies operating in the United States were concerned about possible liability under the antitrust laws of the United States. For companies operating in the European Economic Community the same concerns arose under the competition rules embodied in Article 85 of the Treaty of Rome. These questions immediately reappeared with the creation of the IEA, since the Agency would become itself the centre of co-ordinated efforts to deal with future crises. In the Agency's view, the participation of U.S., European, and other oil companies would be indispensable to the effectiveness and success of the actions which the Agency was preparing to take in future emergencies.

For co-operating oil companies, antitrust questions could arise in relation to a number of expected IEA activities and actions. From the outset, the IEA has needed industry advice on the details of the Sharing System, and it still does on a regular basis. That advice is provided not only by companies acting individually, but also and more systematically by means of the Industry Advisory Board [described above in Section (b)] in essentially a co-ordinated fashion. When the Agency requests oil companies to provide confidential and proprietary information for use in tests of the System, just as it would in an actual emergency, industry personnel participate in the ISAG to advise on specific movements of allocated oil, and companies participate in the redirection of oil under IEA auspices. These company actions raise serious risks of antitrust enforcement litigation on the initiative of governments or of private litigants who may bring actions under U.S. law in civil litigation for treble damages against alleged antitrust violators.

Since these problems were known to the founders of the Agency, it was not altogether unexpected that company representatives found it necessary to delay their participation in some early IEA preparations while the antitrust problems were being resolved in Washington and Brussels. Although the companies were co-operative, they insisted that their governments provide them with protection against antitrust proceedings grounded on actions the IEA or their governments would ask them to take under the Sharing System. The most serious problems arose with respect to the United States and the European Communities.

In the United States these concerns led to the Congressional enactment of an antitrust defence, initially for two years, in the Energy Policy and Conservation Act of 1975 (EPCA) [CCH, Federal Energy Guidelines ¶10,879], which also adopted a number of conditions and restrictions. A Voluntary Agreement and Plan of Action [¶15,845] was thereafter adopted to provide for certain conditions and restrictions that are to be respected if the antitrust defence is to be applicable. Specific provisions describe the types of substantive actions which companies may take, the confidential or proprietary information which may be communicated, the disposition of and access to such information, the requirements for recordkeeping, reporting and monitoring, rules for notice of meetings, and U.S. government monitoring. The U.S. system has at times proved to be burdensome to the Agency and companies, and the periodic need for renewal of the antitrust defence provisions has caused a brief hiatus in coverage and longer periods of uncertainty. The time limits requiring renewal every few years give rise to recurring concerns about the expiration of this legislative protection at times

when the defence would be necessary to IEA operations. Such concerns were raised in the midst of the gulf crisis in 1990-1991, but fortunately the renewal legislation came into force before the scheduled expiration date.

The risk of company liability under the EU rules of competition, particularly under Article 85 of the Treaty of Rome, also brought calls for relief. In 1976 the Agency received a "light negative clearance letter" from Mr. Schlieder, Director General for Competition of the Commission [See IEA/SEQ (76)27], declaring in effect that the contemplated company actions with the IEA "are not in themselves incompatible with the rules of competition of the Treaty" so long as these actions also complied with a number of conditions and restrictions. This served the companies well until the early 1980s when it began to appear that the letter, which became known as the "Schlieder letter", might not fully protect companies in litigation initiated by Member States or by private litigants. In order to strengthen their protection, a number of companies initiated a proceeding under Article 85(3) of the Treaty for an exemption decision, which was granted by the Commission on 12 December 1983 for a ten year period [See IEA/SEQ (84)62], also with conditions and restrictions. That Decision was in turn extended by the Commission on 21 February 1994 for a further period of ten years [See 94/153/EC, O.J.E.C., No. L 68/35, 11 March 1994].

The IEA has fully understood and has consistently supported the companies in their efforts to remove or reduce the hazards associated with antitrust and competition rules which might otherwise interfere with the smooth operation of the Sharing System, because the IEA has continued to need the co-operation of the oil companies as an essential support for the development, testing, and operation of the Sharing System.

8. Resolution of Differences and Disputes

The modalities for settling differences which might arise under the Emergency Sharing System were not foremost among the Members' concerns in November 1974 when the Agency was established. Their primary concern was the resolution of the industrial countries' problems with practical and immediate issue of energy policy, with short and long-term response to the "energy crisis". Thus, it is not surprising that specific dispute settlement procedures were omitted from the I.E.P. Agreement. Nor were they discussed as such at any length in the preparatory work on the Agreement. While a number of Agreement provisions was designed to help shape the resolution of *policy* disagreements within the Agency, there was no specific provision for the resolution of disputes of a legal nature, such as questions of interpretation

of the Agreement, competence of the various IEA bodies, the validity of the innovative actions to be taken by the Secretariat, and compliance by governments with their new I.E.P. obligations, or disputes which might arise between the co-operating oil companies and the Agency or governments or other companies.

The sense of the Energy Co-ordinating Group was that legal as well as political disagreements among the various participants would have to be resolved in accordance with the future decisions of the Governing Board, which is the senior decision-making body of the Agency. Such questions as whether the Governing Board's actions concerning disputes would be taken case-by-case or whether the Board would establish separate mechanisms for dispute resolution were not explicitly addressed. Nor would it have been feasible for the founders to write into the I.E.P. Agreement a comprehensive dispute settlement mechanism while there was clearly a more urgent need to proceed with broader questions of policy. Furthermore, it would have been difficult at that early date to make a thorough analysis of the kinds of disputes which might arise under the Emergency Sharing system and it would have been quite impossible to foresee the nature of disputes in those sectors which would be developed only after the Agency had become fully operational.

One can surmise that in the operation of the Sharing System, disputes could arise out of any of the oil company activities described above in Sections 5 and 6, particularly out of supply actions taken by the companies, whether voluntary or mandatory. In some cases, the supply actions may require companies to terminate existing commercial arrangements and to enter into new ones, with some degree of political as well as commercial risk. Disputes could also arise out of the application of rules governing competition under the Treaty of Rome, the antitrust laws of the United States, and similar measures in other countries. Most disputes would be expected to be resolved through discussion, negotiation, and agreement among the parties, or through such mediation and conciliation procedures as the parties might adopt. There could well remain, however, other disputes for which some form of arbitral or legal proceeding would be the most appropriate or the only effective means of settlement.

In the absence of a specified dispute resolution procedure, the Agency itself could help resolve disputes, but the Agency is not well-placed from a juridical or practical standpoint to impose settlements on oil companies. Theoretically the relevant I.E.P. Agreement provisions and Governing Board decisions could have been made directly applicable to oil companies, which was not done. None of the I.E.P. Agreement provisions concerning oil companies is directly addressed to them. Under Article 52.1, Governing

Board decisions are explicitly made binding on Members but not upon oil companies. Since the Agency's relationship with the companies is one of voluntary co-operation except insofar as they may be compelled to act under national legislation or by agreement, it is clear that the I.E.P. Agreement was not intended to apply directly to the oil companies. The I.E.P. and Governing Board texts have created a high expectation of company co-operation, but there is no international legal or contractual obligation for the companies to participate either in the Sharing System or in dispute settlement procedures or to abide by any settlements developed in the IEA except by voluntary agreement. The companies co-operating with the IEA found that the costly and lengthy remedies available under national legal systems are not fully satisfactory for disputes which might arise under the Sharing System.

There was accordingly a case to be made for creating a specialized dispute settlement mechanism to which the parties to a dispute could turn, if they so choose, for resolution of IEA related disputes. The availability of such a mechanism would make it easier for oil companies to make Type 1 and Type 2 voluntary supply arrangements [See Section 5 above] in the allocation process. It could be particularly important in Type 3 mandated actions, where companies might not have at their disposal the options available to them in normal commercial transactions. Hence early in the life of the IEA, the co-operating companies proposed that an alternative and specialized dispute settlement mechanism be established under the auspices of the Agency.

The oil industry group's initial suggestions to the Agency concerned the special risks companies might incur in taking supply actions under the Sharing System, especially in respect to mandatory (Type 3) supply actions because company compliance directives could bring the company into conflict with non-IEA governments, private commercial partners, or both. There were also suggestions that the Agency adopt procedures for the resolution of disputes arising under the I.E.P. Agreement involving a broad category of parties, including disputes between (1) two or more companies, (2) co-operating companies and Member countries, and (3) two or more Member countries (although suggestions focused particularly on disputes among companies, and between companies and governments). A broad subject matter jurisdiction was also foreseen.

Early in 1977, the Industry Advisory Board developed a systematic proposal for the Dispute Settlement Centre modelled after the World Bank's International Centre for Settlement of Investment Disputes. These initial suggestions of the oil companies did not attract full support within the Agency. Although the Governing Board found no difficulty in adopting the suggestion that it should consider the potential impact upon the companies

concerned before taking a mandatory supply action, Members could not accept liability for such costs or the establishment of a dispute resolution system with jurisdiction over such claims against Members.

The IEA Dispute Settlement Centre (DSC) was established by the Governing Board on 23 July 1980 on the basis of modified IAB proposals, made after extensive consultations with governments, oil companies, the Secretariat, and the SEQ [See text in IEA/GB(80)56, Item 8 and Annex; 20 I.L.M. 241 (1981)]. As finally presented, the modified proposals were designed principally to meet industry concerns about the resolution of commercial-type disputes which might arise out of the application of the Sharing System. Commercial-type disputes could arise from the termination of existing supply contracts in some cases, the rapid conclusion of new contracts, or commercial situations where buyers and sellers might deal with new and unfamiliar partners and where questions of the buyer's credit worthiness might arise, all occurring under strong pressures for rapid action in the course of an emergency. Under these circumstances, disputes of a commercial nature might raise issues such as price, liability, damages for failure of delivery or untimely delivery, responsibility for freight, insurance, port and demurrage costs, responsibility for costs of vessel diversion, breach of contract, and so forth.

While arbitration for commercial disputes may be obtained under systems and facilities available in Paris, Stockholm, London or New York, there are a number of advantages to be found in specialized arbitration conducted under the auspices of the Agency. The particular advantages of the Centre include the availability of an expert panel of arbitrators with specialized experience IEA matters, a greater uniformity and continuity of decision, the promise of greater speed, and the availability of IEA facilities and support staff. The IEA system is also less expensive than other alternatives. Overall, the DSC provides a rapid, coherent, and reliable system of arbitration specifically designed to meet the needs of the co-operating oil companies.

The jurisdiction of the Centre and tribunals has been necessarily restricted to a relatively narrow category of disputes. The subject matter jurisdiction of the Centre is provided in Article II(a) of the Charter of the International Energy Agency Dispute Settlement Centre, which provides as follows:

> The jurisdiction of Arbitration Tribunals convened pursuant to the Charter extends to any dispute between a seller and a buyer of oil, or between the parties to an exchange of oil arising

> out of an oil supply transaction during implementation of the emergency allocation of oil and under the International Energy Program and as between the parities to a particular supply transaction but not to decisions or right or obligations of I.E.A. Countries under the International Energy Program, including allocation rights and allocations obligations of I.E.A. Countries.

The parties to disputes remain fully free to pursue other means of dispute resolution before they enter into a DSC arbitration, and even then and at any later time they remain free to agree upon other procedures or to terminate their DSC arbitration. Jurisdiction of DSC arbitration tribunals is limited to disputes where the parties to the arbitration have *consented in writing* to arbitration pursuant to the Charter. Consents to arbitration are made in much the same way that they are made in systems of private arbitration. One exception foreseen under the DSC in the establishment of a special inducement for a party to accept arbitration in Type 3 mandated oil supply actions. The idea is that a government issuing the supply order might authorize the supplier to require the other parties to the transaction to accept Dispute Settlement Centre or other means of dispute settlement, and in that case the supplier would be free to do so, which could make the mandatory transaction more acceptable.

Institutionally, the Centre is organized on a standby basis, ready to be activated when the Emergency Sharing System is operating and if disputes arise. The parties to a dispute may choose the arbitrators either from the DSG Panel of Arbitrators or from outside of the Panel. The DSC Panel of Arbitrators has been selected in advance and is maintained in place. The responsibility for operating the Centre is assigned to the IEA Secretariat. No arbitrations have yet been conducted by the Centre because its jurisdiction extends only to cases arising out of the Emergency Sharing System and the activation of that System has so far not been necessary. There is always a possibility that the jurisdiction provisions of the DSC Charter could be amended to extend the jurisdiction of Tribunals to additional categories of disputes. Suggestions in the 1980s that DSC arbitration might be used to fix the price of allocated oil in transactions during a period of activation of the Sharing System have not been pursued. Although there has been no modification of the DSC rules since the Centre was established in 1980, the DSC could be adapted or further developed by the Governing Board to satisfy additional dispute settlement requirements of the Agency.

C. The 1979-1981 Oil Supply Disruption

1. IEA Response

Since the founding of the IEA in 1974, there have been two oil supply crises which raised questions about whether the loss of supplies might be sufficient to trigger the Emergency Sharing System and, if not, what other responses might be appropriate: (1) the 1979-1981 crisis arising out of the Iranian Revolution and the Iraq-Iran War, and (2) the Gulf crisis of 1990-1991 [See Sections C and E below]. In neither of these crises was the loss of supplies sufficient to trigger the Sharing System although in 1979-1981 the selective trigger might have been reached because of the temporary short supply of individual countries (but not the general trigger for the group as a whole). In the case of the Gulf crisis the threshold of 7 per cent actual or expected shortfall for individual countries or for the group was not reached. The 1979-1981 crisis caused severe economic damage to IEA countries. It also stimulated for the first time the adoption of alternative response measures in situation where the Sharing System trigger level was not reached, and it later brought about a far-ranging reform movement in the IEA, leading to greater awareness of the possibilities of employing oil stocks and demand restraint and to the adoption of procedural changes designed to enable the Agency to respond more rapidly and flexibly to future oil supply disruptions.

During the five years following the first oil crisis of 1973-1974, the industrial countries adjusted to the resulting "oil shock" and refined the Sharing System on an operational basis. Although Significant measures had been taken to reduce the Members' dependence on imported oil [See Chapter IV below], Members still remained vulnerable to oil supply disruptions, as the 1979-1981 crisis would show. World oil consumption in 1978 (not counting the centrally planned economies) was about 52 million barrels of oil per day, of which some 38 mbd were produced by OPEC countries (i.e. over 70 per cent). As these figures indicate, by 1978 the acute vulnerability seen in the lead-up to the events of 1973-1974 had not been overcome. The main importers were the United States, the European Community countries, and Japan, in that order; the main OPEC exporters were Saudi Arabia, Iran and Iraq. The state of the oil market at the outbreak of the Iranian Revolution, and succeeding oil market development, including changes in supply, deliveries, stocks, and price levels during the 1978-1981 period, are reported and analyzed in detail in Daniel Badger and Robert Belgrave, "Oil Supply and Price: What Went Right in 1980?", *Royal Institute of International Affairs, Energy Paper No. 2, (1982).*

Following months of political and labour unrest in Iran during 1978, with serious interruptions in oil production, Iranian oil exports virtually stopped in December 1978. The IEA Secretariat reported these developments to the responsible government expert bodies of the Agency and to the Governing Board. Though the IEA did not immediately find the need to take responsive measures, that was soon to change. One early question was the need for detailed supply information from oil companies and governments. This information was rapidly called for by the Executive Director, who activated the emergency information system, Questionnaires A and B [See Section B-6 above]. Supply was falling; prices were rising. Largely independent actions were taken by a few countries to permit the drawdown of stocks below the 90-day IEA level, to cease the purchase of strategic stocks, and to persuade buyers to avoid paying the rising spot market prices. By March 1979, the Secretariat's assessment showed that the disruption was serious, not sufficient to trigger the Sharing System for the group, but severe enough for some Members to experience individual reductions above the 7 per cent trigger level.

At its 1-2 March 1979 meeting, the Governing Board adopted the "Action on the Oil Market Situation in 1979" [IEA/GB(79)8. Item 3, Annex III], in which it found that "there exists a serious risk that in 1979 oil supplies could fall short of anticipated oil demand by some 2mb/d". The Board noted uncertainty ahead, exacerbated by the substantial possibility of further deterioration in the situation, and agreed to the objectives of improving the supply/demand balance, of implementing flexible stock policies (while providing an adequate stock level for the following winter), and of relieving the "current abnormal market conditions, with their pressures on prices". In the action part of its decision, the Governing Board.

> (f) agreed that IEA countries will contribute to a stabilization of the world situation by reducing their demand for oil on the world market. *The reduction would be in the order of 2 mb/d which would correspond to about 5% of IEA consumption.* Each Participating Country will regard this as guidance in the policies it will pursue to achieve its contribution to this reduction. These policies are expected to yield equivalent results in Participating Countries [Emphasis added].

The 2 mbd reduction would be achieved by short-term action appropriate to each country's circumstances and as determined by each including

reduced demand for oil (more efficiency, avoidance of energy consumption not essential for maintaining high-level economic activity, and short-term fuel switching away from oil), indigenous production, a shift to non-premium grades of fuel, the adjustment of regulatory systems, and the adoption of supporting domestic pricing policies [Paragraph (g)]. The Board also expressed its expectation that "oil companies pay particular attention in the present situation to the need for the fair distribution of oil among consuming countries" [Paragraph (j)]. The Governing Board's action, taken under general powers conferred upon the Board in Article 51 of the I.E.P. Agreement, was intended not as a *legal* decision but as a *political* one, the Board stating that

> although the Governments of Participating Countries were not thereby establishing legally binding commitments, they were expressing their firm political determination to give effect to this Action [IEA/GB(79)8, Item 3(a)].

This decision suffered from the infirmities of not being legally binding and of stating the oil demand reduction action only as a "group objective" which substantially impaired its effectiveness. (As will he seen below [Section E], when the Board acted in the Gulf crisis in 1990-1991, its decision avoided both of these problems). The 1979 action did not assign to Members firm commitments as to the particular measures to he taken (unlike the 1991 Gulf decision which was *specific* as to measures (quantified by country as to stockdraw, demand restraint, fuel switching and increased indigenous production). Although the 1979 action was carefully monitored by the IEA and individual country responses were scrutinized, the calculation of the 5 per cent contribution could not be precise. Moreover, as in all "group objectives" without specific commitments quantified country-by-country, the responsibility for performance was diffuse, and accountability was difficult, for oil would be saved in fact by government interactions with consumers, not by a group of governments seeking to act as "a whole". This group action of 1979 would provide the lessons which afterwards could he applied with advantage to the more coherent Gulf crisis decision.

In March and again in May of 1979, the Governing Board met to confirm the importance of the 1-2 March action and to consider detailed performance information produced by the government expert Standing Groups on Emergency Questions (SEQ) and on the Oil Market (SOM). On 22 May 1979, the Board convened in a special Ministerial Level meeting on this situation. BY that time IEA Ministers could agree that "the 1979

world energy situation is a serious one with an oil shortfall of 2 mbd still a reality and that there are at present no signs of improvement for 1980" [IEA/GB(79)32, Item 3]. Ministers also confirmed the 1-2 March action, recognized that implementation measures needed to be strengthened, undertook to accelerate and improve those measures, and agreed on the Board's systematic monitoring of the Members' progress in meeting this commitment. Ministers were particularly concerned about the effects of higher oil prices (then in the process of rising to the $25 per barrel range), and they expressed the objective of "moderating this development and of bringing about more understanding of the overall price structure". In extending the 1-2 March action into 1980, IEA Ministers expressed concern about the Members using up their oil stockdraw and demand restraint cushions which might be needed soon as a defence against further supply interruptions, which the Ministers rightly foresaw.

Immediately following the meeting of Ministers, the Governing Board met again on the crisis, this time at official level to consider the request by Sweden for activation of the selective trigger to meet its particular situation, which involved a shortfall exceeding the 7 per cent trigger level [See Section B-4 above; I.E.P. Agreement Articles 17 and 21]. In the history of the Agency, this was a carefully monitored first (and to date the *only*) formal request for activation of a Sharing System trigger. Finding insufficient support to activate the Sharing System, the Board referred the matter to the Secretariat "to examine the case of Sweden further, and to consult with oil companies as provided in Article 19.6 of the I.E.P. Agreement in order to obtain their views regarding the situation and the appropriateness of the measures to be taken" [IEA/GB(79)33 Corrigendum 1, Item 2]. The Secretariat found that the Swedish problem could be attributed to special conditions, including severe winter weather conditions, reduction in supplies from the Soviet Union for technical reasons, price controls, and technical problems. In June 1979, the Executive Director identified several major international oil companies which had expressed their willingness, at the request of the Swedish government, to consider specific measures by which they could contribute to an improvement in the Swedish oil supply situation. However, it soon appeared that the foregoing causes of the Swedish situation were being reduced or eliminated. With the Swedish problem thus resolved and with future prospects becoming more promising, there was in the end no need to trigger the Sharing System.

During the months that followed, the Governing Board made some improvements in the Agency's response capability, by making adjustments to the data system, developing a registration system for oil import transactions and working on improving understanding of the oil spot market. In

October 1979, the Governing Board examined some of the problems of effectively managing demand restraint decisions, particularly the problems of overcoming statistical difficulties in measuring performance on demand restraint. As a matter of course, the Board decided to continue the submission of Questionnaires A and B to provide adequate data for monitoring the fragile situation that would continue throughout the crisis. The Board also

> agreed that a continued or increased effort should be made for the rest of 1979 in order to assure that the agreed demand restraint objective of 2 mb/d (5% of consumption) will be reached at the end of the year [IEA/GB(79)64, Item 2(i)].

Prices continued to rise during this period, having doubled since the beginning of the year, and reaching the range of $25 - $30 per barrel. In December IEA Ministers met again to fix import targets for 1980 and goals for 1985, assigned this time country-by-country. Ministers also tightened monitoring procedures and principles, and sharpened the focus on the potential role of oil stocks in dealing with the crisis, thus foreshadowing later changes in the Agency's response systems which enlarged the role of stock management and demand restraint.

The second phase of the 1979-1981 crisis began in the autumn of 1980 with the outbreak of the Iraq-Iran War, which resulted in the blocking of all exports from Iraq, and caused a loss of about 3 mbd from Iraq and 1 mbd from Iran. Concerns about more price rises led the Governing Board in October 1980 to meet urgently to take measures designed to reduce pressures on the oil market. The Board noted [IEA/GB(80)61, Item 2 and Annex] that while consumption in IEA countries was lower than in recent years and oil stocks were at a high level, responsive action was still required. Members agreed to urge private and public market participants "to refrain from any *abnormal purchases* on the spot market" [Emphasis added] and to undertake consultations with oil companies

> to carry out the policy that in the 4th quarter there will be a group *stock draw* sufficient to balance supply and demand taking into account whatever additional production is available to the group [Emphasis added].

Prices nevertheless continued to rise. When IEA Ministers next met in December, spot prices had continued their rise into the $40 range, up one-third in the course of a few months. The need for further and rapid action

was clear to Ministers, and they accordingly acted along five main lines: (1) to extend the October stockdraw and abnormal purchase decisions into 1981, (2) to draw on stocks as necessary to maintain a balance between oil supply and demand in the world market, (3) to discourage "undesirable purchases" of oil at price levels which have the effect of increasing market pressures, (4) to correct severe imbalances between countries or companies as a result of the Iran/Iraq supply (disruption, and (5) to encourage and support high levels of indigenous oil and gas production. In doing so, Ministers

> agreed that the objective of IEA countries is to remove serious potential market pressures which unnecessarily lead to higher prices, thereby damaging the world economy [IEA/GB(80)97, Item 2(f) and Annex I].

A number of noteworthy policy elements and precedents made their appearance in these actions. Influencing price through supply measures was the Members' clear objective. Members in effect waived their right to insist that the 90-day I.E.P. emergency stock levels be maintained [Paragraph 2(g)(i)]. To contend with the so-called "undesirable purchases", buyers with ample stocks of oil were encouraged to delay purchases and run down their stocks instead. Buyers short of both stocks and supply sources were, to be assisted by other and better situated participants in the market. If buyers were seeking to meet their oil stock legal requirements, these could be temporarily relaxed, and maximum political influence could be brought to bear to attain these objectives, especially where legal powers did not exist to compel compliance.

With regard to country imbalances of oil supply, the Executive Director would play a leading role in identifying the imbalances, in consulting with the countries concerned, in assessing the situation, and in finding possible solutions to redress the balances. Actions were to be taken by the governments of countries principally concerned with the company imbalances of oil supplies, including encouraging of companies to refrain from decisions which increase pressures on price. In both country and company imbalance conditions, there would be applied the principles of fair treatment and oil pricing based upon price conditions prevailing for comparable commercial transactions, as provided in Article 10 of the I.E.P. Agreement for the Sharing System. Moreover, Members explicitly recognized that one of the purposes of the agreed measures was to prevent Members from finding themselves in situations which would justify the application of the relatively heavy and costly selective trigger of the Sharing System. These market intervention

measures were among the most detailed and far reaching that the Agency would take in the course of its first twenty years. One long-term consequence was the, consideration of *stockdraw* measures which would later be taken up in the 1984 CERM Decision [See Section D below].

By January 1981 the worst of the crisis was over. At no point had the supply loss approached 7 per cent for the IEA group as a whole. The situation that induced Sweden to make its request for a selective trigger had been successfully resolved by other means. When Turkey also reported a particularly disruptive oil supply situation due to financial difficulties, a pipeline closure, the low level of stocks on hand, and the absence of any viable solution in view, the IEA entered into consultations and sought assistance for Turkey. Ultimately, however, the Turkish problem was resolved without the need for conclusive IEA action, when additional supplies became available to Turkey by means of pipeline transport in January 1981.

The resolution of the crisis, following IEA actions and appeals, is described by Badger and Belgrave as follows:

> These appeals from governments to draw down stocks also coincided with the physical situation in the industry and with the refiners' own perception of their commercial interests. Business was slack. Refiners' stocks were at high levels, and there was a desire to reduce them because of growing evidence that the market was weak, and because of the high prevailing rate of interest. Customers' storage was also probably unusually full in anticipation of winter and with the experience of 1978/9 in mind. It is probable, therefore, that the industry would have acted in accordance with the wishes of the IEA, even if it had not been asked to do so. But the encouragement by governments through the IEA, their abstention from competitive bidding, and in particular the indication of their readiness to authorise use of the 90 days stocks did much to ensure that, by the end of the year, the '1980 supply crisis' was over, even though the war between Iraq and Iran was continuing [Page 124].

For the IEA as an international institution, among the most important outcomes of the 1979-1981 crisis was a thorough review of emergency response principles and procedures, and the adoption of new emergency response measures in 1981 and in 1984 [Taken up in Sections C-2 and D below].

2. December 1981 Decision on Supply Disruptions

At the outset of the 1979-1981 crisis the Agency sensed the need for a number of changes in the structure, principles, and procedures of the Agency's emergency response system. Early in the crisis it was clear that even an oil supply loss of less than the I.E.P. trigger threshold of 7 per cent could bring serious economic damage. The Agency took the specific *ad hoc* measures described in Section C-1 above, but a strong consensus favoured the erection of further, *institutionalized* defences for the management of crises of that kind. This was the problem characterized at the time as the "Italian Proposal", "pre-crisis", "mini-crisis", "sub-crisis", "creeping crisis", or "simplified sharing system". The problem was to find ways of responding to supply disruptions which either would not qualify under the Sharing System's 7 per cent threshold rule, or could be managed through other IEA procedures without triggering the Sharing System. This interest led to the creation by the Governing Board of a High Level Ad Hoc Group, chaired by Executive Director Ulf Lantzke, to consider generally short-term oil supply disruption measures.

In February 1981 the Ad Hoc Group, consisting of all Members of the Agency, began work on the issues under its broad mandate. By June the Group reported to the Governing Board at Ministerial Level on the main features of the proposals it was developing, drawn largely from past experience. At this stage Ministers concluded that

> the IEA and its Member countries should he prepared to prevent a disruption in oil supply from again resulting in sharply higher prices and severe economic damage. The full implementation and strengthening of market forces in consuming countries will contribute heavily to this objective. Supplementary action by governments may he necessary in those areas where market forces do not sufficiently counteract the adverse impact of supply disruptions, particularly in international markets [IEA/GB(81)33(2nd Revision), Item B.3].

Ministers approved the general concept of what would become the December 1981 Decision on this subject and they called for an in-depth consultation between IEA governments and oil companies, which took place soon after.

In the first institutionalized extension of the IEAs emergency response capability, the Board adopted on 10 December 1981 the "Decision on Preparation for Future Supply Disruptions". Carrying forward the Ministers' policy declaration of June, quoted above, the Board again spoke of oil

supply disruptions below the 7 per cent level, of price increase problems and economic damage, of market forces, and of supplementary action by governments, nothing that such action should be "light-handed and flexible in, responding to the specific situation at hand and at the same time be taken promptly and effectively" [IEA/GB(81)86, Item 2 and Annex I].

The Secretariat would continuously monitor current and expected oil supply, demand, and stocks of IEA countries in order to permit "an accurate and timely assessment of the nature, extent and probable impact of supply disruptions" [Section 1]. This would be done with the assistance of a new monthly information system described in the Decision [Section 2]. This system which soon became known as "Questionnaire C", was intended to enhance the regular availability of relevant information without invoking the emergency data system. However, the new system was never fully satisfactory in producing accurate and consistent data as required. Although several efforts were made to improve its performance, in 1993 the Agency concluded that the poor data quality would not justify the effort and discontinued the Questionnaire [IEA/GB(93)65, Item 5(b)]. Other data sources would provide the necessary information.

In the event of a supply disruption, consultations on the situation are to take place promptly on the-initiative of the Executive Director, after preliminary consultation with the Chairman of the IEA government expert bodies responsible for emergency questions (SEQ) and the oil market (SOM), and contact with Members. IEA governments will then promptly enter into substantive consultations on the situation. Under the Decision the Executive Director may *decide* to activate the emergency information system Questionnaires A and B [See Section B-6 above], and the "Governing Board will meet promptly at the appropriate level to *consider and decide* upon what action, if any, is necessary to meet the situation as it exists so as to avoid serious economic damage, should the assessment of the situation indicate that this might otherwise occur" [Section 3; emphasis added]. This quoted text makes *obligatory* for the first time the convening of the Governing Board, a procedure clearly necessary to enable the Board to act promptly in cases of significant oil supply disruptions. The measures to be considered and decided upon include those which had been used in the past, such as:

- Discouragement of abnormal spot market purchases or other undesirable purchases.
- Restriction of consumption.
- Short-term fuel switching.
- Increased indigenous production.

- Stockdraw by government decision or through government consultation with oil companies.
- Informal efforts to minimize and contain the effects of supply imbalances [Section 4].

In the interest of flexibility and effectiveness, the 1981 Decision also provided that measures would "be applied on an IEA-wide basis, although the detailed methods of implementation will be decided by governments in accordance with national law and the IEP, and could vary from country to country while aimed at achieving the overall result desired on an integrated basis". Moreover, governments would individually consult with their oil companies concerning any measure agreed upon under Section 4 [Section 5].

This Decision was strongly influenced by the experience gained during the 1979-1981 crisis. Institutionally, the Decision strengthened the potential measures by identifying *in advance* which ones were the most likely options to be considered and applied. The stated options were not at all binding, and they could he applied on a phased or other basis as circumstances might require. Overall the Decision created the expectation that these potential measures would be available and serviceable, an expectation that indeed reflected the growing experience of the Agency and of Member governments in this sector. The Governing Board employed these options in the 1990-1991 Gulf crisis, in conjunction with the CERM Decision of 1984 which advanced further the institutionalization of these procedures and strengthened the policy conclusion that oil stocks should be considered with other measures in building flexible and effective defences against future oil supply disruptions.

D. CERM: Co-ordinated Emergency Response Measures

Of all the alternative measures foreseen under the 1981 Decision on Preparation for Future Supply Disruptions, discussed in Section C-2 above, the prospect of stockdraw seemed to be the most promising for further development. During the 1982-1984 period the Secretariat and IEA government expert groups on emergency questions (SEQ) and the oil market (SOM) developed suggestions along these lines. When this work began to take tangible form in 1984, the Governing Board requested these two Standing Groups to examine the following key elements: the stockdraw possibilities,

the practical instruments for consultation on stockdraw in time of an oil supply shortfall, and the possibilities for other responses including demand restraint [IEA/GB(84)15 Corrigendum, Item 3(a)(ii)]. On the basis of a discussion held in a joint meeting of the two Standing Groups, the Secretariat prepared a paper on oil stocks, reporting on potential benefits and costs, physical availability, legal or political availability, logistical availability, and methods for release [IEA/SEQ(84)38; IEA/SOM(84)22]. The general assessment contained the following:

> 9. As a measure for responding to a supply disruption, stock draw has several advantages. The most direct effect of stock draw is to provide additional supplies to the market, thereby *immediately* improving the supply/demand balance and reducing the pressures for short-term price increases resulting from physical loss of supply. Since this effect can be perceived and quantified at once by market participants, the release of stocks also has a psychological effect on market participants, i.e. reassuring them that alternative supplies are available and reducing their expectations of price increases. By dampening price increases, stock draw can limit the economic damage resulting from the disruption. The willingness of governments to implement stockdraw policies should help calm psychologically induced fear and panic buying. In addition, by allowing consumption to continue not too far from pre-disruption levels, stock draw can further contribute to economic well-being. The economic cost of stocks used in a disruption would be incurred prior to the disruption and would therefore not add to the adverse economic impacts of the disruption itself [Emphasis added].

The Agency's analysis made out the case for developing procedures for using stockdraw as an emergency response measure. By 1984 more stocks had become available for use in a supply disruption than had been at the beginning of the IEA, although they were to decline from the mid-1980s onward [See the table contained in Section B-1 above]. The level of stocks held by governments had increased considerably, creating greater assurance that they could be used promptly for emergency purposes. Moreover, stocks were being held under a variety of legal regimes, with governments having access to, or control over, a considerable portion of them. Suitable techniques

were available to move those stocks into the supply system in the event of a supply disruption. So the necessary physical, legal, and technical requirements for stockdraw were satisfied, although as a practical matter further effort and actions could strengthen the levels of stocks which could be drawn upon [See IEA/GB(84)17].

In 1984 other considerations also played a role in developing stockdraw arrangements. All countries intended to use one or more of various methods for reducing consumption, including the operation of market mechanisms, the promotion of voluntary conservation, fuel switching, and allocation, among others. Although demand restraint and stockholding are provided in both the I.E.P. Agreement and the 1981 Decision, the *actual use* of stocks under flexible arrangements merited further consideration. Stockdraw in sufficient quantities could present a rapid and effective means of restoring lost oil supplies, particularly in the early stages of a crisis (even the known presence of the stockdraw mechanism could have a calming effect on markets, before stocks would actually be drawn). While precise decisions as to the timing, rate, and duration of stockdraw cannot realistically be taken in advance of a supply disruption (before the surrounding circumstances are known), "it is highly desirable for the IEA as a whole to establish clear and firm procedures for prompt decision on stockdraw and other measures", procedures which should be closely related to, and should not alter existing arrangements [IEA/GB(84)17, paragraph 2]. These were some of the main considerations which led the Secretariat to propose the "Decision on Stocks and Supply Disruptions", adopted by the Governing Board on 11 July 1984 [IEA/GB(84)27, Item 2(a)(ii), Annex 1 and Appendices]. This Decision established the IEA's Co-ordinated Emergency Response Measures system, commonly known as CERM, which not only highlights stockdraw but also retains the important IEA emphasis on demand restraint measures.

The CERM Decision itself recites much of the analysis described above, but also refers specifically to the severe economic damage which could result from supply disruptions involving a significant net loss of world oil supply, "whether or not sufficient to activate the I.E.P. emergency oil sharing system" [Paragraph 1]. The Decision also makes reference to "exaggerated crude oil price increases" which could result from public panic. Although the Decision acknowledges that responses to the disruption will vary from country to country, the "aggregate of national responses designed to minimize economic damage is more likely to achieve a coherent overall result if they are co-ordinated and are as complementary as the circumstances and individual national policies permit" [Paragraphs 1 and 2].

Since decisions on the details of stockdraws could not realistically be taken in advance, the operative parts of the Decision constitute mainly a network of *procedural* commitments of Members. When the Governing Board Chairman determines that a supply disruption "involving a significant net loss of world oil supplies" exists or is imminent, the Chairman calls a meeting of the Governing Board, and the Board is then required to meet "promptly at the appropriate level". In making his determination the Chairman surveys the overall loss of "world oil supplies" and takes into account estimated excess production and facility capacity.

The Governing Board's responsibility to act in such circumstances is a broad one. First, it should assess the situation by considering, among other factors, those listed in Appendix 1 to the Decision: origins, causes, probable evolution, magnitude, and probable duration of the crisis; the world economy; the probable impact of the crisis on particular countries; the oil markets; current available stock levels; probable effects of actions pursuant to the 1981 Decision or the I.E.P.; the effectiveness of oil consumption reduction measures; and any other material factors.

Secondly, the Board is to "determine what action would be advisable under the December 1981 Decision or, in accordance with its terms, under the I.E.P.; and [it] will consider all measures which could contribute to restoration of the supply/demand balance" [Paragraph 8], which include demand restraint as well as stockdraw measures. Paragraph 5 states that

> Member countries recognise that, in the event of an oil supply disruption of the nature referred to in paragraph (1) above ["Oil supply disruptions involving a significant net loss of world oil supply, whether or not sufficient to activate the I.E.P. emergency oil sharing system"], each country would follow or implement oil consumption reduction policies appropriate to it in light of the circumstances and its national policies. Policies to reduce consumption will vary from country to country and could include, *inter alia*, such methods as allowing market mechanisms to operate, and/or urging voluntary emergency conservation and/or fuel switching measures by individuals and enterprises, and/or regulation of oil consumption. Other measures, including those referred to in the December 1981 Decision, might also be appropriate, depending on national circumstances.

Moreover, this Decision does not detract at all from the formal authorities which have been previously established for IEA actions. There is no

displacement of the Emergency Sharing System, although the Governing Board would be free, of course, to decide under Article 19.4 of the Agreement whether or not to activate the Sharing System or to act pursuant to the 1981 Decision, or not to act at all [Members' decisions under Article 65 might also be useful in such circumstances]. Another possibility would be for the Sharing System and CERM measures to run in parallel, or one could follow the other. The flexibility of this dual approach has been a fundamental IEA policy. In 1987 it was expressed as follows:

> Ministers reaffirmed the high priority given to the IEA emergency preparedness system, including *both* IEP oil sharing and the co-ordinated *early response* stipulated in the Governing Board Decision of 11th July 1984 [IEA/GB(87)33, Annex, paragraph 17; emphasis added; see also IEA/GB(89)36, Annex, paragraph 4(a) to the same effect].

Flexibility on all such questions is essential to applying the right measures at the right time under the precise circumstances of a particular supply disruption. The inflexible application of one or another response measure has not been the IEA's way of viewing the conduct of this important business.

In a third phase, when the Governing Board wishes to implement CERM measures, the 1984 Decision provides further procedural guidance. Those countries which wish to contribute meaningfully to stockdraw as described in the Decision (by drawdown or implementation of mutually reinforcing measures) will then proceed with the consultation in a context which takes account of the Members' obligations and of information provided by the Secretariat, and which reflects all the relevant circumstances of the disruption,

> including the availability, timing and quantitative effectiveness of measures to *reduce oil consumption* and the special attributes of *oil stocks* and the volume and manner in which they are held in Member countries [Paragraph 9; emphasis added].

The consultation is to consider a wide range of questions. It will be open to all IEA and OECD Members (the only OECD Members not now Members of the IEA are Iceland and Mexico; in 1984 Finland and France were also included in that category, and Mexico was not yet an OECD Member). The objective of the consultation will be not only to determine what volume and duration of stockdraw and other measures would be effective in responding

to a serious disruption and in calming markets, but also to determine the stockdraws individual countries could make to achieve that volume, and the duration and methods for implementing stockdraw. Another objective will be to reach "a *consensus* as to the action which those countries plan to take, by national decision, concerning co-ordinated stockdraw". The consultation could also develop recommendations to the Governing Board on *other actions*, such as demand restraint, which could complement such a stockdraw.

After the consultation is complete, the CERM process moves to the Governing Board, which of course might be meeting in parallel with the consultation process. The consultation results, as described above, are reported to the Governing Board. The Board is to take them into account in reaching its overall decision, which is to reflect the following considerations:

- all countries must take action to help restore the supply/demand balance;
- some countries plan to engage in co-ordinated stock draw, others to undertake complementary actions, and others both [Paragraph 10].

The Governing Board's decision is required to clarify the relationship between the stockdraw and other action decided upon, and the rights and obligations of all Member countries under the I.E.P, including the 90-day stockholding obligation. Under the flexible CERM approach, it is not inconceivable that the Board could decide to implement other measures instead of stockdraw, such as those designed to produce oil demand restraint or other desirable effects.

The Decision also provides that Members whose stocks did not at the time of the Decision meet the I.E.P. requirement would intensify their efforts to do so, and that Members whose stocks were below the levels required to make "a meaningful contribution" to a co-ordinated stockdraw would "promptly" use their best efforts to improve their stock positions [Paragraph 12]. One of the most significant innovations is the commitment, quoted above, of all Members to take action to help restore the supply/demand balance. Although the particular modalities of that action are not adopted, because they could not be determined in advance, each Member is committed under the Decision to contribute substantially in co-ordination with the others. This *established commitment* also helps to overcome the CERM's reversal of the Sharing System's automaticity. The Sharing System was designed to ensure activation by virtue of an *administrative* rather than a prior *political* decision, reflecting lessons of the 1973-1974 crisis. The CERM in effect requires a political decision, which excludes the "fail-safe"

activation feature of the Sharing System [See Section B-4 above]. The absence of the "fail-safe" feature in the CERM is tempered, however, by the action commitment of *all* Members under the CERM and by the continuing availability of the Sharing System (with its fail-safe feature) for the most serious supply disruptions which require a Sharing System response.

Any decision on such a broad, important, and sensitive subject as the CERM, was bound to leave a few issues for later consideration, and the 1984 Decision was no exception to the rule. The Secretariat, the SEQ, and the SOM were instructed to examine further a number of related questions, including minimum operating stock requirements, current and appropriate levels of available stocks (taking into account all pertinent factors), the effectiveness of different methods of holding stocks intended to be available for drawdowns, practical problems in implementation, the range of economic consequences of various types of oil consumption reduction measures, the economic impacts of serious oil supply disruptions, and short-term fuel switching potential [See paragraph 11 and Appendix 2]. In March 1986 the Secretariat reported to the Governing Board on these subjects [IEA/GB(86)10], and the Board requested further work on monitoring and preparation of concrete procedures [IEA/GB(86)15, Item 3(b) and Annex IV].

At the 1987 Ministerial Level Governing Board meeting, IEA Ministers favoured further improvements in effective demand restraint measures and stockholding, particularly for countries whose degree of emergency preparedness was relatively low. Moreover,

> Ministers asked the Governing Board to conclude within one year whether and, if so, what steps should be taken within this context to further improve IEA Member countries' capacity, both individually and collectively, to contribute effectively to *early responses*, including the level and availability of stocks and demand restraint [IEA/GB(87)33, Annex, paragraph 22; emphasis added].

Thereafter, all Members tested their appropriate procedures and mechanisms. The CERM itself was tested in the IEA in early 1988, and a test appraisal was made [See IEA/GB(88)18]. The CERM Operations Manual was prepared during the ensuing period. After further procedures were developed, the Governing Board adopted the CERM Operations Manual in September 1988 [IEA/GB(88)25, Item 2(b)(ii)]. The Manual contains detailed information on the context of CERM consultations, the decision-making process, information requirements, response development

methodology, timetable, and monitoring systems. Practical expertise has been developed by means of the IEA workshops conducted in the field of demand restraint in 1987 [See Section B-2 above], and in oil stockdraw in 1989 and in 1994 [See Section B-1 above]. The SEQ's report to the Governing Board in response to the Ministerial request in reproduced in IEA /GB(88) 15 and the Board's action noting the report, in IEA/GB (88)25, Item 2(b)(iv).

This CERM Decision is the latest of the major emergency response institutionalizing actions taken by the IEA. With the 1981 Supply Disruptions and the 1984 CERM Decisions in place, the IEA has become fully armed institutionally to manage a wide range of oil supply disruptions. The I.E.P. Sharing System provides the relatively heavy but indispensable response to perhaps the worst supply disruptions, those exceeding the Sharing system's 7 per cent threshold. The 1981 and 1984 Decisions provide the framework for managing lesser crises, as well as the more severe ones if that should be the Members' wish. The 1984 Decision adopts special procedures which would make deliberations on stockdraw better prepared and in the end more effective. The main conclusion to draw from these developments is that with this array of flexible measures, the Agency is procedurally and operationally ready to act. These Decisions have doubtless induced Members to increase their logistical and other internal measures, which in turn means that the Agency as a whole is better prepared to act, not only at its Paris headquarters, but also through the Members' potential for successful response actions throughout the energy world.

Since its inception, the CERM Decision has been the subject of numerous follow-up actions by the Secretariat, the SEQ, the SOM, and the Governing Board. In the first Ministerial Level Governing Board meeting following the adoption of the CERM Decision, IEA Ministers fully endorsed that Decision and adopted continuing preparation decisions on the Appendix 2 points summarized above and on other questions. Ministers again endorsed the CERM and stockdraw preparedness in 1987, 1989, 1991 and 1993 (indeed from the first Ministerial meeting onward, IEA Ministers have strongly and consistently supported the building of emergency oil stocks). In 1993 Ministers also urged all Members to meet fully their emergency reserve commitments and encouraged "Member countries to increase their emergency reserves *above the 90-day level*" [IEA/GB (93) 41, paragraph 7; emphasis added]. Although the CERM as such has not been applied in name since it was adopted, it provided the inspiration for the successful Gulf Crisis Contingency Plan, as will be seen in the following Section.

The CERM measures preparations are still undergoing review and adjustment in order that might best realize their full potential when called upon. A CERM review and a simulation test (CERM Test II) are planned for 1995. Proposals were being developed in late 1994 for a high-level conference to familiarize decision-makers with present day oil market conditions and CERM analyses and responses, to examine Members' operational considerations and anticipated measures, and to consider overall the many and varied aspects of responding to future energy crises in a flexible, co-ordinated manner.

In the ten years since the Governing Board adopted the CERM Decision, the oil market has undergone a transformation which would justify consideration of reassessment and up-dating of the CERM system. In short, the market has become more capable of immediate responses to disruptions, much more sophisticated in its operations, and more "global" in its geographical reach. Spot market transactions have multiplied by perhaps a factor of twenty since the IEA was founded and they now account for the bulk of international oil transactions. Price movements now become known almost instantaneously to a large number of market participants, making potential market reactions to supply disruptions and other market affecting events appear almost without delay [These developments are reflected in the updated version of the Emergency Management Manual, 5th Ed. 1994].

With the emergence of these market developments combined with the growth in strategic stocks held in Member countries, as well as perception of increasing vulnerability to oil supply disruptions in the years ahead [see the IEA's 1994 *World Energy Outlook*, p. 18], the Agency in 1994-1995 undertook a review of IEA emergency response mechanisms and procedures. Concerned about the need to ensure the flexibility and effectiveness of these mechanisms and the cohesiveness and capacity of IEA Members in responding to oil crises, the IEA focused this review on a wide range of response measures and on the policy context in which the selection of appropriate measures would be made, particularly with respect to the IEP Sharing System and CERM measures. On 22 February 1995, the Governing Board took a number of policy decisions on this subject and initiated further studies on related questions [The Decision is contained in IEA/GB (95) 11, Item 4; see also the Executive Director's explanation entitled "The IEA Governing Board's Decision on Emergency Response Policies", document IEA/ED/95.73, dated 10 March 1995]. In reaching its decisions, the Governing Board reaffirmed "the importance it attaches to all aspects of the Agency's emergency preparedness system" (which is based on the IEP complemented by the CERM Decision) and to "close co-operation among

IEA countries in their implementation" [Paragraph (b)(i)]. The Board also reaffirmed its intention of "placing the Agency's emergency preparedness system in a policy context which reflects the current oil market situation" and its intention that the CERM Decision (with co-ordinated stockdraw and complementary measures) pertain "to all disruptions, regardless of size", and not just to those falling below the 7 per cent level provided in the Sharing System [See paragraph (b)(iii)].

The 1995 Decision clearly places its principal emphasis on "the need for flexibility in exercising the Agency's emergency preparedness system" and outlines specifically the textual and other bases for this flexibility [See paragraph (c)], before adopting the operational language which provides that before activating the Sharing System, with its relatively heavy and costly procedures, consideration would be given to co-ordination and implementation of stockdraw, demand restraint and other emergency measures. This would be done in a manner which in effect maintains the option of using the full IEP oil Sharing System if necessary. The Decision also retains the IEA emphasis on free markets and voluntary measures [See paragraph (d)]. Finally the Board requested the Standing Group on Emergency Questions (SEQ) to examine and report to it on a number of related technical matters concerning measures available in Member countries for stockdraw, demand restraint and oil sharing, the conditions under which stocks could be drawn below the 90-day IEA level, the use of demand restraint and other measures complementary to stockdraw, and issues arising in a possible transition from initial use of stockdraw, and demand restraint to full use of IEP measures [See paragraph (e)].

The principal operating part of the Decision is contained in paragraph (d) in which the Governing Board agreed that

(i) IEA measures in response to a crisis should be tailored to specific circumstances, underpin the efficient functioning of the oil market, and minimize damage to Member countries;

(ii) the Secretariat, in reporting on whether a disruption reaches the threshold for a finding that can activate IEP emergency measures, or whether a resumption of sufficient supply can be anticipated, should include full consideration of any stockdraw, demand restraint and complementary measures that may be provided for in the overall Governing Board decision that is contemplated by the 1984 CERM Decision;

(iii) in the event of an oil supply disruption which reaches the threshold for a Secretariat finding that can activate IEP

emergency measures, the Governing Board, as a matter of policy, would normally *first give consideration, consistent with the IEP,* to a step-by-step process involving adequate opportunity for the co-ordination and implementation of stockdraw, demand restraint and other emergency measures to be fully effective, in a manner compatible with the timely and effective preparation and activation of oil sharing should that prove necessary;

(iv) markets should even in times of crisis remain unconstrained by price controls or restrictions other than those consistent with the implementation of IEA emergency measures, and voluntary measures should be encouraged [Emphasis added].

It should be recalled that the intention of the foregoing Decision is to state a *policy* approach rather than to change the legal terms of the texts governing emergency response measures. The Sharing System as provided in the IEP Agreement remains unchanged, as does the Governing Board's discretion under the Agreement to determine when oil sharing or other response mechanisms should be employed, and indeed the 1995 Decision quoted above provides additional emphasis on that discretion. As stated in the IEA Executive Director's explanation cited above, the "Decision reflects the Members' commitment to a new policy as to how they will take such future decisions", thus enhancing the flexibility and efficiency "without imposing new legal obligations on Member countries". With this Decision in place, the IEA has not only updated its emergency measures, it has also confirmed the institutional flexibility and decisional policies to enable it to deal with future oil supply crises like the Gulf crisis, taken up in the next Section, or even more serious oil supply disruptions.

E. The 1990-1991 Gulf Crisis

Since 1979-1981 there has been only one *live* test of the foregoing Decisions and the Agency's response measures, and that was the Gulf crisis of 1990-1991, when the Iraqi occupation of Kuwait led to the United Nations embargo of all exports of oil from Kuwait and Iraq. This Section examines how the Agency employed its array of possible measures under the I.E.P. and the 1981 and 1984 Decisions in responding to the challenge of that crisis.

When the Gulf coalition forces began the military campaign for the liberation of Kuwait on 17 January 1991, the IEA was well prepared to respond to the resulting threat to oil supplies. The Iraqi invasion of Kuwait and the United Nations embargo on Iraqi and Kuwaiti oil had removed 4.3 million barrels of oil per day from the market. About two-thirds of that loss directly affected IEA countries. The amount and duration of any *further* loss of oil supply in the course of the military action was potentially quite extensive at worst, and highly uncertain at best, given the vulnerability of Saudi Arabia and the difficulty of forecasting the responses of other oil producers, especially the Arab producers. Hence on the day the air campaign began, the IEA acted to add oil to the market. IEA Executive Director Helga Steeg gave formal notice to all IEA Member governments and other participants to activate the Co-ordinated Energy Emergency Response Contingency Plan to make available to the market 2.5 million additional barrels of oil per day within 15 days' time. Two million barrels were to come from participants' oil stocks, 400,000 barrels from demand restraint measures designed to reduce oil consumption, and 100,000 barrels from fuel switching out of oil and the use of spare capacity. All IEA countries, joined by Finland, France, and Iceland, had adopted the IEA Contingency Plan earlier in the month [11 January 1991, IEA/GB(91)1, Item 3 and Annex], following an extensive preparation and build-up of measures going back to 2 August 1990, the day Iraq invaded Kuwait. As will be seen below, the IEA's successful response presents a procedural model of how an international institution and the industrial countries should respond to supply crises of this nature and scope.

1. Preparation for Action

The invasion of Kuwait carried the immediate threat of a major disruption of oil supplies, the third in less than twenty years. The Agency estimated that the Middle East Gulf countries produced about 17.0 million barrels a day (mbd) of crude oil and natural gas liquids (NGLs), and that they had exported 14.5 mbd in the second quarter of 1990. Of this amount Iraq had produced 3.1 mbd and exported 2.7 mbd, while Kuwait had produced 1.8 mbd and exported 1.7 mbd. This accounted for 29 per cent of Gulf oil production and 31 per cent of Gulf crude oil exports. IEA country imports from Iraq accounted for 7.8 per cent of their total imports, and imports from Kuwait amounted to 3.6 per cent of total imports. On 1 August 1990, combined government and company stocks on land in OECD countries amounted to the equivalent of some 150 days of IEA net imports and

99 days of forward consumption, while stocks either owned or controlled by governments were held at levels of around 30 days of forward consumption. In this overall supply situation, it was clear that the IEA would have to prepare itself to act decisively in this crisis.

When the invasion occurred, the IEA had in place two principal oil emergency response systems. The first and most far-reaching of these was the oil Emergency Sharing System, taken up in detail in Section B above, designed to respond massively to oil disruptions exceeding 7 per cent of expected supply. The other was the Co-ordinated Emergency Response Measures, known as CERM, a comprehensive and flexible set of procedures adopted by the Governing Board in 1984 in the aftermath of the 1979-1981 oil supply crisis [See Section D above]. CERM is intended to facilitate rapid agreement on stockdraw and demand restraint in response to an oil supply disruption below the 7 per cent level, or in a more severe supply shortfall, or in conjunction with the Emergency Sharing System. Both systems were ready for implementation before the Gulf crisis began. In support of these response systems, the IEA also had in place a number of oil supply information systems, probably the best in the world. Some were in normal operation with monthly and other periodic reporting by all Members to the IEA on supply balances, stock levels, imports, and other data, including the Monthly Oil Statistics. Moreover, a monthly *emergency* data reporting system was available on a standby basis. When activated, it could provide more detailed data in the form of individual company and government reports to the IEA [This is the Special Section of the Information System; see Section B-6 above]. Legislation was in place for operation of the Emergency Sharing System and the CERM under national legal systems and for the provision of necessary confidential and proprietary information by oil companies under the monthly emergency data reporting system. The contrast between the foregoing levels of preparedness for the Gulf crisis, and the inchoate measures and the disarray of the industrial countries in the period leading up to and during the 1973-1974 crisis is quite remarkable [See Volume I, Chapters I and II, and Chapter II above]. The depth of the preparations as well as the aggregate co-operation and political readiness of the industrial countries to act must be credited to the IEA which transformed the degree of co-operation and preparedness of the industrialized countries over the period 1974-1990 and made possible their vigorous response to the Gulf crisis.

Four days after the invasion of Kuwait, the United Nations acted on proposals to impose an import embargo on Iraqi and Kuwaiti commodities and products. In its binding Resolution 661 of 6 August 1990, the Security Council

3. Decides that all states shall prevent:
   (a) The import into their territories of all commodities and products originating in Iraq or Kuwait exported therefrom after the date of this resolution;
   (b) Any activities by their nationals or in their territories which would promote or are calculated to promote the export or transshipment of any commodities or products from Iraq or Kuwait; and any dealings by their nationals or their flag vessels or in their territories in any commodities or products originating in Iraq or Kuwait and exported therefrom after the date of this resolution, including in particular any transfer of funds to Iraq or Kuwait for the purpose of such activities or dealings.

On 25 August the Security Council adopted a maritime enforcement resolution to support the embargo. The Security Council in Resolution 665

1. Calls upon those Member States cooperating with the government of Kuwait which are deploying maritime forces to the area to use such measures commensurate to the specific circumstances as may be necessary under the authority of the Security Council to halt all inward and outward maritime shipping in order to inspect and verify their cargoes and destinations and to ensure strict implementation of the provisions related to such shipping laid down in resolution 661 (1990).

In the IEA, a process of data collection, monitoring, analysis, and legal preparations was already underway, in order to enable the Agency to act promptly if the crisis should lead to an actual oil supply shortfall or other events requiring co-operative action. The initial review of the supply/demand situation in the face of the embargo of oil imports from Iraq and Kuwait led to the conclusion that compensatory oil supply would be available from other OPEC Member States and from high stock levels, if necessary, to supply the market adequately, without need for recourse to either of the IEA emergency response systems. On 9 August, the Governing Board confirmed this assessment, stating that

> sufficient oil supplies are currently available to compensate for the loss of Iraqi and Kuwaiti crude and product to the market.

> Therefore, there is no need for recourse to the IEA emergency response system at this time [IEA/GB(90)24, Item 2 and Annex].

The Board at that time also took the first of a number of precautionary actions, including a recommendation for companies to avoid abnormal spot market purchases and a statement of the need for consumer restraint. Monitoring and implementing measures were set in place. In the same measure, the Board adopted the first in its series of decisions on the monitoring of the situation by Member governments and by the Agency itself, while setting the stage for convening the Governing Board on short notice if necessary, and preparing such national procedures and instruments for implementing co-ordinated actions, including the drawing on stocks, as might be needed.

The Agency thus found it unnecessary to apply in the early phase of the crisis either the Sharing System (the trigger level would not be reached) or the CERM, because any shortfall in the months ahead was expected to be covered by other sources of oil and preparations were already made for any accelerated action which might prove to be necessary or appropriate. High oil stocks also provided a cushion. The public was immediately informed of the Governing Board's actions, and at later meetings the Board specifically recommended that Members and the Secretariat keep the public informed of oil market developments.

An early operational step was the Executive Director's decision taken on 9 August 1990 to activate the detailed emergency data reporting by individual companies co-operating with the Agency and by governments [See IEA/GB(90)24, Item 2 and Annex, where this action, approved by the Board, is referred to technically as the "submission of Questionnaires A and B"]. That additional data, consisting in large part of information on the production, trade, stockdraw, and deliveries of oil scheduled by companies for the current month, two prior months and two forward months, was essential to enabling the Agency to consider on a contingency basis whether the conditions existed for triggering the Sharing System (whether the data showed that the required 7 per cent shortfall had occurred or could reasonably by expected to occur). On the same day the Secretariat formally requested the United States Secretary of Energy to issue an approval letter foreseen under United States law and regulations for U.S. companies to provide the confidential and proprietary information called for under this data system. The approval letter was required as a condition to the protection of U.S. companies, pursuant to Section 252 of the Energy Policy and Conservation Act of 1975, from U.S. antitrust liability [See

Section B-7(c) above]. The U.S. authorities responded on 17 August by granting the approval in accordance with the Secretariat's request for data submissions until the end of 1990, subject to the renewal of the applicable U.S. legislation, which was scheduled to expire at the end of September, That legislation was indeed renewed, and the U.S. approval was later extended at the Secretariat's request until the end of June 1991. Companies operating in Europe might also have found an obstacle in the competition rules of the European Communities (EU), but these companies enjoyed the benefit of the exemption under Article 85(3) of the Treaty of Rome as provided in the Commission's exemption decision of December 1983 [See Section B-7(c) above]. Specific approvals for the submission of data by oil companies in Europe were not necessary under the terms of the exemption, and Commission officials confirmed this expressly to the Secretariat in writing before the data submissions commenced. The smooth application of both the United States and European Union antitrust and competition arrangements for the IEA made it possible for the Agency to receive the vitally necessary information. A series of legal obstacles which might have prevented companies from supplying this information in the absence of these arrangements was thereby overcome.

After its first meeting on the Gulf early in August 1990, there followed regular meetings of the Governing Board, convened for further monitoring, assessment, and adoption of preparatory measures. Throughout the crisis the assessments continued to show that, due principally to increased oil production by OPEC and others, the market was generally adequately supplied. By the end of September, the Board sharpened its recommendation that each IEA country

> now complete preparations and take all decisions necessary, on a standby basis, to enable its authorities to act immediately and effectively to implement stockdraw and/or demand restraint or surge capacity measures at the outset of any further significant oil supply shortfall [IEA/GB(90)32, Item 2 and Annex).

By virtue of the Board's recommendation that its Chairman and the Executive Director convene the Board on short notice in emergency session, the Agency itself became better geared to rapid action if a further oil supply shortfall should occur. Participants would be expected to have the necessary Ministerial authority in order for the Board to decide promptly on co-ordinated measures "warranted by the situation".

At the same meeting in September 1990, the Board also recommended that Members take additional precautionary measures concerning energy conservation and efficiency, "full price pass through" to markets for crude oil and products (i.e. the price rises would be reflected down the line to the consumer), fuel switching, monitoring of stock building, and overcome product supply difficulties by "introducing temporary flexibility in the application of environment measures". The Board instructed the government expert group on emergency questions (SEQ)

> to include in its assessments a description and evaluation of the potential response of *each* Member country broken down specifically as to stockdraw, whether company or government owned or controlled, and government mandated demand restraint [IEA/GB(90)32, Item 2 and Annex; emphasis added].

The Board at the same time requested the SEQ and the SOM to continue on an urgent basis to "refine their assessments of emergency preparation measures and the oil market situation on the basis of possible further oil supply disruptions arising during the uncertain period ahead". One month later when the Board convened its fourth session on the Gulf crisis, it was clear that the earlier requests for preparations to be ready on a standby basis had been carried out and that the Agency could indeed act quickly and effectively if necessary [IEA/GB(90)39, Item 2]. The high state of readiness was again confirmed by the Governing Board in December [IEA/GB(90)46, Item 2]. By that time, alternative supplies were helping to improve the supply/demand situation, higher oil prices were exerting downward pressure on oil demand, and government actions were producing desirable effects; reduced economic activity in some countries also contributed to the reduction in oil demand. IEA preparations had advanced by December 1990 to the point where the Board could note that "each Member country now has completed preparations and taken all decisions necessary, on a standby basis, to enable its authorities to act immediately and effectively to implement stockdraw and/or demand restraint or surge capacity measures at the outset of any further significant oil supply shortfall" [IEA/GB(90)46, Item 2(d)].

2. The IEA Contingency Plan of 11 January 1991

The process of data gathering, analysis, assessment and preparations, with the assistance of the IEA's SEQ and SOM groups and advice from the IEA's

oil industry supply experts [IAB, see Section B-7 above] continued without interruption during the crisis. It provided the basis for the adoption of the IEA Contingency Plan which followed the Board's assessment of the situation in view of the then approaching 15 January deadline set by the Security Council in Resolution 678 for Iraq to withdraw from Kuwait, and in view of the possibility that armed force might have to be used to enforce the Security Council's Resolutions.

When the Governing Board convened on 11 January 1991, OECD crude oil and product stocks were found to be *higher* than one year earlier and to be well balanced between crude oil and the main product groups. Despite the continuing availability of ample oil supplies to the market, the Board agreed that "the outbreak of hostilities in the Gulf could lead to heightened uncertainty and volatility in the market as a result of the possible temporary shortfall of some Gulf supplies". That judgement induced the Board to conclude that it would be prudent to complete preparations for a co-ordinated response in the event of hostilities. In the operative part of its Conclusions on this subject the Governing Board

> **Adopted** a coordinated energy emergency response contingency plan for use in anticipation of any possible temporary shortfall in oil supplies in the event of hostilities in the Gulf which, through a combination of stockdraw, demand restraint, and other measures, would make available to the market 2.5 million barrels of oil per day [IEA/GB(91)1, Item 3 and Annex].

Since the hostilities had not actually commenced at that time, the Board made the plan contingent "upon notification by the Executive Director, after prompt and wide-ranging consultations with Member governments, of the need to activate the contingency plan". The Board also agreed that the measures

> would be implemented so as to take effect, in terms of additional availability of oil to the market and reduced demand for oil, beginning within 15 days after notification by the Executive Director.

Upon receipt of the Executive Director's notification, the commitments would be activated not only for each IEA Member country, but also for Finland, France and Iceland.

The specific commitments [See IEA/GB(91)67, p. 14] expressed in precise numbers of thousands of barrels per day were agreed with regard to each country in relation to stockdraw, demand restraint, fuel switching, and increased indigenous oil production, as follows:

OECD Country 2.5 mbd Emergency Response Programme
Adopted at the IEA Governing Board Meeting of 11th January 1991
(thousand barrels/day)

	Stockdraw	Demand Restraint	Fuel Switching	Increased Indigenous Production	Total Response [th.b/d]
Canada					115
United States	1125	0	0	0	1125
North America	1125	0	0	0	1240
Australia	0	33	0	13	46
Japan	350	0	0	0	350
New Zealand	3	0	1	3	7
Pacific	353	33	1	16	403
Austria	6	5	5	0	16
Belgium	9	18	0	0	27
Denmark	11	2	0	0	13
Germany	169	18	0	0	187
Greece	9	9	0	0	18
Ireland	5	1	0	0	6
Italy	74	24	32	0	130
Luxembourg	0	2	0	0	2
The Netherlands	25	7	0	0	32
Norway	5	7	0	0	12
Portugal	10	2	5	0	17
Spain	0	62	0	0	62
Sweden	0	21	0	0	21
Switzerland	6	12	1	0	19
Turkey	0	20	11	0	31
United Kingdom	120	0	0	0	120
IEA Europe	449	210	54	0	713
Total IEA	1927	243	55	16	2356

OECD Country 2.5 mbd Emergency Response Programme *(continued)*
Adopted at the IEA Governing Board Meeting of 11th January 1991
(thousand barrels/day)

	Stockdraw	Demand Restraint	Fuel Switching	Increased Indigenous Production	Total Response [th.b/d]
Finland	0	12	0	0	12
France	59	58	9	0	126
Iceland	0	1	0	0	1
Total OECD	1987	314	64	16	2500

The Plan consisted, therefore, of four-fifths stockdraw and of one-fifth other measures, mostly demand restraint.

In the Governing Board's Conclusions of 11 January, the Board also welcomed the participation of Finland, France and Iceland in the Contingency Plan, on this first occasion in which *non-Member countries* participated in a Governing Board action. These three countries participated fully in the Governing Board's preparations which culminated in this unprecedented decision. In the following year, Finland and France both became Members in accordance with IEA rules.

Since the Contingency Plan would be activated by decision of the Executive Director but without the Board's having an opportunity for last-minute fine tuning, the Board arranged to meet again soon after activation. It agreed to meet within ten days afterwards, "to assess the energy implications and to decide upon any modifications which may be required in the contingency plan", thus providing an opportunity for the Board's assessment and further decisions *after* the activation notifications would be despatched but *before* the close of the period for implementation. The SEQ and the SOM were requested to "continue to monitor closely the oil market situation and, if activated, the implementation of the contingency plan". As a further response measure the Governing Board

> **Recommended** that oil companies continue to draw on their commercial stocks, that governments and consumers maintain and intensify their conservation efforts, and that oil companies and consumers exercise restraint in purchases, in order to reduce uncertainty and volatility in the world oil market.

This recommendation, like the parallel action in earlier meetings on the Gulf crisis (9 August and 28 September), established an institutional innovation, in addressing not IEA Member governments but *oil companies* and *consumers* directly. International organizations normally address recommendations and decisions to their member governments, and do not reach into the member countries to act directly upon companies and individuals (for example, the IEA Contingency Plan was addressed to "Member governments", and the Iraq and Kuwait embargo decision of the Security Council quoted above was addressed to "states", in accordance with traditional practice). The Governing Board's recommendation quoted above doubtless gained in stature and rhetorical effect by virtue of its addressing oil companies and consumers directly.

The Agency viewed its proper role as requiring responses not to undesirable price movements, but to disruptions of *physical supply*, to the actual or anticipated loss of oil volumes in the market. This policy in the circumstances of the Gulf crisis was explained by Peter D. Huggins, a senior IEA official, as follows:

> At no stage of the crisis up to the expiration of the Allied Ultimatum to Iraq in January were there actual or imminent shortages of oil to the Group or individual countries which could justify activation of IEA emergency measures. This is not to say that the crisis did not cause problems to Member countries and the world. Prices were for much of the period high and erratic. Spot prices doubled over a two month period in contrast to the Iran crisis when doubling took place only after seven months. Average IEA import prices were about $34/barrel in October against $16 in July but that has to be seen against the firm objective set by the OPEC meeting a few days before the Iraqi attack to limit production to obtain a $21 price. Prices in the Crisis reflected fears about imminent rather than actual loss of supplies in the Gulf. The market did, of course, take account of the fact that provision of alternative supplies had virtually exhausted spare productive capacity .... The IEA was able, however, to base its operations on the information that there was no global or regional shortage of oil supplies to meet current requirements [Peter D. Huggins, "Lessons from the Gulf Crisis of 1990/91", statement at the University of Dundee, United Kingdom, September 1991: IEA archives].

The time for the IEA to act came when the air campaign against Iraq commenced on 17 January. Acting upon the authority delegated to her in the Contingency Plan adopted a few days earlier, and following a lengthy telephone authorization consultation with participants in the Plan, on 17 January Executive Director Helga Steeg gave the formal notification which activated the Contingency Plan. She then explained to the press the action which would he taken, and stated that

> There is no need for concern about physical supplies of oil. World petroleum markets are comfortably supplied and additional refinery capacity is available. But the outbreak of hostilities could lead to heightened uncertainty and volatility in the market. Therefore, these countries [IEA Members, Finland, France and Iceland] are making available additional oil to meet any possible temporary shortfall which may occur [IEA Press Release. 17 January 1991].

Mrs. Steeg also made it clear that the IEA had not established any price targets or considered price numbers. There was no intention of influencing price, but rather, the intention was to avoid a possible far-reaching panic in the market after the outbreak of hostilities. In the following summary of the procedures used by the IEAs three biggest countries, the United States, Germany and Japan, Peter D. Huggins illustrated how the Contingency Plan worked in practice:

> The U. S. Strategic Petroleum Reserve made available more than 4 million tons of crude oil for release through a bidding procedure. About half of this was actually taken up and delivered to the market. The German EBV, which is an industry body set up to meet national stockholding commitments jointly, made available some 650,000 tons of oil products to its members. Again, only about half of this was taken up. The Japanese authorities, on the other hand, cut the emergency reserve commitment of industry by an amount equivalent to four days of imports thus allowing industry to deliver 1.4 million tons of oil which otherwise would have been unavailable. In all three cases, however, it was the amount made available rather than that actually delivered that mattered. This reassured market operators that oil supplies were sufficient to meet current needs [Peter D. Huggins,

"The IEA's Response to the Gulf Oil Crisis of 1990/91", statement at the Node Conference of the UK Oil Industry Emergency Committee, 20 March 1992].

The Governing Board convened as foreseen on 28 January 1991 to assess the energy implications of the hostilities in the Gulf and the activation of the Contingency Plan eleven days before. The Board noted the report of the SEQ government expert group that the 2.5 million barrels per day to be added to the market was "comfortably within the capacity of OECD countries, that countries had taken or were in the process of taking all necessary actions for its implementation, and that higher levels of emergency response could he maintained for an extended period if necessary" [IEA/GB(91)3, Item 2 and Annex]. Activation of the Contingency Plan had helped to discourage abnormal purchases by "instilling confidence that any possible temporary shortfall in oil supplies from the Gulf would be mitigated". The Governing Board accordingly

> **Decided** that the co-ordinated energy emergency contingency plan, adopted at its 11th January 1991 meeting and which makes available to the market 2.5 million barrels of oil per day, would remain in effect and that it would continue to be implemented flexibly in close consultation with the Executive Director.

In addition the Board welcomed the participation of the three non-Members in the Contingency Plan, agreed to convene again quickly if the Executive Director determined the need for further review of the Plan, and continued the established monitoring process.

In its later assessment of the IEA response, the IEA government expert group (SEQ) concluded that

> The Allied advantage which emerged within hours of the outbreak of war had a decisive effect on markets. A significant calming effect was also attributed to the IEA Contingency Plan, which was seen to make available large quantities of oil to the market . . . . In a longer term context, doubt was dissipated about the will of the IEA to implement programmes such as the 2.5 mb/d Contingency Plan as well as design and prepare them. The Contingency Plan comprised oil actually saved or

> released to the market and oil made available to the market, thus strongly underpinning confidence, but not fully taken up [IEA/GB(91)67, p.13].

With the end of hostilities, the fall of oil prices closer to normal levels, and the reduced immediate risk of supply reductions, the Contingency Plan had performed its function. The IEA could thus terminate the Contingency Plan, and it did so promptly. When the Board met on 6 March 1991, less than a week after the cessation of hostilities, the Board terminated the Contingency Plan with immediate effect [IEA/GB(91)19, Item 31, and the data system was deactivated with the March 1991 submissions by companies and governments.

The Agency then embarked upon a penetrating assessment of its management of the Gulf crisis. This was carried out by the Secretariat, by the SEQ, the SOM, and the Industry Advisory Board. Each of these groups reported to the Governing Board to enable that body to make the official assessment of performance and to formulate conclusions on the "lessons" to be drawn and on future actions to be taken. By and large the assessments were quite favourable, but they were not without *caveats* for the future. The IAB's report recounted the major events and showed that the Contingency Plan achieved the intended results in a positive fashion. Moreover, the IAB suggested the need for the Sharing System procedures to take account of the major changes which had occurred in the oil industry since the Agency was founded. It also identified some problem areas in the emergency information system, and drew attention to the ability of the refinery system and tanker fleet to adjust to the rapidly changing supply pattern. This report was noted by the Governing Board and submitted to IEA Ministers at their June 1991 meeting.

The IEA Ministers were impressed with the "co-operation and cohesion of IEA countries", with the "resolution and pragmatism", flexibility, and participation of the non-Members, as well as with the advice of the IAB and the co-operative spirit of the oil producing countries which had increased oil production. The fundamental lesson they drew from the Gulf War experience was that Members must "continue their successful efforts to reduce their vulnerability to oil supply disruptions" through means employed in the IEA. Ministers noted the "efficient working of oil markets" aided by improved trading practices and the "unimpeded pass through of oil price changes during the crisis". They also confirmed IEA emergency policies on stocks and demand restraint, remarked upon the need for enhancing refinery flexibility, and noted the importance of the adequacy of the oil tanker fleet and other policies. They expressed "abhorrence at the continuing ecological

effects and the waste of petroleum resources associated with the wanton destruction by Iraq of Kuwaiti oil facilities", and for the first time they recognized the need to explore means "to advise *non-Member countries* on emergency preparedness, drawing on IEA models" [IEA/GB(91)46, Section 11; emphasis added].

In December 1991 the Governing Board at official level endorsed the SEQ's conclusions on the Gulf crisis, much of which was a more detailed treatment of the subjects already addressed by Ministers [The SEQ Report is contained in IEA/GB(91)671. The Board noted that the Middle East situation remained fragile, and that the "IEA and Member governments should ensure that they can continue to respond *promptly and flexibly to future disruptions, whatever their nature*" [Emphasis added]. The Board also confirmed that

> IEA emergency mechanisms take actual or imminent loss of physical supplies of oil as the criterion for their activation. This approach was vindicated during the Gulf Crisis.

On other points, the Board referred to the "success of the Contingency Plan", the need to "strengthen Government control over oil stocks", the complementarity of stock and demand restraint, and the significant role of "unimpeded price pass-through". The Board spoke favourably on product stocks and refinery flexibility, refinery capacity, the emergency data system (and the need to improve data quality and systems for gathering data from industry), the possibility of providing advice on emergency response systems to non-Member countries (while respecting the need to protect confidentiality of information), and the need for further analysis of the Gulf crisis experience. The Governing Board "recommended that those Conclusions he taken carefully into account in further IEA work on emergency preparedness". The sound relations with oil producers played an important role in mitigating the effects of the Gulf crisis, especially the increased oil production by Saudi Arabia and Venezuela. The Board agreed that "contacts among all oil market participants should he further developed to promote communication and understanding" [IEA/GB(91)79, Item 4 and Annex 1]. Thus the IEA closed the response and appraisal phase of the Gulf crisis, after initiating preparatory measures promptly as the crisis began, completing its readiness as the crisis continued, exercising restraint when the need for action had not been fully established, and acting promptly under established procedures when the. time for action came in January 1991.

F. Continuing Emergency Response Readiness

The Agency's emergency response systems have been fully maintained in accordance with their terms, the Emergency Sharing system since 1975, the CERM measures since the Governing Board's Future Supply Disruptions Decision in 1981, and the CERM system as such since the Stocks and Supply Disruption Decision of 1984. Emergency response systems readiness requires that political support continue regularly, that the systems be maintained operationally, that they be adjusted, updated, and even overhauled as conditions evolve, that competent personnel be trained, that the systems be tested periodically under changing operational conditions, that Members respect their commitments, and that their performance be thoroughly and regularly reviewed and assessed.

All of these requirements have been the subject of regular IEA actions over the years. Political support from the Ministers occurs at virtually each Ministerial meeting of the Board, and the Governing Board provides parallel support at official level. This is done specifically meeting by meeting, as appropriate, but also in more permanent policy statements such as those contained in the 1993 IEA Shared Goals discussed above [See Chapter II, Section J above], where energy security is a prime objective. In that decision the emergency response goal is stated as follows:

> Energy systems should have the ability to respond promptly and flexibly to energy emergencies. In some cases this requires collective mechanisms and action — IEA countries co-operate through the Agency in responding jointly to oil supply emergencies [Goal 2].

The IEA provides constant institutional support for the response systems by maintaining the IEA infrastructure, the specialist staff responsible for emergency response work, and statistical as well as other services. The systems themselves have been regularly adjusted as required to keep them up to date. Training of specialized staff for emergency response is a high IEA priority. For co-operating company staff, the Agency periodically mounts training seminars. The most extensive and thorough training exercises consist of the periodic systems tests described below. Finally, the Agency conducts in a regular cycle an emergency response review of a number of individual

countries, also described below. Not to be underestimated in any assessment of IEA readiness is the vivid sense within the Secretariat that emergency response has been the main mission of the Agency from the outset in 1974 and that the future success of Agency may depend largely upon its performance in dealing with oil supply disruptions.

1. Systems Tests

The IEA has not been content with establishing, maintaining, and improving its emergency response systems, as important as those actions have been throughout the Agency's history. The Agency has also on a regular basis *tested by simulation* the potential operation of those systems. Beginning in 1976, Allocations Systems Tests (ASTs) have been carried out every few years with varying purposes and scenarios, as will be seen below. There has been a total of seven ASTs to date and the Agency also conducts separate data transmission tests, using current operation data. Since the CERM was adopted in 1984, moreover, there has been one simulation test of CERM operations as well. The Gulf crisis response may be considered also as a "live test" of the CERM, in response to an actual situation, although it was not officially identified with the CERM as such.

The structure of the ASTs and the conduct of the tests have evolved over the years into a now well-established pattern. Their primary purpose is to test the capacity of Members the Secretariat, and the international oil industry to respond to major oil disruptions. They also test changes in the Sharing System, reveal the need for improvements in the System, and train key personnel. At the outset of each AST, a disruption scenario sufficient to trigger the Sharing system is devised and communicated to the participants. Questionnaires A and B are usually activated in advance to provide the data base, except in the most recent test (AST-7) for which the actual data submitted during the Gulf crisis was utilized. The test periods have ranged from less than one month to over two months. Participation is broad in scope and includes the Secretariat, the Industry Supply Advisory Group (ISAG), Reporting Companies (RCs), Non-Reporting Companies (NRCs), National Emergency Sharing Organisations (NESOs), and the SEQ. All Member countries are expected to participated. The key procedures and necessary information are set forth in a detailed operational guide. The ISAG convenes at IEA offices in Paris to work with the Secretariat throughout the duration of the Test, just as it would in an actual emergency. The ISAG makes its assessments of the simulated crisis situation. Supply rights, allocation rights, and obligations are calculated and circulated. The re-allocation process is conducted broadly as described above in Section B-3, including the

submission of Voluntary Offers and the conduct of the Voluntary Offer matching process, but without actual contracts or movements of oil, stockdraw, demand restraint, or Type 3 mandatory supply actions.

The ASTs are followed by a number of appraisals, usually by the NESOs, the ISAG, the Reporting Companies, the IAB, and the Secretariat, which are reported to the SEQ and to the Governing Board. These test outcomes contain evaluations of the conduct and results of the test and make recommendations for changes in future tests, in the Sharing System, and in the Emergency Management Manual. In AST-7 in 1992, the extensive recommendations were formulated as an "Action Programme" which was endorsed by the Governing Board [IEA/GB(93)26, Item 9]. IEA Ministers expressed strong support for the tests in the Communiqués of 1982, 1985, 1989, 1991, and 1993.

Over the years, the specific elements and objective of the ASTs have changed, as they are formulated test-by-test to meet particular developments or concerns. Some of these have been the following:

- AST-1, 1976: data flow from Members and oil companies on actual and scheduled oil supplies, in a fast-data system; computerized calculations of supply rights under the I.E.P. Agreement; companies' rescheduling of supply movements; and procedures and mechanisms for balancing allocation rights and obligations.
- AST-2, 1978: the first full-scale test of co-ordinated emergency measures by Members, the oil industry, and the Secretariat.
- AST3, 1980: assessment of effectiveness of the NESOs, assessment of the procedures, communications, and data processing on which the Sharing System is based, and training the NESOs and industry personnel in the implementation of the System.
- AST-4, 1983: continuation of the programme of training personnel in Member countries, oil companies, and the Secretariat, involving to the fullest extent possible the NESOs in each Member country (including submission of Voluntary Offers by NESOs for Non-Reporting Companies), test modifications and improvements in the systems and procedures made since the previous test, and identification of ways by which the actual functioning of the Voluntary Offer system could be improved.
- AST-5, 1985: training of Secretariat, Member government, and oil company personnel, particularly on the compilation, transmission, handling, and verification of data on detailed flows of oil supplies; communication of data and other messages; calculation of countries'

Supply Rights, Allocation Rights, and Allocation Obligations; and transmission, matching, and simulated implementation of Voluntary Offers for international redirection of oil supplies.

- AST-6, 1988: again training as in AST-5, extended to include all features of the Voluntary Offer process and necessary communications between the Emergency Operations Team, oil companies, and the NESOs, testing of improvements in telecommunications and data processing facilities, identification of modifications and possible improvements of procedures defined in the EMM and the Operations Manual, testing of such new procedures as the "Wider Window" enlarged period for handling Closed Loop Voluntary Offers, pricing elements, an arbitrary non-implementation procedure, and teleconferencing with the ISAG for part of the test period.
- AST-7, 1992: again training as in previous tests, but especially thorough training of new ISAG members; identification of possible improvements in the Sharing System, including procedures to be followed by the Members, the IEA Secretariat, and the oil industry in response to major oil supply disruptions, as well as possible EMM amendments; flexible responses and fine tuning to actual conditions of crude oil availability, refining configurations, and transport constraints.

The overall objective of these periodic Allocation Systems Tests has been to ensure that the Emergency Sharing System could be activated, could function effectively as intended under the I.E.P. Agreement, and could bring about a suitable resolution of a major oil supply disruption. In this process, the tests have revealed needs for training of personnel and improvements in the Sharing System, leading to appropriate adjustments in both. In addition to the technical details, ASTs enable the IEA to keep up-to-date with evolving oil market conditions. Following AST-7, the Agency's operating manuals for this sector were completely revised to correspond to the oil market and other conditions of the mid-1990s. One other result has been the high degree of IEA readiness to respond promptly, realistically, and effectively to future disruptions, as has also been the case from the testing of the CERM measures.

A CERM Test was conducted for the first time in early 1988 in order to test co-ordinated emergency response procedures under the July 1984 Governing Board Decision on Stocks and Supply Disruptions. All IEA Members participated. The purposes of the Test were to train the personnel of Member governments and the Secretariat in the essential procedures and mechanisms necessary to implement an early co-ordinated

response to a Significant oil supply disruption in accordance with the July 1984 Decision. Beyond training, the purpose was to exercise the Members' domestic procedures for such response, to exercise procedures for relevant data handling, to determine what data is "truly required" for this purpose, and to identify useful modifications and improvements to international as well as domestic procedures.

ASTs are operational in their approach, while the 1988 CERM Test was more of a textbook exercise, without oil company participation, concentrating on procedural rather than operational issues. The national Emergency Organisations in Member countries, virtually identical to the NESOs, participated in the CERM Test. Members' efforts were directed to the administrative, logistical and legal procedures, not to policy. There was no attempt to simulate the consultative process, which in any case would depend on the overall market and other conditions existing at the time of a crisis. Working on the basis of a disruption scenario as in the ASTs, the Members analyzed the scenario and carried through all of the respective procedural steps which would be required if their measures were implemented in an actual emergency. The Test was also a data development and transmission exercise, although it did not involve operational data as in ASTs, and extensive reports were made by Members to the Secretariat on details of actions taken and measures implemented. The Test appraisal found the Test to be a good indicator of the existing state of preparedness and identified the basis for Member to improve further their readiness in general. The 1988 CERM Test also provided valuable training to participants, and the overall performance was considered adequate in view of the new ground covered in the Test.

The Agency's favourable experience with systems tests points the way to the continuation of these exercises. A second CERM test was foreseen a few years later, but the 1990-1991 Gulf crisis intervened. Since the IEA's Gulf crisis Contingency Plan consisted of CERM-like elements and provided a more than sufficient exercise of many CERM procedures, there was no need during that period to proceed with another simulation exercise. The Gulf crisis reality had fulfilled the required need at that point. The "live test" satisfied the Members that the required state of readiness for CERM was well in hand. Another test of the CERM (CERM Test II) is planned for 1995 as part of the expected review of CERM procedures. Planning for 1995 also includes a test of the Questionnaires A and B data systems, which could provide data for a further AST. Systems test are thus expected to continue to contribute to IEA readiness in this sector, as are the country reviews which are taken up as the last topic in this Chapter.

2. Country Reviews

Emergency response reviews of the IEA Members' preparedness represent a major IEA activity to maintain readiness to manage oil supply disruptions. The need for periodic reviews was foreseen by the IEA's founders, who wrote review requirements into the I.E.P. Agreement. They made provision for reviews by the SEQ on measures taken by Members to meet their emergency reserve commitment (mainly oil stocks) [Article 4], demand restraint [Article 5], allocation [Article 6], and the emergency data system [Article 36]. The resulting review information, assessments and recommendations are reported to the Governing Board which is empowered to make its recommendations or to take other appropriate action. In order for the SEQ's reviews to be grounded on an accurate and full presentation of the facts on these fat-reaching and at times complex subjects for each country, the Agency has developed a pattern of thorough and detailed reviews under which each Member is periodically reviewed by a team to experts which then makes its findings and views known to the SEQ.

The reviews began on a limited basis in the early years of the Agency, as in 1979 for example, when reviews were conducted for ten Member countries on demand restraint to be implemented upon triggering of the Sharing System. Similar reviews were conducted in 1980 for seven Members. The first cycle of reviews of all Members was Completed in 1981, and a new cycle was begun. The 1985 IEA Ministerial Communiqué gave explicit support to continued reviews of emergency preparedness [IEA/GB(85)46, Annex I, paragraph V. 6)], and in 1987 it did so for a new round of reviews [IEA/GB(87)33, Annex, paragraph 23] which were expected to identify areas of improvement in effectiveness of demand restraint programmes. Following completion of the review cycle which ended in 1989, the Governing Board "noted that procedures for the current cycle of reviews have been demonstrated to be efficient and productive" [IEA/GB(89)54, Item 4(b)]. Another review cycle was completed in the period 1989-1993, and still another is scheduled to commence in 1995. Over the years, the scope of the reviews has evolved to cover not only demand restraint but emergency response preparedness generally under the Sharing System, and since 1984 also under CERM measures.

The scope of subjects presently reviewed is indicated in the Emergency Response Programme Review Questionnaire Outline [IEA/SEQ(94)26]:

I. Oil Import Dependence and Market Structures
   - i) Oil Supply, Demand, and Import Issues
   - ii) Market Structures

II. Emergency Response Policy and Emergency Organisation
    i) Emergency Response Policy
    ii) Emergency Organisation
    iii) EMM Allocation Procedures
III. Emergency Reserves
    i) Policy and Legal Instruments
    ii) Operational Aspects of Stockdraw
    iii) Compensation and Costs
    iv) Compliance Issues
IV. Demand Restraint
    i) Policy and Legal Instruments
    ii) Procedures and Monitoring
    iii) Decision Processes
    iv) Costs
    v) Evaluation of Measures
V. Surge Production and Fuel Switching Capabilities
VI. Data Issues
    i) Compilation and Transmission
    ii) Forms, Procedures and Legal Instruments
VII. International Co-operation on Oil Security Issues
VIII. Other

The questionnaires provide a principal basis for preparation of the Review Team which makes the review investigations and analysis. The Teams typically consist of two or more senior officials from other Member governments and members of the Secretariat. Some of the reviews are conducted in the country concerned when that is required because of the complexity of the mechanisms and the numbers of personnel involved in those countries. The other reviews are conducted at IEA offices in Paris.

The periodic reviews are essential to the maintenance and improvement of the Member's emergency response potential. Thorough and detailed, the reviews need to be frequent enough to "reflect major changes in emergency response legislation, important developments in long-term net oil import prospect and other fundamental changes in the emergency response situation of Member countries" [IEA/GB(94)26, paragraph 1]. In the cycle beginning in 1995, the Secretariat expects to pay particular attention to new legislation, new stockholding agencies, major changes in supply/demand trends, and other factors affecting response potential. More particularly, the reviews will emphasize meeting the IEA's 90-day emergency reserve requirement (mostly

through oil stocks), strengthening further holdings of emergency oil stocks beyond 90-days, increasing the efficacy of demand restraint programmes, and developing, national fair sharing systems. The reviews will also focus sharply on the specific recommendations made to the reviewed countries in the previous review cycle, on the results of the 1994 Kagoshima Workshop on Stockdraw and Emergency Response Policies and Management, and on the results of an oil security review foreseen for 1995. Moreover, for the first time, the results of these reviews have recently been published by the IEA [*Oil Supply Security: The Emergency Response Potential of IEA Countries, 1995*]. Along with the recently published *Proceedings* of the Kagoshima Workshop they constitute a comprehensive guide to the state of IEA preparedness for international oil disruptions in 1995.

The Agency has thus moved well beyond the initial I.E.P. provisions for SEQ reviews, to develop an elaborate, thorough, and effective system of supporting investigations, assessments, and recommendations. Combined with the emergency response tests taken up in the previous Section of this Chapter, the emergency response reviews play a vital role in maintaining the Agency's emergency response readiness.

This concludes the discussion of the Agency's policies and practices with respect to oil security, which treats essentially the short-term responses to oil supply disruptions. As seen above, the Agency disposes of a considerable array of measures which may be employed for that purpose. Moreover, the Agency has installed systems of flexibility for the decisions selecting and applying particular measures, and it maintains these measures at a high degree of operational readiness. Yet the IEA's energy security problem is not limited to these short-term oil supply disruption measures. Relatively long-term policies and actions have also proved to be necessary to strengthen the industrial countries overall energy security, as will be seen in the following Chapter on that subject.

Long-Term Energy Policies: Reducing Members' Dependence on Imported Oil

This Chapter is devoted to the IEA's co-operation on long-term policies and actions for reducing its Members' dependence on imported oil. This broad energy policy subject includes not only measures to increase indigenous production of oil, but also the Agency's early measures fixing numerical objectives and ceilings for oil imports, adopting firm energy policy principles, and protecting new energy investments. Long-term energy policy also extends to energy conservation and efficiency, as well as to the energy alternatives to oil, and thus to coal, natural gas, nuclear energy, hydroelectricity and other renewable energy sources. The discussion continues with electricity generally, and energy trade and investment. Energy and environmental policies and actions feature prominently in this Chapter. After describing the IEA's energy policy review process, this Chapter closes with a discussion of the Agency's "free markets" policy now in effect and its comprehensive declaration in the 1993 IEA Shared Goals.

While the IEA's most immediate problems of protection against oil supply disruptions received highest priority when the Agency was first established [See Chapter III above], the founders of the Agency were also keenly aware of the need for effective policies to reduce their dependence on imported oil, which they could achieve only over the long term. The IEA's long-term energy policies began with only the sparest of guidance from the Agency's founders, although the general objectives of long-term policy were well understood twenty years ago. During the negotiation of the I.E.P. Agreement, there was little time to devote to long-term policy for addressing the problems of continuing oil import dependence. At that time the founders of the Agency were unable to finish the details of the Agency's oil Emergency Sharing System, much less to develop in the short time available a coherent long-term programme. This task in fact would later consume over a year of concentrated IEA deliberations to complete. Yet the founders

started in the IEA a process of long-term policy co-operation to ensure the continuous strengthening of protection from oil supply disruptions.

When long-term policies began to take form in the IEA, the Members gave effect to early policy outlooks favouring direct intervention measures, as seen in numerical objectives for oil import reductions, conservation, and expanded use of an important alternative fuel like coal, with support in the IEA's 1977 "Principles for Energy Policy" covering most aspects of long-term policy, taken up in Section D-1 below. When it became clear in the 1980s that this approach could not produce the intended results, the Agency shifted the emphasis of long-term policy to more pragmatic means of promoting the production and use of alternatives to oil, to energy security, to sustainable economic development, to protection of the environment, and to the enlargement of the scope of IEA policies and actions on a worldwide basis. These developments culminated in the IEA Ministers adopting in 1993 the IEA Shared Goals, which stated the Agency's overall policies also in terms of free markets and globalisation [See Section G below].

This IEA process of developing long-term energy policies began with modest general guidance contained in the brief passages of the I.E.P. Agreement's Chapter VII on this subject, consisting of a declaration that Members "are determined to reduce over the longer term their dependence on imported oil for meeting their total energy requirements" and of commitment to "undertake national programs and promote the adoption of co-operative programs" in a number of areas set out in the Agreement. The scope and character of their commitments were to be developed later in the Governing Board, in the specified areas of conservation of energy, development of alternative sources of energy, energy research and development, and uranium enrichment. The Agreement charged the Governing Board to adopt the long-term policy decisions by 1 July 1975; i.e. in a little over seven months. This schedule ultimately did not prove possible. Preparations in the Standing Group on Long-Term Co-operation for submission to the Governing Board and the adoption of the decisions took overall about fourteen months to complete.

A. The Long-Term Co-operation Programme (LTCP)

Following an arduous negotiation, the Governing Board officially adopted the resulting Long-Term Co-operation Programme (LTCP) on 30 January 1976,

with effect from 8 March 1976 [IEA/GB(76)5, Item 2]. The LTCP was adopted by consensus without formal reservations or exceptions, aside from the Canadian exception to the Programme's Chapter V on legislative and administrative obstacles and discriminatory practices [See Section D-7 below]. The Programme reflected the IEA Ministers' judgement on "the importance for the world economy of a regular and stable energy supply" [PRESS/A(75)20, p. 1] and the Agency's aim of "accelerating and facilitating the medium and long-term transition to an oil-scarce world economy" [IEA/GB(80)5, paragraph 1]. Some of the commitments were taken in legally binding form; others adopted essentially political commitments formulated as declarations or recommendations which are not legally binding. The comprehensive and detailed programme, designed ultimately to contribute to the security of energy supply, still provides the conceptual basis, framework and essential policies for IEA long-term co-operation.

The LTCP is to be carried out through the co-ordination of national efforts and by co-operative activities designed to accomplish the following objectives:

- Promote the conservation of energy.
- Accelerate the development of alternative sources of energy, through an overall framework to increase and stimulate energy investment, a general measure to safeguard such investment, and co-operation in the production of energy.
- Encourage and promote new and beneficial technologies for the efficient production and utilization of energy.
- Work toward the removal of legislative and administrative obstacles and of discriminatory practices that could impede the realization of the Programme [See LTCP, Chapter I, paragraph 2].

Members accepted commitments to establish on a periodic basis *medium- and long-term objectives* for reducing the group's dependence on imported oil, to review progress toward meeting these objectives, and to assess the adequacy of their national and co-operative activities [See Chapter I, paragraph 3]. The LTCP is designed to achieve an "equitable balance of advantage" among Members, taking into account their respective economic and social interests and objectives. All the elements of the Programme are "regarded as interlinked" and are to be implemented "to ensure a continuing balance between burdens and benefits" [Chapter I, Article 1]. Each of the IEA's main long-term policy categories developed in the course of the Agency's first

twenty years is specifically foreseen or foreshadowed in the I.E.P. Agreement or the LTCP, although the priorities, intensity of interest, and focus of the Members and the operational scope of the various Programme elements would rise and fall as a function of the changing conditions, opportunities, and severity of the challenges facing the Agency. Since the LTCP was adopted in 1976, the Programme has not been formally amended except for several additions to the R & D Guiding Principles set forth in Annex II to the Programme [See Chapter V below]. The major policy directives and programme structure remain textually unchanged, although the operating policies have since evolved in many cases, as will be seen in the history of the long-term sector developed in this Chapter.

B. Energy Conservation and Efficiency

Conservation policy as stated in the 1976 LTCP focuses on the reduction of the rate of growth of energy and particularly oil consumption, on the elimination of waste, on more efficient energy utilization, and on the application of energy price levels to reduce demand for energy. The principal instruments to be employed are the fixing of "conservation objectives" and periodic reviews of national programmes and policies in this sector [LTCP, Chapter II]. Analytical studies, publications, and public education programmes were soon added to the instruments at hand. As developed in the Agency, *energy conservation* has come to refer to policies on the use of less energy, by reducing the extent or quality of the services resulting from energy use, and the related notion of *energy efficiency* refers to policies designed to produce essentially the same services with the use of less energy. A key role of Members' co-operation in this sector has been the sharing of information and experiences as well as the development of common objectives and policies.

Conservation activity in the IEA moved forward rapidly. In keeping with the Agency's policy during the early years to establish numerical objectives, ceilings, targets, and goals as policy implementing and performance measuring devices, conservation "targets" were almost immediately fixed, first for 1975 (and medium-term targets for 1980 and 1985), then for 1976 and 1977. These targets were expressed as percentage reductions of primary energy and oil consumption *growth*, and Members expected that additional targets would be fixed for later years. However, the Agency's agreement on broad policy pronouncements and its fixing of targets

in the conservation field would not suffice. The Agency's assessment of the Members' national conservation policies and programmes led to the early preparation of an indicative list of recommended conservation measures, which would also play a role in the IEA's periodic energy policy reviews [See Section F below]. While conservation was included as one of the instruments for realizing the later Group Objectives for reducing oil imports, the practice of establishing specific targets for conservation on a continuing basis was not welcomed by all Members and would eventually disappear.

Conservation figured prominently in the "Principles for Energy Policy" adopted in 1977 [See Section D-1 below], where policy was stated not in the form of ultimate objectives but more in terms of actions which could contribute to the realization of the objectives. Principles 3 and 4 stated the basic conservation actions to be taken:

3. Allowing domestic energy prices to reach a level which encourages energy conservation and development of alternative sources of energy.
4. Strong reinforcement of energy conservation, on a high priority basis with increased resources, for the purpose of limiting growth in energy demand relative to economic growth, eliminating inefficient energy use, especially of rapidly depleting fuels, and encouraging substitution for fuels in shortest supply, by implementing vigorous conservation measures in various sectors along lines which include the following elements:
   - pricing policies (including fiscal measures) which give incentives to conservation;
   - minimum energy efficiency standards;
   - encouragement and increase of investment in energy saving equipment and techniques.

These Principles were accompanied by an inventory of still more specific conservation measures applicable to industrial, residential, and commercial installations, transport, and the "energy sector" (the latter referred to district heating, combined production of heat and power, waste products, and heat, as well as full cost tariffs for electricity generation) [IEA/GB(77)52(1st Revision) Appendix A to the Principles, pp. 23-24].

By 1979 the IEA was framing the objective of conservation policy in part as an "overall energy/economic growth ratio" and as a measure of "energy efficiency", as suggested in Principle 4 quoted above. The ratio of energy consumption to gross domestic product, known as "energy intensity",

became an important policy indicator. However, the use of an indicator of energy efficiency improvement became problematic when it developed that other factors, especially the changing structure of the economy and the changing products and value additions of major energy intensive industries, had major influences on intensity. Another measuring device was the ratio between the rate of increase in energy consumption and the rate of economic growth, a formula which found its way into IEA deliberations in 1980 when the expectation was that over the decade to come that ratio could be reduced to about 0.6, and when it was assumed that the share of oil in total energy demand could be reduced from 52 per cent in 1980 to about 40 per cent by 1990 [IEA/GB(80)58, paragraph 10].

However, guidelines for more specific policies and actions had also become necessary for policy making. In December 1980 IEA Ministers adopted additional measures for structural change, including "energy demand management" to promote conservation and to encourage substitution away from oil. In order to increase public awareness of useful conservation actions, and to "move from statements of general intention to more specific actions to achieve results", IEA Ministers adopted a decision containing "Lines of Action for Energy Conservation and Fuel Switching" to be implemented in national policies [IEA/GB(80)97, Item 4 and Annex II]. The key provision of the "Lines of Action" was appropriate energy pricing, to "Allow energy prices to reach a level which encourages energy conservation, movement away from oil, and the development of new sources of energy" [Paragraph 5]. Also included were specific measures for industry, road transportation, residential and commercial buildings, and electricity generation and transmission.

IEA Ministers found in 1982 that the increase in oil prices over the period 1978-1982 "has made *conservation* more economically attractive" [IEA/GB(82)51(1st Revision), paragraph 11]. After noting that significant progress had been made, Ministers concluded that there was more progress to come, depending upon further efficiency efforts in Member countries, "particularly in areas where government action can *remove barriers to the operation of market forces*, or is needed to *supplement* market forces" [Emphasis added]. Ministers agreed to keep their national programmes under review and to pay particular attention to the retrofit of rental dwellings, to the industries' difficulties in developing their own electricity supplies, to bulk metering practices in multiple unit dwellings, and to district heating. The eased market situation in 1984 still caused concern about conservation in motor car fuel efficiency, since reduced consumer interest in fuel efficiency could impair car manufacturers' efforts in this sector. Noting again that gains had been made, the Governing Board adopted its "Decision

on Policies to Improve the Fuel Efficiency of New Passenger Cars" [IEA/GB(84)42, Item 3(e) and Annex I], a text that reflected agreement on a group of measures to be applied as appropriate on enhanced testing procedures, on the dissemination of information to consumers, on fuel efficiency programmes, and on the evaluation for policy purposes of new and stringent automobile exhaust emission standards.

Since the mid-1980s the trend in IEA conservation policy has been to place greater emphasis on market forces, although the IEA has stated that the *full potential* for achieving energy efficiency and conservation gains "can best be realised through market forces and government policies complementing one another in a manner which depends on national circumstances" [IEA/GB(85)46, p. 4]. In 1985 the Ministers agreed that "government policies remain important to continued progress in reducing energy intensity, and that those policies should be selective, carefully planned, cost effective and their results periodically assessed". At their 1989 meeting, IEA Ministers cited efficiency gains as one of the factors contributing positively to overall economic activity and energy security in IEA countries [IEA/GB(89)36 Annex, paragraphs 2 and 4(c)]. The Ministers agreed on the need to "continue the gains already achieved and to increase the *rate of improvement* above present levels" [Emphasis added]. The IEA published at this time its important work on *Electricity End-Use Efficiency.* Future action on energy efficiency would concentrate on the large and fast growing sectors of transportation, electricity generation and end use, heating and energy process requirements. The means to be employed would be market-based pricing and detailed measures, as appropriate to national circumstances, on information provision and dissemination, on the removal of institutional and other market barriers, on the development and application of technologies, on financial or fiscal incentives, on taxation, and voluntary and mandatory standards, taking account in each case of the economic and other costs.

In more recent years, IEA conservation policy has retained the foregoing policy measures, while emphasizing the contributions to be made to environmental objectives, the removal of barriers to efficiency gains, co-operation with industry, and the accelerated deployment of new technologies. In the 1993 IEA Shared Goals, Ministers stated this:

> Improved energy efficiency can promote both environmental protection and energy security in a cost-effective manner. There are significant opportunities for greater energy efficiency at all stages of the energy cycle from production to

consumption. Strong efforts by Governments and all energy users are needed to realise these opportunities [IEA/GB(93)41, paragraph 5].

Some of the results of IEA conservation and energy efficiency policies and actions are especially worthy of note. During the Agency's first ten years, the IEA Members' energy demand and oil demand per unit of GDP both declined, energy demand by 19 per cent and oil demand by 34 per cent. Over the longer period of the IEA, the results are even more impressive: per unit of GDP, IEA energy demand fell 25 per cent, and oil demand fell 43 per cent, although total energy consumption increased over that period [See *Energy Policies of IEA Countries: 1993 Review,* Table A-19, p. 568]. This reduction in the intensity of energy consumption resulted from a number of factors, including structural changes in Member country economies and market reaction to changing energy prices, as well as the effective application by governments, industry and private individuals of energy efficiency policies and practices developed or promoted in the IEA.

C. Oil Import Reduction Policies and Actions

Direct measures for meeting the Agency's objective of reducing Members' oil imports attracted strong support in the early years of the IEA. The notion of agreed limits on oil imports at levels below expectations was at that time the preferred policy instrument. These limits were expressed as numerical objectives, ceilings, or targets, and the corresponding reductions were to be achieved by application of the "Principles of Energy Policy". In addition, the Agency adopted a number of policy declarations and actions promoting greater indigenous production of oil in Member countries and elsewhere. These policy developments are the subject of this Section of the long-term energy policy Chapter.

1. Oil Import Objectives and Ceilings

After beginning with quantified conservation objectives in 1975 and 1976, the IEA was attracted in 1977 to quantified oil import objectives. In the Ministerial Decision on Group Objectives and Principles for Energy Policy [IEA/GB(77)52(1st Revision), Item 2(c) and Annex], Members agreed to a

political (not legal) commitment to "hold their total oil imports to not more than 26 million barrels per day in 1985". This policy mechanism was intended to be repeated and developed in subsequent years as well. IEA "Principles for Energy Policy" consists of a broad statement of key principles to be pursued in the formulation and development of national energy policies. The Principles were initially intended as instruments to assist in the realization of the Group Objectives, but they later served, and continue to serve, a more general energy policy guidance function.

Since the Group Objectives for reducing oil imports expressed a global figure for the IEA group as a whole, they could provide only general guidance to individual countries seeking to apply it. Although this Objective suffered from a lack of country-specific precision, it was considered a first step in a process of establishing co-ordinated control of IEA oil import levels. In the next step, the IEA sought to break down the group numbers into specific ceilings for each country individually, which was not an easy objective on which to reach consensus. The country-by-country ceilings were intended to provide responsible officials with a more concrete and realistic basis for setting policy and to offer the IEA review process a more specific measure for assessing the effort of each Member to reduce oil imports.

Following decisions taken at the Tokyo Summit in 1979, not only was the Group Objective for 1985 reduced to 24.6 mbd from 26 mbd, but *country specific import ceilings* were set for the year 1980. This was the first and only time that the Agency officially adopted individual country ceilings of that nature. However, the 1980 individual country import ceilings were taken as firm commitments, while the 1985 adjusted import reduction Objective was taken rather as a "goal" to be pursued. Both of these decisions had been characterized as "political commitments" [See IEA/GB(77)52(1st Revision), Item 2(d); IEA/GB(80)58, paragraph 12(a), third tiret], which meant that they were not intended as "legal commitments". As such, the decisions could be more far-reaching in scope and more flexible in application than legal commitments could be on such subjects.

The expectation that the Group Objective would be adequately implemented through the application of the "Principles for Energy Policy" was almost immediately challenged, as revealed first by the 1977 country review [See Section F below more generally on country reviews]. In the Governing Board's April 1978 assessment, the Board concluded that the Review "demonstrated very clearly that efforts undertaken are not sufficient", with respect to the group as a whole and for a majority of individual Members [IEA/GB(78)18, Item 2(a)(3)], and the Board then made a number of policy recommendations for both the group and individual countries. In their review

the following year, Ministers again noted that the Group Objective of limiting oil imports to the agreed level "seemed capable of realization, *but expressed deep disquiet that the achievement of this Objective might result principally from a lower level of economic growth than had been assumed when the Objective was established*" [IEA/GB(79)35, paragraph 5; emphasis added]. This statement assumed doubts about the effectiveness of the Members' performance and of the assessment of their efforts, notwithstanding the fact that there was a short-term rhetorical value associated with the numerical measures. The problems included uncertainty about the realism of the quantified Group Objective and about the ultimate credibility and utility of policy reviews based upon them. Since it was clear that the national import ceilings and goals would have to be modified from time to time to reflect potential change in a multitude of underlying factors, in May 1980 the Governing Board at Ministerial Level adopted an adjustment system [IEA/GB(80)49, Item 3(a)(ii) and Annex II] which would take into account the existing ceilings and goals, existing estimates of national oil requirements, oil supply and demand developments, and equitable burden sharing, among other considerations. Whether adjustments were to be made or not, questions about the desirability and effectiveness of the co-ordinated control of group or individual country oil imports could not be ignored, in view of the differences among Members' situations generally and among their respective current and prospective growth rates, and in view of the important role to be accorded to free market notions.

Following vigorous monitoring and assessment in the IEA's Standing Group on Long-Term Co-operation (SLT) and in the Governing Board, the Members' interest in numerical objectives, ceilings, and similar instruments seemed to reach its peak. By May 1980, the Ministers noted that imports for 1985 "should substantially undershoot the existing 1985 Group Objective", in realizing both the potential for savings in oil use and for increased oil production [IEA/GB(80)58, paragraph 9]. The Ministers discussed arrangements for considering future yardsticks and ceilings, but none was adopted. The Secretariat's analysis of the Members' performance with many country-specific suggestions and recommendations was published in an Annex to the Communiqué. In December 1980 new Objectives and Ceilings were not established, but the Ministers agreed simply that "total IEA net oil imports will have to substantially undershoot both the 1985 Group Objective and Member countries' current estimates of net oil imports for 1985. They noted the Secretariat assessment that prudent policy suggests aiming for net oil imports of between 22 and 23 mbd in 1985" [IEA/GB(80)85(FINAL), paragraph 11]. A similarly soft approach was taken in 1981, when Ministers reconfirmed the

existing policy principles and "stressed the need for consequent and continued implementation". While they noted that "the Secretariat has indicated a potential for limiting IEA net oil imports to 19-21 mbd in 1990 and even lower by the end of the century, if appropriate policies are carried through", no new numerical criteria were adopted [IEA/GB(81)34(Final), paragraph 6]. In March 1981 the SLT expressed concern about the realism of estimates on growth rates, domestic production, and import levels employed in the numerical calculations. The SLT "agreed that more emphasis should be given to a *qualitative approach* rather than a *quantitative approach*" and noted the difficulties of several Delegations in accepting specific net oil import levels [IEA/SLT(81)52, paragraph 33; italicized emphasis added; underscoring in the original]. Two years later, IEA Ministers listed in the Communiqué their IEA commitments, including the "Principles for Energy Policy", but they made no mention of the Objectives and Ceilings or any other numerical criteria [IEA/GB(83)36(Final), Annex I, paragraph 3].

2. Energy Investment Measure (MSP)

In addition to the oil import Objectives and Ceilings discussed above, another interventionist feature of the LTCP is the so-called Minimum Safeguard Price (MSP) mechanism, contained in Chapter III, Section D of the Programme under the caption "General Measure of Co-operation". In the MSP Decision, IEA Members agreed to "ensure that imported oil is not sold in their domestic markets below a price corresponding to US$ 7/bbl", in accordance with the terms of the Decision. The MSP Decision applies to imported crude oil and certain products. The minimum price of $7 is not specifically indexed; although it can be modified by Governing Board decision, it never has been. To apply the MSP, the Members would choose from a list of approved measures: a specific or variable charge (levy, duty, tariff, or fee) on oil arriving at the border at an f.o.b. price below the MSP, an import quota, consumption or other appropriate taxes, or other measures deemed appropriate by the Governing Board.

The MSP remains on the books, but it became inoperative as a practical matter a few years after it was adopted, for lack of supporting decisions necessary to its application. The $7 level was adopted at a time when it appeared that oil producers could impose oil price reductions to a level which would make certain domestic oil investments by IEA Members uneconomic (North Sea, Alaska, and tar sands oil resources were mentioned at the time). Assuming a challenge of predatory pricing of oil in producer countries, the MSP would maintain the minimum price necessary to ensure

that the necessary investment in industrial countries would not be adversely affected. This measure has never been applied; indeed its activation has never been proposed to the Agency. Broader principles of energy policy almost immediately assumed greater importance in the IEA's deliberations on long-term policy. The MSP has been treated for years as of little other than historical interest.

3. Indigenous Production of Oil

The IEA has pursued a number of policy developments favouring enhanced domestic oil exploration, production, and processing, although early expectations of extensive co-operative efforts and joint projects by Members in this sector [See LTCP, Chapter III. C] have not been realized. When the IEA adopted comprehensive "Principles for Energy Policy" in 1977, an important first Principle stated that Members would pursue the establishment of national programmes and policies formulated as specifically as possible for

> reducing in absolute terms or limiting future oil imports through . . . expansion of indigenous energy sources . . . [IEA/GB(77)52(1st Revision), Item 2 and Annex I, Principle 1].

In May 1979 IEA Ministers "considered that oil exploration and development and enhanced recovery techniques, within the IEA and worldwide, should be strongly encouraged by policies which promote the development of reserves on a timely basis, under sound economic and reservoir management practices, and by appropriate pricing policies". They also initiated an Agency study on "the capability of refineries in IEA countries to increase the yield of light products" and mandated work on "the need for policies designed to achieve a better balance between future crude oil availability and refinery configuration" [IEA/GB(79)35, paragraph 12]. Moreover, in May 1979 the Agency launched an R & D enhanced oil recovery collaborative project in which a large number of IEA countries still participate [the R & D projects are described in Chapter V below].

Broad policy statements to encourage the indigenous production of oil in IEA countries have been made by IEA Ministers on a regular basis. In December 1980 for example, they recognized that oil shortages could be avoided by "strong and urgent policy measures to . . . expand supplies of liquid fuels through . . . exploration and development efforts in IEA countries in order to maximise indigenous production on a long-term basis". They also recognized that "oil prices in general should reflect international oil

prices, in order to promote a balanced energy market [and] the development of alternative fuels and an associated reduction of dependence on oil". They agreed "that in order to assist in achieving these goals, the IEA should examine more closely the pricing of energy in general and institute a more effective monitoring system on energy pricing" [IEA/GB(80)85(FINAL), paragraphs 13 and 15].

At the IEA Ministerial meeting three years later, the price and fiscal elements were highlighted more specifically. Ministers agreed to pay particular attention to

- the removal of those price regulations which discourage the development of indigenous energy or the displacement of oil by other fuels or the efficient use of energy; . . .
- reviewing of energy pricing policy with the aims that energy prices should be more transparent and more closely reflect market prices or the long-term costs of maintaining supplies, as appropriate;
- the structuring of fiscal regimes for oil and gas production so as to encourage timely development [See IEA/GB(83)36, paragraph 5].

In the period following the 1990-1991 Gulf War, heightened oil security concerns and rising demand brought renewed Ministerial declarations on the need for greater indigenous oil production in Member countries. In the early 1990s the Agency's oil production concerns reflected the IEA's growing dependence on imported oil once again. IEA Ministers clearly discerned that the rise in imports, with most coming from the Middle East, presented a new challenge of increased vulnerability to oil supply disruptions, which would inexorably result in "short-term market instability and longer-term investment indecision". In 1991 the key words were these:

> Ministers encouraged Member countries to exploit all economic and environmentally appropriate opportunities to *minimise declines in their own indigenous oil production* and to promote diversified investments in worldwide production [IEA/GB(91)42/REV2, paragraph 9; emphasis added].

Referring to investment, oil production, environmental and security goals, IEA Ministers in 1993 confirmed that

> . . . investment requirements in the oil sector will be substantial over the next decades and the supply response to meet the

> expected upsurge in oil demand could be improved by greater predictability in the policy framework. Recognising the importance of adequate oil production and refining capacity for achieving security and environmental goals, Ministers call on the IEA to closely monitor and analyse capacity developments, in particular the effects of environmental constraints on refining capacity, from both a regional and a global perspective [IEA/GB(93)41, paragraph 9].

The 1993 IEA Shared Goals assumed the same lines of policy concerning indigenous oil production. Relevant measures include the emphasis on "the establishment of free and open markets" and on energy security as underlying objectives. More specifically the Shared Goals call for diversity of supply, minimization of environmental impacts, clean and efficient fossil fuel use, improved energy efficiency, R & D, undistorted energy prices, free and open trade, and co-operation among all energy market participants. It is likely that the application of each of these lines of policy developed in the IEA Shared Goals will play a significant role in the further development of indigenous oil resources. However, the IEA has never considered that indigenous oil production alone could remove the risks of oil import vulnerability. From the outset, the IEA's other major policy approach to this problem has been the development of alternative energy sources, formulated in recent years as "energy diversity", which is the subject of the Section which follows.

D. Alternatives to Oil: Energy Diversity

In addition to conservation and indigenous oil production, the Agency's long-term programme relies heavily upon alternatives to oil, or the policy of "energy diversity", to reduce oil import dependency. The Members agreed in the LTPC to "carry out national programmes and to undertake co-operative measures and programmes to stimulate and increase production from alternative sources of energy as rapidly as possible, consistent with their economic and social conditions" [Chapter III, Article 1]. To that end, the Members undertook to "create a climate favourable for investment in energy" [Article 2] and to "establish medium- and long-term objectives for the group as a whole for the production of alternative sources of energy"[Article 3]. The LTCP also established the IEA's system of periodic reviews of Members'

"national programmes and policies relating to the accelerated production of alternative sources of energy" [See Section F below]. The Members undertook as well to "co-operate, to the extent feasible and desirable, in increasing the production of energy from specific energy sectors" and established a framework for co-operation on energy projects [LTCP Chapter III, B and C]. This Section considers the general energy policies contained in the "Principles for Energy Policy" and the IEA's policies and actions with respect to the particular alternative energy sectors.

1. Principles for Energy Policy (1977)

The discussion of the Group Objective in Section C-1 above referred to the adoption of the IEA "Principles for Energy Policy", which provided Members with agreed guidance on the optimal means for realizing that Objective. However, these Principles set forth the general principles IEA countries are to pursue in the formulation and development of national energy policies on a broader basis. Moreover, they remain in force today (together with the IEA Shared Goals) and thus merit particular attention. In sum, they fix IEA energy policy on the following themes:

- Establishment of national programmes and policies formulated as specifically as possible for reducing oil imports through conservation of energy, expansion of indigenous energy sources, and oil substitution.
- Attention to important environmental, safety, regional policy, and energy security concerns, and improvement of speedy procedures to reconcile conflicts arising between energy policies and these concerns.
- Pricing energy in domestic markets at levels which encourage conservation and stimulate supply.
- Vigorous conservation policies using price mechanisms, minimum efficiency standards and increased investment.
- Progressive replacement of oil in electricity generation, district heating, industries, and in other sectors.
- Strong steam coal utilization strategy and promotion of trade in steam coal.
- Concentration of the use of natural gas on premium requirements, and gas infrastructure development.
- Steady expansion of nuclear generating capacity, consistent with safety, environmental, and security standards.
- Emphasis on energy R & D, including collaborative projects.

- Establishment of a favourable investment climate which encourages the flow of public and private capital to develop energy resources.
- Development in energy policy planning of alternatives to oil to meet supply shortfalls.
- Co-operation on energy with other countries and with international organizations.

[The adopting decision and full text of the Principles are found in IEA/GB(77)52(1st Revision), Item 2 and Annexes; the Principles are reproduced in Appendix III below. Document IEA/GB(77)53 describes in greater detail the policies and measures which IEA Members intend to pursue in order to achieve the Group Objective, once they have taken into account the Principles and the results of the IEA's country reviews].

These comprehensive Principles constituted the leading standing statement on the Agency's policies until the IEA Shared Goals decision was adopted in 1993. The Governing Board stated that the decision containing the Principles does "not establish legally binding commitments" and that Member governments "express their firm political determination that, taking into account their individual energy circumstances, they will give effect to this Decision in carrying out their policies" [IEA/GB(77)52(1st Revision), Item 2(d)]. However, the Principles have been largely overtaken in practical terms by the 1993 IEA Shared Goals which emphasize market forces more than governmental intervention as an instrument of policy [See Section G below]. Both the Principles and the Shared Goals figure prominently in the discussion of energy sectors which follows. In policy developments geared less to government intervention and more toward market forces, productive efforts have been made by the Agency to encourage the development of increased domestic production of oil and the other alternatives to imported oil.

2. Coal Production, Trade, and Use

From the time of the founding of the IEA, coal was already identified as the principal energy sector to be developed as an alternative to oil. While domestic oil production, natural gas, nuclear energy, hydroelectric power, and renewable energies were also strong elements, *coal* was the leading alternative energy source. Coal benefited from its ample supply availability in many industrialized countries and from its favourable transportation and trade prospects. Environmental considerations were taken into account, but early IEA policies were developed before climate change became a public policy concern.

Although long-term energy policies are not developed in detail in the I.E.P. Agreement, Article 42.1(b) refers specifically to coal, and lists it first after domestic oil. The I.E.P. Agreement envisions a co-operative programme on information exchange, on the ways and means of reducing imported oil consumption through such alternative energy sources (including jointly financed projects), and on environmental protection. Nothing further on coal appears in the Agreement; indeed coal received little specific attention in the LTCP when it was finally adopted in 1976.

However, the LTCP did mandate energy co-operation among Members to increase "the production of energy from specific energy sectors" [Chapter III, B]. The alternative energy Chapter of the LTCP referred to the establishment of national programmes, to the creation of a climate favourable to investment, to the use of public resources to contribute to or engage in the production of energy, to medium- and long-term objectives, and to periodic reviews, all of which applied to coal production, use, and trade. Coal was listed in Chapter III, B. 3 with nuclear energy as a key sector for co-operation in the production of energy, in annual programme reviews, and in periodic assessments of the potential for additional production. More specific substantive policy actions on coal (and the other alternatives to oil) were left to the later determination of the Governing Board following more systematic research and analysis in this sector.

IEA policy statements on coal began to take more concrete form with the 1977 "Principles for Energy Policy" [See Section D-1 above], in which a "strong steam coal utilization strategy and active promotion of an expanded and reliable international trade in steam coal" were announced [Principle 6]. These efforts would be composed of the following elements:

- Rapid phasing-in of steam coal as a major fuel for electrical power generation and in industrial sectors.
- Further development of steam coal policies within producing, exporting, and consuming IEA countries in order to support the increased utilization of coal by enhancing market stability through reliable and increased export and import flows under reasonable commercial terms.
- Development of policies to remedy anticipated infrastructure bottlenecks.

While the foregoing text stated basic IEA coal policy, other provisions of the Principles also affected coal policy; for example, Principle 1 on the

formulation of specific policies, Principle 2 concerning environmental, safety, regional and security concerns, Principle 3 on price levels, Principle 5 on discouraging oil-fired electricity generation, and on district heating and industrial use, Principle 9 on research and development, Principle 10 on a favourable investment climate, Principle 11 on emergency planning, and Principle 12 on international co-operation. These Principles evolved into more concrete formulations for coal in 1979, but technically they remain still in force. Their application would be affected by the 1993 IEA Shared Goals, although the Goals did not formally replace the Principles [See Section G below and the remainder of this Section].

In the year following the adoption of the "Principles for Energy Policy", the Secretariat conducted a major analytical study on the subject of the role and potential of coal for the remainder of the century. This study was published in 1978 under the title *Steam Coal Prospects to 2000*. It concluded that the presence of adequate reserves and the economic advantages of coal use indicated a potential for increased coal production, use, and trade. It also concluded that even to maintain modest economic growth, *a massive substitution of oil by coal* would be required. This work had a significant influence on the major coal policy developments which took place in the IEA in the course of 1979.

The year of coal in the IEA was unquestionably 1979, when the Agency adopted the far-reaching policies and actions on coal production, use, and trade which remain in force today. The first of these is the specialized "Principles for IEA Action on Coal" [IEA/GB(79)32, Item 4(a) and Annex I], accompanied by the "Decision of the Governing Board on Procedures for Review of IEA Countries' Coal Policies" [IEA/GB(79)32, Item 4(f) and Annex II]. In the same year the Agency was assured of the co-operation of the coal-related industries, particularly for advice on policy formation, by virtue of the "Decision of the Governing Board on the Establishment of an IEA Coal Industry Advisory Board" [IEA/GB(79)49, Item 5 and Annex]. These actions set for years to come the pattern of coal policy, the IEA's internal procedures for review of coal policy, and the advisory role of the coal related industry.

In adopting the Coal Principles, the Board first assessed the potential for coal, affirmed its previous policy statements, and outlined long-term considerations, noting the continuing problem of oil supplies, the relatively limited scope of the other alternatives to oil, the economic competitiveness of coal, and the long lead time for investment in coal utilization equipment. While the Board did not fix formally a group objective for increasing coal utilization, it did consider that

> thermal coal utilization in the IEA area, which in 1976 was 475 Mtoe, could, by adoption of strong national coal policies, increase beyond the 900 Mtoe for 1990 in current forecasts based on country submissions towards the 1500 Mtoe level for 2000 projected in the Secretariat's accelerated policy case in "Steam Coal Prospects to 2000" [IEA/GB(79)32, Annex I, paragraph 5].

The Board thus showed the expectation that a *doubling* of thermal coal utilization could be achieved by 1990.

In addition to considering the differing constitutional structures of Member countries as an important factor, the Governing Board's 1979 assessment also recognized that the achievement of this rate of thermal coal utilization would require policies to "encourage the necessary capital investment" in coal, that significant coal producers would wish to safeguard domestic coal production at required levels, and that "increased coal utilization, trade and production must proceed under acceptable environmental conditions" [Annex I, paragraphs 6-9]. The assessment concluded that long-term oriented government action would be necessary to reduce uncertainties and to improve coal development. It also concluded that this would have to be done within the IEA in co-operation with non-Members, that domestic measures to encourage expanded trade and investment in coal should be implemented, and that continuing review and assessment within the IEA would be necessary.

In the specialized provisions of the Coal Principles themselves, IEA Members agreed to "ensure that an economic, fiscal and investment climate prevails which is conducive to development of coal production, trade and utilization" as envisaged in the Principles [Principle 22]. "Standstill" provisions were included to protect the expansion of international trade and investment in coal from new measures inconsistent with the Principles [See Principles 23 and 25]. Energy pricing policies were established to allow coal to "develop its full competitive power" [Principle 18]. There are also provisions on long-term contracts [See Principles 22 and 24], on reduced uncertainty about national coal policies [See Principles 15 and 16], and environmental questions [See Principles 16 and 17]. Specifically on the subject of electricity generation, Principle 19 commits Members to preclude "new or replacement base load oil-fired capacity", to confine oil use progressively to "middle and peak loads", and to make "maximum use of fuels other than oil in dual-fired capacity", while Principle 7 of the earlier "Principles for Energy Policy" reserved natural gas for premium uses, not for electricity generation. The Coal Principles also refer comprehensively to coal

"transportation systems, port facilities and other infrastructure, where necessary, to handle much larger volumes of coal" [Principle 20], to advanced methods of coal mining, transport, and combustion, to R & D programmes, and to commercialization of advanced coal technologies [Principle 21]. In a more detailed Annex to the Principles, IEA Members agreed to take a number of specific steps concerning coal utilization, mining, and transportation.

In order to complete the essential framework of coal actions, in December 1979 the Governing Board established the Coal Industry Advisory Board, which now consists of up to 50 "individuals of high standing active in coal related enterprises to assist the IEA in the practical implementation of the Principles for IEA Action on Coal". The CIAB is composed of individuals who are active in coal producer, user, trader, transportation, or other energy related enterprises. The members are proposed by their respective governments or by the Executive Director and are appointed by the Governing Board in consultation with the Executive Director (or by the CIAB itself for individuals from non-Member countries), and CIAB members serve normally for three year terms in an individual capacity. The CIAB provides an independent forum in which industry leaders meet with Agency officials to advise on a range of coal industry related questions covering opportunities for expanding coal production, requirements for transportation facilities, expansion of the steam coal trade, electricity generation, investment capital, acceptable environmental conditions, advanced technologies, and national and international coal developments and trends as set forth in the CIAB terms of reference [IEA/GB(79)49, Item 5 and Annex, paragraph 1]. The CIAB thus became the third group of IEA industry advisors, in company with the IEA Industry Advisory Board (IAB) which advises on oil emergency questions and with the oil Industry Working Party (IWP) which advises on the oil market.

In the year that followed, for the first time the IEA's annual review assessed the Members' policy actions in the light of the Coal Principles. Coal proved still to be the alternative energy with the most substantial growth potential, but insufficient progress had been achieved under national policies. At the May 1980 Ministerial meeting, the Secretariat's analysis of the annual review produced the following conclusion on coal:

> Stronger actions are required to expand coal production (Australia, Canada and the United States, which should be prepared to develop further their capacity to export substantial quantities of coal); use (Germany, Italy, Japan, Spain, the United Kingdom); and trade, where greater attention to long-term

> contractual arrangements is necessary to provide the stability and confidence to develop new mines and transportation facilities. Positive action is required to deal with environmental considerations, including demonstration projects and other support for technologies that can reduce environmental impacts [IEA/GB(80)58, paragraph 5 and Annex I, paragraph (vii)].

By December of that year, the CIAB had delivered its first report to the Governing Board, and Ministers again addressed the coal problems. The CIAB had cautioned that without stronger actions against uncertainties, "the objective of doubling coal production and use by 1990 is not likely to be met", and stronger commitments and actions are required "if the potential of coal in reducing dependence on oil is to be achieved in a timely way" [IEA/GB(80)85(FINAL), paragraph 19]. Carrying the question one step further, the CIAB prepared an action programme with recommendations on the steps which would need to be taken for coal use to double by 1990 and to triple by 2000. In response to this report, IEA governments agreed to strengthen their efforts for coal use, production, and trade in the framework of the Principles, to carry out national coal policy reviews of the CIAB recommendations, and to act on them as appropriate. Ministers also mandated the development of a coal information system to be prepared with CIAB advice and endorsed the CIAB's plans for follow-up on the report.

Although the basic coal policy lines were thus in place by the late 1970s and early 1980s, the coal policies have since been confirmed, and at times enlarged upon in successive Ministerial meetings. Coal plays a major role in the annual energy policy reviews, and the results of these reviews all but ensure that the higher bodies of the Agency will review coal policy on a knowledgeable and systematic basis at least once each year. In addition, the Agency has conducted several specialized reviews of coal policies and programmes from which assessments are derived for further policy action on coal [See for example the policy outcomes of the coal reviews in IEA/GB(84)15, Item 3(c) and Annex I; IEA/GB(88)14, Item 2(ii) and Annex I]. The CIAB reports regularly with pertinent and respected advice on current coal questions. In 1982 the CIAB and the IEA published *The Use of Coal in Industry*, which confirmed analysis showing a large potential for coal in IEA countries. The IEA Coal Information System was established in the same year, following a CIAB recommendation and with Ministerial blessing; the System provides the basis for the IEA's annual *Coal Information* publication which has become the standard reference work on this subject. Another CIAB contribution, in the form of a report on *Coal Use and the*

Environment which appeared in 1983, concluded that the use of coal could be expanded in an environmentally acceptable manner and suggested actions which governments and industry could take to increase coal use. More recently the CIAB's reports have included *Global Climate Change* (1991), *Industry Attitudes to Combined Cycle Clean Coal Technologies* (1994), and *Global Methane and the Coal Industry* (1994).

Coal policy in the early 1980s began an enlarged and closer relation to environmental concerns, although those concerns were present in the IEA from the outset [See Section E below on energy and environment]. By 1983 the IEA was saying that "Coal use must be environmentally acceptable", with emphasis on "clean use of coal" and the need for R & D on coal use technologies [IEA/GB(83)36(Final), page 3 and Annex I, paragraph 7]. In its 1985 statement to Ministers, the CIAB addressed industry's concerns about environment strategies, funding for R & D, the electricity sector as an energy option, the information system, free trade, coal use in industry, and technical co-operation with developing countries [See IEA/GB(85)45]. R & D was stressed in 1985 when Ministers agreed to give weight to "the combustion of coal or its conversion to other forms of energy in an environmentally acceptable manner" [IEA/GB(85)46, Annex I, paragraph III.3], the statement appearing under an environmental rather than a coal rubric, presaging a theme which would reappear in the years to come. Other environmental policies endorsed at that time also had direct effects upon coal, such as the Polluter Pays Principle, environmentally acceptable ways of burning coal, better coal preparation, and use of low sulphur coal. Stating the governing environmental principle

> Ministers urge that, just as the formulation of energy policy should give due weight to environmental considerations, so should environmental policy give due weight to energy policy considerations [IEA/GB(85)46, Annex I, paragraph III.5].

This type of formulation has continued to receive support in IEA policy since that time. It appears as recently as 1993 in the important IEA Shared Goals adopted that year by Ministers [See Section G below]. But environmental opposition to coal expansion policy has been a constant IEA preoccupation. In 1987, the atmospheric content of carbon dioxide stemming from use of fossil fuels was beginning to attract a great deal of policy attention. Damage to the climate, agriculture, and sea levels was cited as a reason for undertaking a "well co-ordinated multinational research effort . . . to assess the likelihood, extent, and timing of such consequences" [IEA/GB(87)33

Annex, paragraph 33]. Similar concerns were expressed two years later, when the IEA spoke out on "the complexity and uncertainties of the relationships between greenhouse gas emissions from fossil fuels and atmospheric concentrations, and consequent climate change, as well as the world wide dimensions and implications of these issues". At the same time, IEA Ministers pledged, when fossil fuels are used, to set "strict standards for SO_x and NO_x emissions" and to encourage the "introduction of advanced cleaning and combustion technologies" [IEA/GB(89)36 Annex, paragraph 4(d)].

In major policy statements made in 1991 and again in 1993, the IEA confirmed the objective of energy supply diversity through coal expansion and the concerns about environmental constraints. The basic assessment was retained: "Ministers observed that ample, low cost, secure sources of **coal** and other solid fuels are available to OECD countries, and that coal importers have a wide choice of suppliers" [IEA/GB(91)42/REV2, paragraph 12]. While progress had been made on the reduction of barriers and other distortions to coal trade, the IEA called for further significant reductions "leading to improved competition, accompanied by appropriate regional and social policies" without new barriers or other distortions. The other potential limiting factor for coal was the concern about "greenhouse gas emissions", for which "greater use of clean coal technologies with high conversion efficiencies", the commercial availability of new technologies, and international co-operation are necessary.

IEA coal policies were again confirmed in 1993, but this time with the advantage of the World Energy Outlook projection which showed that the "solid fuels' share in total energy requirements is expected to remain fairly constant at about 30 per cent worldwide, and 25 per cent in OECD countries. This implies about a 45 per cent increase in worldwide solid fuel consumption from 1990 to 2010, with more than half of this increase coming from China and India" [IEA/GB(93)41, paragraph 11]. Under these circumstances the IEA policies on trade barrier reduction, regional and social matters, and the absence of new barriers or other distortions were confirmed. Given that clean coal technologies can substantially reduce CO_2 emissions, IEA Ministers also called upon the IEA "to expand international co-operation, information exchange and technology dissemination to provide incentives for and eliminate barriers to clean coal technology deployment".

The IEA Shared Goals, adopted in the same meeting, reconfirmed the familiar elements of IEA coal policy outlined above without specifically referring to coal as such but including it in the generic "fossil fuels" concept. Reflecting a trend away from statements of preference in the selection of fuels,

the Goals take a more general and conceptual approach than did the 1977 "Principles for Energy Policy". Thus, the most directly stated Goal with respect to coal is that "Clean and efficient use of fossil fuels is essential". More general Goals also have applications to coal, including the Goal statements concerning free and open markets, energy security and the environment, energy diversity, efficiency and flexibility, minimization of adverse impacts of energy activities, taking into account energy consequences in making decisions on the environment, the Polluter Pays Principle, and such other policies as continued R & D, undistorted energy prices, free and open trade, a secure framework for investment, and co-operation among all energy market participants [See Section G below].

Much remains to be done, in accordance with the coal and environment policies outlined above, to meet the IEA's objectives. The Members' performance in expanding coal production, use, and trade has not lived up to the high expectations in this sector, as appears in the Agency's *Energy Policies of IEA Countries: 1993 Review* [See pages 42-44 and Table A-19, pp. 565, 566]. The share of coal in total energy supply (TPES) had risen only modestly from 20.3 per cent in 1973 to 20.8 per cent in 1992, mainly by means of substituting coal for fuel oil in electricity generation. The early IEA notion of doubling IEA coal demand by 1990 was all but hopelessly under shot: total supply (TPES) of 706.3 Mtoe in 1973 grew slowly to 907.3 Mtoe in 1990, an increase of only about 28 per cent and it fell below that supply level to 872.7 Mtoe in 1992. Hence it comes as no surprise that the IEA review concluded in 1992 that

> Coal production in IEA countries does not use full capacity and could be increased substantially in major producing countries such as Australia, Canada and the United States without significant additional investments. The large number of suppliers, improved infrastructure and mature international trading system assure adequate supply [*1992 Review*, p. 34; the Secretariat also confirmed this assessment in the *1993 Review*, pp. 42-43].

While recording a favourable coal supply situation, this review also underscored the existence of significant state support of uneconomic supply in some Member countries. These were problems of subsidies for high cost coal production and of other protection measures for domestic production as well as problems of overcoming environmental concerns, among others, which had become a focal point for the energy policy reviews after 1986. In the *1993*

Review [p. 44], the Secretariat concluded that "Protection of domestic coal mining thus not only distorts markets and reduces efficiency; it has no justification in terms of security of supply". At the close of 1994, the Agency continues, with the regular co-operation of industry (CIAB), to give attention to such coal issues as expanding coal trade, reducing state aids, reducing the environmental effects of the coal cycle, improving the efficiency of its combustion, and in particular, reconciling coal's clear energy security attribute with the concern about rising concentrations of CO_2, for which the combustion of coal played a significant role.

3. Natural Gas

Like coal and nuclear energy, natural gas was seen from the outset of the IEA as a realistic alternative to oil in many - but not all - applications, and especially in power generation which twenty years later became the most important application, with major implications not only for other fuels, especially nuclear, but also for the very structure and organization of the electricity supply industry. The I.E.P. Agreement refers to the development of natural gas as an alternative to oil on the same basis as domestic oil, coal, nuclear energy, and hydro-electric power, and foresees programmes for exchanges of information, concrete projects, and policy reviews, but only in the most general terms [Article 42.1(b)]. The same is true of the LTCP provisions where gas is linked to the other alternatives to oil, although natural gas is not mentioned by name in the LTCP (only coal and nuclear were identified specifically as alternatives to oil). Still in an early development phase in the mid-1970s, natural gas policy was "in the air", so to speak, but the consensus was that any substantive policy detail concerning it should be determined later by the Governing Board, and this indeed has been the case.

In the early years the Agency's interest in natural gas was modest and technical, compared to the relative attention given to other energy alternatives. There was no specific concern either about possible security threats to the natural gas supply, because gas was not yet imported into IEA Member countries in substantial amounts from insecure sources, and the emergency focus at that time was all but exclusively fastened upon oil security. In the years to follow, however, the expected role of natural gas and IEA policy actions in this sector would evolve to give gas much more prominence. Security concerns about reliance during the Cold War upon single suppliers of natural gas and about accidents, breakdowns, and other disruption possibilities would attract sharply concentrated policy interest.

Between the mid-1970s and the early 1980s, IEA policy sought to increase the availability of natural gas, but it did so in a relatively low key fashion. The 1977 "Principles for Energy Policy", in their sole specific reference to natural gas, state this objective:

> Concentration of the use of natural gas on premium users' requirements, and development of the infrastructure necessary to expand the availability of natural gas [See Section D-1 above].

This "premium use" concept arose because natural gas was viewed at the time as a component of the oil industry, and could be used as a replacement for oil derived products in petrochemical feed-stocks. Under these circumstances, there was little or no policy encouragement to use natural gas to raise steam to generate electricity. Yet the above Principle supported development of natural gas, and a number of broad formulations in other parts of the Principles apply to natural gas or have implications for it. These include the Principles dealing with specific policies, environmental safety, regional and security concerns, price levels, research and development, favourable investment climate, and others, as is also the case for coal.

In 1979 the general interest in natural gas was already rising rapidly. At the May 1979 meeting,

> Ministers stressed the importance of *natural gas as the most readily available alternative fuel,* and agreed on the need to encourage both indigenous production and international trade in natural gas [IEA/GB(79)35, paragraph 11; emphasis added].

In December 1979 the Ministers added more specifically that action must be taken to bring about "rapid medium term substitution of natural gas for oil" [IEA/GB(80)5, paragraph 2]. The IEA Secretariat embarked upon an assessment of the potential in OECD countries for natural gas supply, demand, and international trade. At the 1982 Ministerial meeting, the policy analysis became more precise, as Ministers stated that the expansion of natural gas use depended heavily on international trade. They referred to options for encouraging reliable gas trade and for reducing vulnerability to potential natural gas supply disruptions, including:

- Diversification of supply sources.
- The timely development of indigenous IEA sources.

- Emergency storage in excess of storage required for normal technical and seasonal reasons.
- Greater reliance on interruptible contracts with adequate provision for dual-fired equipment and back-up fuel supplies.
- Flexibility in supply arrangements from secure sources, together with adequate integration of pipeline systems [See IEA/GB(82)51 (1st Revision), paragraph 15].

In the same year the Agency published a major study on *Natural Gas Prospects to 2000* analysing the potential for natural gas and critical issues for gas development, particularly the price of gas and security of supply. A further and more intensive study of gas security was then undertaken. These actions set the stage for the major decisions on natural gas security which the IEA took in the course of the next year.

In May 1983, after confirming the policies described above, IEA Ministers emphasized the importance of gas security, mainly as a result of the Cold War concerns and the importance of the Soviet Union as a major exporter of natural gas to Western Europe. In the Communiqué,

> Ministers agreed that gas has an important role to play in reducing dependence on imported oil. They also agreed, however, on the importance of avoiding the development of situations in which imports of gas could *weaken* rather than *strengthen* the energy supply security and thus the overall economic stability of Member countries. They noted the potential risks associated with high levels of dependence on *single* supplier countries. Ministers stressed the importance of expeditious development of indigenous OECD energy resources. They noted that existing contracts are currently insufficient to cover expected gas demand by the mid-1990s, and agreed that in filling this gap, steps should be taken to ensure that no one producer is in a position to exercise monopoly power over OECD and IEA countries [IEA/GB(83)36(Final), Annex I, paragraph 9; emphasis added].

This policy statement was followed by a number of commitments by the Members on actions to be taken to make gas supplies more secure. These included commitments to avoid undue dependence on single sources of gas imports, to obtain future gas supplies from secure and diverse sources, to strengthen gas companies' and other undertakings' ability to deal with

supply disruptions. The Members also undertook to avoid or reduce trade barriers, to encourage imports from a variety of OECD sources, to develop indigenous sources, to give attention to future supply in the annual country reviews in various international organizations, and to inform other Members of relevant policy changes. These 1983 policy statements and commitments represent the most far-reaching actions on natural gas yet taken by the IEA.

In 1985, IEA Ministers again addressed gas security and adopted a number of measures designed to implement the 1983 policy statements on this subject. Here they emphasized the development of indigenous gas resources, particularly in North America and the North Sea, including the Norwegian Troll field, which had been mentioned in 1983 as well. This policy was to be carried out "with a view to making supplies available at prices competitive with other fuels in the mid-1990s" [IEA/GB(85)46, Annex I, Section II]. The actions also referred to cost-effective measures to strengthen the Members' ability to deal with gas supply disruptions, and to avoid reliance on oil if gas supplies should prove inadequate. The Secretariat continued its research and analysis in this sector, leading to the publication in 1986 of *Natural Gas Prospects*, and in 1991 of *Natural Gas Prospects and Policies*, followed in 1994 by *Natural Gas Transportation — Organisation and Regulation*.

Natural gas questions continued to preoccupy Ministers as well as the Secretariat. In 1991 IEA Ministers noted that "**natural gas** is a relatively clean fuel and that demand for it is expected to grow rapidly in most IEA countries" [IEA/GB(91)42/REV2, paragraph 10], that it could contribute to the transport sector where diversity is weakest, and that "a commercial approach to the development of more open and competitive markets would ensure the exploration, development and production" of natural gas resources. In 1993 Ministers again addressed natural gas issues, carrying forward the policy analysis and actions by noting that imports of gas from outside the IEA were increasing, that gas systems are less flexible than oil systems, and most significantly that "the potential for interruptions of gas supply has grown" [IEA/GB(93)41, paragraph 10]. Noting that gas markets tend to be regional and largely unconnected, Ministers called upon the IEA to analyze regional gas security issues. The Agency is now engaged in a new natural gas security study, in which both the practical risk of technical breakdowns and politically conditioned disruptions in supply are being studied.

Unlike the 1977 Principles which conferred "noble fuel" status on natural gas, the IEA Shared Goals, adopted in 1993 [See Section G above], made no reference to natural gas as such, but adopted a number of Goals which bear directly on natural gas, much as described above in the discussion of the IEA Shared Goals and coal [See Section D-2 above], in

effect recognizing the use of natural gas whenever the market would allow it. Perhaps the essential point for natural gas is that it could play a role well beyond its present applications in various energy sectors, such as electricity generation, heating and transport. Natural gas does not carry the danger of pollution or potential destructiveness associated with some of the other alternatives to oil. As IEA policy aims at overcoming the natural and man-made barriers to the wider use of natural gas, gas may be taken as a major and permanent subject of IEA research, analysis, and policy. Over the first twenty year period of the IEA, the status of natural gas evolved from being treated as a "noble fuel" with its particular rule system, to becoming a "general commodity" subject to the rules of competition, with spot markets in some regions, and with an international natural gas industry now developing links for the generation of electricity with this energy source.

4. Nuclear Energy

The IEA's founders considered nuclear energy, along with coal, to be the two most promising alternatives to imported oil. Already well-established in the field of electricity generation by 1974, nuclear power could replace existing oil-fired electrical power stations and could be employed in new installations to meet the growing demand for electricity, with the expectation of substantial savings in oil consumption. Since the nuclear fuel supply was supported by the existence of abundant and widespread uranium reserves held mostly in OECD countries, the accelerated development of nuclear power could be undertaken without serious concerns about the security of supply, although there were familiar problems of nuclear safety, waste disposal, and non-proliferation. With oil security the main energy preoccupation of the mid-1970s, there was much policy interest in the advantages of expanding nuclear energy when the IEA was established.

Hence nuclear energy appeared immediately after coal and natural gas in the alternative energies inventory of Article 42.1(b) of the I.E.P. Agreement, and radioactive waste management and nuclear safety were featured in the list of priority subjects for energy R & D co-operative programmes under Article 42.1(c). Uranium enrichment was highlighted in the Article 42.1(d) provisions for monitoring, facilitation of development, consultations on international issues, and information on planning of enrichment services. Like other elements of long-term energy policy work in the IEA, the nuclear energy questions were granted only initial recognition and support in the I.E.P. Agreement, and it was left to the Governing Board to develop them with more precision, as it did in adopting the LTCP and in other actions over the years.

Technical aspects of nuclear energy had been managed by the OECD Nuclear Energy Agency prior to the founding of the IEA; and that work has continued in the NEA to the present day, while the broader questions of energy policy concerning nuclear energy have been taken up in the IEA.

Although the LTCP did not develop detailed policies on nuclear energy, the LTCP's elaborate and systematic framework for alternative energies referred specifically to co-operation on increasing the production of nuclear energy. Work on nuclear energy co-operation was already underway when the LTCP was adopted in January 1976. In the R & D Chapter of the LTCP (Chapter IV, Section 4.1), there was provision for a programme of high priority R & D on "High Temperature Reactors for Process Heat" to be added to the nuclear safety work already mentioned in the I.E.P. Agreement. More broadly speaking, the LTCP's provisions for national programmes, the creation of a favourable investment climate, use of public resources to contribute to or engage in production, and periodic policy reviews all applied to nuclear as well as the other alternative energies.

Early nuclear energy work in the IEA included a study to assess the likelihood of Members' achieving projected long-term nuclear power growth and the conclusion in the R & D sector of a co-operative agreement on nuclear safety information exchange. In 1977 IEA Ministers made the first of a consistent pattern of statements supporting the expansion of nuclear energy use, the sense of which was restated as a matter of routine in a number of successive Ministerial meetings. However, in most of the Ministerial formulations, there is a lack of consensus on all but the most general statements supporting the expansion of nuclear power. This lack of consensus continues to this day.

In the Conclusions of their 1977 Meeting, the Ministers recognized the important role nuclear energy would have to play "in reducing the risk of insufficient energy availability as early as the 1980s, *although some Participating Countries had reservations due to specific domestic political situations*" [IEA/GB(77)52(1st Revision), Item 2(b)(7); emphasis added]; also, Ministers "agreed that further measures must be found to increase nuclear co-operation and that the IEA has an active role to play". This Conclusion should be read with the text of Principle 8 of the "Principles for Energy Policy" [See Section D-1 above] which provides for:

> Steady expansion of nuclear generating capacity as a main and indispensable element in attaining the group objectives, consistent with safety, environmental and security standards satisfactory to the countries concerned and with the need to

prevent the proliferation of nuclear weapons. In order to provide for this expansion, it will be necessary through co-operation to assure reliable availability of:

- adequate supplies of nuclear fuel (uranium and enrichment capacity) at equitable prices;
- adequate facilities and techniques for development of nuclear electricity generation, for dealing with spent fuel, for waste management, and for overall handling of the back end of the nuclear fuel cycle.

Individual country positions reserving or hesitating upon all or part of Principle 8 were expressed by six Delegations in their respective statements which appear in the Conclusions cited above.

Problems of a relatively thin consensus on nuclear energy were also to appear in the language of the Ministerial Communiqué in 1977. Ministers agreed to "maintain steady expansion of nuclear power, consistent with non-proliferation and environmental concerns, as a main and indispensable element in attaining IEA group objectives" [IEA/GB(77)48(2nd Revision), paragraph 6]. Yet the division of views and concerns among IEA Members again became apparent in paragraph 7 of the Communiqué which repeated the general support language on a qualified basis: "Ministers of *many* Member countries expressed the determination of their governments to expand their nuclear generating capacity" [Emphasis added]; there were some Ministers who did not join in this statement. In addition: "Ministers recognised that some of the constraints on development of nuclear energy can only be reduced by international co-operation". In taking a policy commitment on the role the IEA should play in developing nuclear energy policies, the Ministers hesitated between a role of "facilitating" and a role of merely "studying the problems relating to" that function. In the end they decided upon a more neutral formulation:

> They agreed that given the importance of nuclear power as an alternative source of energy, the IEA should play an active role in the development of nuclear energy policies, taking full account of work being done elsewhere.

In 1978 the Governing Board adopted a Programme of Work in Nuclear Energy directed specifically at assessing "the ability of nuclear power to fulfil its necessary role in meeting the overall energy objectives of IEA" and to strengthen that ability [IEA/GB(78)5, Item 4]. This comprehensive

Programme provided for an examination of alternative scenarios with varying nuclear energy components, including the supply of uranium raw material, mining policies, and exploration programmes. The Programme also referred to the back end of the fuel cycle, a multinational demonstration programme, and non-proliferation objectives. A few months later the Board confirmed the Work Programme, and stressed the need for greater co-operation on nuclear waste and for "smoothly flowing trade".

By the following year the acceptability of nuclear power had been weakened by the accident in 1979 at the Three Mile Island facility at Harrisburg, Pennsylvania in the United States, which would later combine with the 1986 Chernobyl accident in the Soviet Union to bring about a substantial setback to the acceptability of nuclear power expansion, a setback still strongly felt in 1994. This difficulty was first addressed by IEA Ministers in 1979 when the IEA policy emphasis shifted, as would be expected, to nuclear safety and the need for public education on nuclear power. The combined decline in nuclear power projection levels and fall off in public confidence in nuclear power stimulated a strong Ministerial response for building public support. The Communiqué pointed out that shortfalls in energy supply, which should be expected if nuclear power were not to realize its full potential, would lead to undesirable economic and social consequences [IEA/GB(79)35, paragraph 10], and the formal Conclusions more robustly foresaw "serious setbacks in economic activities, with consequences for social and political stability" [IEA/GB(79)32, Item 3(m)]. The IEA retained the established policy of supporting nuclear power, but the IEA also recognized "the urgent need for effective national and international efforts to ensure that safety systems are sufficient to minimise the possibility of nuclear plant accidents and their consequences, and to adequately inform the public of the results" [Communiqué, paragraph 10]. The Communiqué emphasized the need to explain to the public the consequences of the nuclear power loss which could not be made up from other energy sources. During this period, analytical work in the IEA continued, of course. The Ministers supported the International Nuclear Fuel Cycle Evaluation (INFCE) and recognized the need "to ensure that effective action is taken to resolve long-term waste disposal and non-proliferation questions". All IEA Members and the Secretariat participated in the INFCE which led to clarifications and understandings intended to help resolve international nuclear fuel issues and to reduce uncertainties about the future use of nuclear power.

In 1980 a document entitled "Secretariat Analysis of Areas Where Energy Policies Could be Strengthened in Individual IEA Countries" was prepared for Ministers [Reproduced in the Ministerial Communiqué set forth

in IEA/GB(80)58, Annex I; see also paragraph 5 of the Communiqué]. In this document the Secretariat concluded that in the area of nuclear energy greater efforts must be made to accomplish nuclear programmes and "to create an environment in which discussion of nuclear issues can take place in an objective and balanced way" [Paragraph (ix)]. This textual fragment gives a glimpse of the tense *atmosphere* in which nuclear issues were then being considered. By "balanced way" the text meant that there was a need to take into account economic and energy policies as well as safety and non-proliferation policies (and Germany, Italy, Japan, and the United States were specifically mentioned; France was not yet a Member of the IEA at that time). The Secretariat also urged greater efforts to "streamline regulatory processes for the licensing of nuclear plants and for authorisations related to nuclear fuel cycle activities in other Member countries". Streamlining the regulatory process would become a frequent theme in subsequent IEA policy work on nuclear energy.

IEA Ministers again considered nuclear policy in 1983, when they confirmed the established policies and accorded greater attention to stable trade in nuclear equipment, fuel cycle services, nuclear fuel, and management of the "back end" of the nuclear fuel cycle. Moreover, the "IEA and NEA were requested to work together on periodic consultations on the progress of Member governments in the waste disposal programme", and they were also requested to identify new R & D possibilities in advanced technologies to support the Conclusions on nuclear power. Ministers concluded that action along these lines would "provide the basis for both institutional impediments and public acceptance concerns on nuclear power to be vigorously addressed and allayed wherever possible" [IEA/GB(83)36(Final), Annex I, paragraph 8].

Despite these efforts, the following years brought more policy reservations about the use of nuclear power. By 1985 nuclear power accounted for 15 per cent of IEA electricity production, as some countries continued to develop their programmes, but slow-downs were reported in others [IEA/GB(85)46, page 6]. Ministers again endorsed nuclear power by stating that "under stringent standards for health, safety, and waste disposal, and strict respect of current non-proliferation policies, [it] *generally has environmental advantages*" [Emphasis added]. This formulation, found in the environment section of the Annex to the Communiqué, was the first occasion on which environmental advantage was listed as a policy element supporting nuclear power. However, the environment element was a two edged sword. After the Chernobyl accident, nuclear energy was again set back, as health, safety, and environmental risks took on a new dimension in

the public mind, and policy makers remained concerned about the particular kind of reactor which failed at Chernobyl. Policy reactions to this vexing situation varied markedly, as the 1987 Ministerial Communiqué demonstrates [IEA/GB(87)33 Annex, paragraph 14(d)]. Members which viewed nuclear power as a viable option carefully assessed the safety of their particular reactors (which had little in common with the Chernobyl-type installation), and more importantly they assessed the approach to nuclear plant operation and containment. The IEA would later, at the request of the G-7, work with the World Bank (IBRD) and with the participation of the EBRD to prepare a report on "alternative sources of energy in the event that some Soviet-designed nuclear reactors are shut down in Central and Eastern Europe and the New Independent States" [IEA/GB(93)41, paragraph 29]. The IEA countries which accounted for the bulk of electricity production considered "that the standards of safety in their reactor systems and procedures are so high that the risk of major accidents is too remote to justify a change in policy", and they stated their intention to continue their programmes. On the negative side:

> A few countries still have their programmes under review. Other countries have decided not to produce nuclear power either because they have other non-oil resources available or because they consider the long-term environmental impacts and the residual risks of nuclear energy production, even under the highest safety standards, to be unacceptable. One country has decided to discontinue its existing nuclear programme by early in the next century [IEA/GB(87)33 Annex, paragraph 14(d)].

Notwithstanding the decision of some countries to limit or end their nuclear programmes, the need for nuclear power in a diversified mix of energies for the production of electricity continued to be felt. This is clearly confirmed in the major IEA policy statements of 1991 and 1993, although the focus shifted to greater emphasis on the environmental advantage of relatively pollution-free electricity production. In 1991 Ministers declared their support for the substantial contribution made by nuclear power "to the overall energy supply and mix of IEA countries"[IEA/GB(91)42/REV2, paragraph 13]. Some Ministers were "of the view that the use of nuclear energy because it emits no sulphur dioxide, nitrogen oxides or greenhouse gases, provides an important response to the challenge of stabilizing of greenhouse gas emissions". The acceptance of differentiated policies among IEA countries was confirmed in a renewed statement that "each IEA country will have to decide on the mix of fuels used for electricity

generation best suited to its particular circumstances, taking account of energy security, environment, safety and the possible effects of their decisions on other countries". The essence of these policies was restated in the 1993 Ministerial meeting and represents the IEA's position at the time of writing [IEA/GB(93)41, paragraph 12 and Annex I].

Nuclear power promotion was retained in the IEA Shared Goals, the latest systematic statement on IEA policy. Goal 1 refers affirmatively to the contributions of "Non-fossil fuels, particularly nuclear and hydro power" to energy supply diversity, and Goal 4 includes the statement that "A number of IEA members wish to retain and improve the nuclear option for the future, at the highest available safety standards, because nuclear energy does not emit carbon dioxide". The application of other IEA Goals will also affect nuclear power, some favourably, others perhaps not. They include continued R & D, undistorted energy prices, free and open trade, a secure framework for investment, and co-operation among all energy market participants.

5. Hydroelectricity and Other Renewables

Although hydroelectricity and other renewable energy sources provide a relatively small part of IEA countries' total primary energy supply, renewables play an important role in a number of countries and have received considerable policy attention in the IEA. Hydroelectricity supplies over 50 per cent of electricity generation in several countries, and (with geothermal, solar, and wind) more than 16 per cent in the IEA as a whole [See *Energy Policies of IEA Countries: 1993 Review*, p. 58, and Table A-13 in the 1992 and 1993 *Reviews*]. Non-hydro renewables, such as solar, wind, biomass, geothermal, tidal, and ocean energy constitute only about 3.4 per cent of total IEA energy supply [*1993 Review*, p. 60]. However, they and other renewables have been the subject of intense interest in the energy R & D field where a basis for more impressive results might appear in the future. Non-hydro renewables are expected to grow at an average annual rate of about 8.5 per cent to 2010 in IEA countries [*World Energy Outlook*, (1994) p. 233].

Renewable energy sources were not altogether ignored by the IEA founders, who mentioned "hydro-electric power" in the enumeration of alternatives to oil contained in Article 42.1(b) of the I.E.P. Agreement, but made no reference to the other renewables, except to a few as subjects for energy R & D projects. Still, it is clear that the other renewables were not excluded, for the enumeration in Article 42.1(b) is only indicative and leaves ample room for the others. Article 42.1(c) mentions solar energy, the production of hydrogen from water, and municipal and industrial waste as

high priority subjects for R & D co-operative programmes. The I.E.P. Agreement leaves policy development on renewables, as well as on most other long-term sectors, to later actions of the Governing Board.

The LTCP included renewables by implication in the broad language of the programme policies and structure, but without mentioning any of the renewables in the general provisions [See Section A above]. However, the energy R & D Chapter of the LTCP mentioned some key renewables: small solar power systems, geothermal energy, wind power, wave power, ocean thermal gradients, and biomass conversion, all of which have since been the subject of IEA policy research and analysis and co-operative R & D projects or programmes.

The IEA's general declarations on energy policy have consistently supported the expansion of renewable energies, despite their apparently modest potential for the substantial replacement of imported oil, in the absence of major R & D breakthroughs. Renewables have become particularly attractive as energy sources in recent years, because they are perceived as environmentally acceptable without carrying the risks associated with the expanded use of fossil fuels and nuclear energy.

Early IEA policy statements gave relatively low priority to renewables, since they could not be immediately hailed as promising major contributors to the imported oil reduction challenge. Yet as early as 1977, IEA Ministers gave renewables a boost with the commitment "to put more emphasis on development and use of *less depletable* energy sources" [IEA/GB(77)48 (2nd Revision), paragraph 4; emphasis added]. Ministers made no specific reference to the "less depletable" energies or "renewables" as such in the IEA's 1977 "Principles for Energy Policy", although renewables would clearly have benefited from the broad application of a number of the Principles, including those dealing with environmental concerns, energy pricing, R & D, favourable investment climate, and international co-operation [See Section D-1 above]. More intense interest in renewables had to await a few more years of developments, with 1979 bringing only a tepid statement on the "pursuit of new energy technologies for the long term" [IEA/GB(80)5, paragraph 2]. Likewise in 1983 Ministers spoke of their readiness to pursue national and international policies "aiming at exploitation of other indigenous energy resources such as hitherto unharnessed hydropower" [IEA/GB(83)36(Final) Annex I, paragraph 11].

By 1985, the environment concerns quickened the interest in renewables, but still mostly in abstract terms, as in the Ministerial commitment to promote "renewable sources of energy which are environmentally acceptable and competitive" [IEA/GB(85)46 Annex I, III,

paragraph 3]. Ministers noted the role of hydropower and renewables in electricity generation depending on national circumstances and emphasized "the importance of research and development where this would reduce the costs of renewable energies and enable them to realise, on an economic basis, their potential contribution to energy supplies in the medium and longer term" [IEA/GB(85)46, page 7]. The sense of these policies was restated in 1987, again with hydropower highlighted [IEA/GB(87)33 Annex, paragraph 14(c)], and once more in 1989 with respect to "growing energy needs" [IEA/GB(89)36 Annex, paragraph 4(d)(iii)].

The promotion of hydropower was bound sooner or later to encounter stiff resistance not only from the realities of geography, but also from policy opposition to the potentially adverse effects of new facilities on surrounding areas and peoples. In 1991 Ministers recognized "the physical limitations and environmental constraints on substantial further expansion" of hydropower, and acknowledged that the other renewables "are unlikely to replace other fuels in a major way over the coming years" [IEA/GB(91)42/REV2, paragraph 14]. Nevertheless, the Ministers again promoted renewables for their environmental advantages and for energy security reasons, and saw them as likely candidates for "increased commercial development, demonstration, and integration into energy systems".

Renewables also figured prominently in the IEA's major policy declarations of 1993. The over-riding environmental concern at this time was climate change. From the energy perspective, carbon-based fuels were becoming problematic, while nuclear, hydro and other renewable energy sources assumed greater importance. The 1993 Ministerial Communiqué noted their modest contributions and cited technical development and uncertainties regarding the economic viability of non-hydro renewable sources as the reasons for their lack of further development [IEA/GB(93)41, paragraph 13]. However, important contributions could be expected from renewables, despite the limitations on hydro development and the slow increases foreseeable for other renewables; hence Ministers agreed "on the need for continued strong government support and international collaboration" in this sector.

The 1993 IEA Shared Goals, annexed to the Communiqué, also supported renewables. In speaking of the need for diversity, efficiency, and flexibility in the energy sector, Goal 1 stated that "Non-fossil fuels, particularly nuclear and *hydro power*, make a substantial contribution to the energy supply diversity of IEA countries as a group" [Emphasis added]. Goal 3, on the environmentally sustainable provision and use of energy, gave a priority status to economic non-fossil fuel sources. After referring to

nuclear energy, Ministers stated that "Renewable sources will also have an increasingly important contribution to make". As with the other energy sectors, the Goals contain general provisions which would indirectly support renewables, on such topics as R & D, energy pricing, free and open trade, a secure investment framework, and co-operation among all energy market participants.

Thus policy recognition of renewable energy sources has grown remarkably since 1977 when those sources were not mentioned as such in the "Principles for Energy Policy". The situation of renewables has evolved to the point that they received explicit recognition in the 1993 IEA Shared Goals, despite the acknowledgement of practical limitations upon improvement in the overall contribution of renewables.

6. Electricity

Electricity has always been a major element of IEA long-term energy policy, but electricity as such received relatively little attention in the early days of the Agency, when policy was more dedicated to oil, to the other primary energy sources employed to produce electricity, and to efficiency in the use of electricity [See Sections B, C, and D-2 above]. Over the years, however, structural change in Member countries brought significant increases in electricity use; indeed, electricity generation in OECD countries has more than quadrupled since 1960 and it has continued its strong growth to the present day [IEA/GB(93)40, paragraph 27]. Despite improvements in end-use and generating efficiency at the time of writing, it is clear that substantial new generating capacity will be needed to meet this growing demand in the future. As this development became known and understood, the Agency's focus on electricity has broadened beyond the underlying primary fuels and efficiency to include the particulars of electricity as well as the environmental and energy security aspects of electricity policy. It may be expected that the decisions to be taken on the creation of that new capacity will have a significant impact on the effectiveness of energy policies generally.

The I.E.P. Agreement makes no specific reference to electricity, although it does speak of such primary fuels as domestic oil, coal, natural gas, and nuclear energy as alternatives to imported oil, and specifically mentions hydro-electric power [Article 42.1(b)]. Solar energy appears in the list of R & D subjects, among a number of others which also touch upon electricity fuels. The 1976 LTCP says nothing specifically about electricity, but does feature coal and nuclear development [Chapter III, B], and it lists

small solar power systems, geothermal energy, wind power, and ocean thermal gradients, all of which are relevant to electricity, among the new subjects for R & D co-operation under IEA auspices.

Electricity is more prominently featured in the IEA's 1977 "Principles for Energy Policy" [See Section D-1 above] which established the Agency's early core policy on this subject: the "Progressive replacement of oil in electricity generation". The Principles also adopted specific actions, including "discouraging the construction of new exclusively oil-fired power stations" and "encouraging the conversion of existing oil-fired capacity to more plentiful fuels" [Principle 5]. Principle 6 promotes the "rapid phasing-in of steam coal as a major fuel for electrical power generation"; Principle 8 speaks of the need for co-operation to assure the reliable availability of "adequate facilities and techniques for development of nuclear electricity generation" [See Section D-4 above]; and other Principles, such as those on conservation, R & D, investment, planning, and co-operation, also have applications for electricity.

When the IEA adopted the Coal Principles two years later, electricity was also highlighted [See Section D-2 above]. The Coal Principles refine and expand the earlier and broader "Principles for Energy Policy" mentioned above, insofar as coal is concerned. Referring to the statement of IEA Ministers, Paragraph 19 of the Coal Principles provides that

> They will ensure that the use of oil for electricity generation is minimized by national policy planning which, with a minimum of exemptions, precludes new or replacement base load oil-fired capacity; progressively confines oil to middle and peak loads; and makes maximum use of fuels other than oil in dual-fired capacity.

The specific action steps set forth in the Annex to the Coal Principles [See paragraphs 2, 3 and 4] strengthen the Principle of limiting oil-fired base load power plants, and provide that dual-fired power plants are not to be "fired with oil unless other fuels are unreasonably expensive in comparison with oil or it is temporarily necessary for environmental reasons". Improved siting and licensing procedures for new coal-fired power plants are also envisaged.

Since the early 1980s, IEA Ministers have regularly included electricity in major IEA energy policy statements. In their 1982 assessment of the future role of electricity in achieving structural change, Ministers agreed to examine future prospects for electricity and "factors which may constrain *fuel-switching*", including uncertainty about demand, cost-effective patterns of electricity generation, the competitive position of coal

relative to oil, regulatory impediments, safety, and environmental factors [IEA/GB(82)54(Final), paragraph 8; emphasis added]. At the following Ministerial meeting in 1983, the scope of IEA interest expanded to include "the pricing policies and, where it exists, regulation of the tariffs of electricity utilities so as not to impede the provision of funds for *investment* in new generating capacity" [IEA/GB(83)36(Final), Annex I, paragraph 5; emphasis added]. These subjects were taken up in a thorough Secretariat study, published under the title of *Electricity in IEA Countries, Issues and Outlook*, which led to a comprehensive policy statement on electricity in 1985. In that year, Ministers affirmed "the need for strong and effective policies to enable electricity to make its appropriate contribution to economic development and *energy security*" [See IEA/GB(85)46, page 6 and Annex I, Chapter III, 4; emphasis added]. Ministers reviewed the leading primary energy sources for electricity (particularly coal, nuclear, and renewables) in the light of electricity policy and they revived the environment factor in a statement supporting "promotion on an economic basis of the use of electricity when it can be produced in an environmentally acceptable way".

In 1987 Ministers renewed their assessment of present and potential demand (still on the rise) and surveyed the problems for electricity in each of the primary energy sectors (coal and other solid fuels, natural gas, hydropower, and nuclear), confirming much of what had been agreed previously. They noted that "Where economic, multi-fuel generating plants enable consumers to take advantage of competition between fuels" [IEA/GB(87)33 Annex, paragraphs 13-16], suggesting the prospective policy importance of fuel switching as a means of enhancing energy diversity. During this period, IEA interest in efficiency and electricity continued, notably with the completion of the Agency's *Electricity End-Use Efficiency* study in 1989.

The promotion of electricity *trade* and *competition*, because of their economic and environmental advantages, emerged in the 1991 IEA policy statement. The Members would explore the ways to enhance electricity trade and competition, without endangering security of supply. Ministers "agreed to remove impediments to electricity trade where present" and also agreed that "flexible generating capacity and diversified fuel sources will be required". The limitation of any generating option would increase demand for other sources "and thus potentially reduce energy diversity and security" [IEA/GB(91)42/REV2, paragraph 11]. The 1991 Ministerial statements in this field were based upon the work later reflected in *Electricity Supply in the OECD*, published in the following year, and which remarked upon the increasing challenges to electricity generators: tightened environmental

standards, ever-changing rules, and limited supply choices. The inescapable conclusion was that for electric power sources: no supply source, "whether oil, coal, nuclear, natural gas, hydroelectricity, or other renewables, is without constraints. Their prospects raise questions of availability and price" [IEA/GB(93)8, page 12].

The 1993 IEA Shared Goals [See Section G below] made no reference to electricity as such, but a number of the Goals affect electricity policy. An important example is Goal 1 on diversity, efficiency, and flexibility, where the contribution of non-fossil fuels, "particularly nuclear and hydro power", is noted. Others are Goals 3 and 4 on the environment, Goal 5 on energy efficiency, Goal 6 on R & D, Goal 7 on energy prices, Goal 8 on trade and investment, and Goal 9 on co-operation among energy market participants, all of which reflect themes which appear regularly in the IEA's consideration of electricity policy.

The IEA's most recent specific policy statement on electricity was made by Ministers in 1993 as follows:

> Electricity demand in OECD countries continues to grow steadily and substantial new generating capacity and energy efficiency gains from demand-side management practices will be required over the next several decades. Thus, greater efforts are needed to win public understanding and co-operation for the siting of new facilities and investments in efficiency to meet future demand, while continuing efforts to mitigate environmental effects. Enhanced electricity interconnection and trade offer many security of supply, economic efficiency and, in certain instances, environmental advantages [IEA/GB(93)41, paragraph 14].

7. Energy Trade and Investment

The energy trade and investment objectives of the IEA comprise "horizontal" concerns which stretch across the leading alternative energy sectors discussed above in this Chapter, i.e. indigenous oil, coal, nuclear, natural gas, and renewables [additional references to trade and investment are found above in the Sections devoted to those sectors]. The Agency has considered in a broad sense that free and open trade and a favourable climate to investment in Member countries as well as in non-Members are vital to the realization of its more specific sectoral objectives and policies. The stake in the trade issue is suggested in the following Table [See *Energy Policies of IEA Countries: 1993 Review,* Table A-19, p. 565]:

OECD Trade in Energy for 1992

Million tonnes of oil equivalent (Mtoe)

Total Net Imports		**1105.7**
Coal	Exports	174.2
	Imports	195.4
	Net Imports	21.1
Oil	Exports	481.0
	Imports	1520.0
	Bunkers	72.6
	Net Imports	966.4
Gas	Exports	113.9
	Imports	231.2
	Net Imports	117.3
Electricity	Exports	17.6
	Imports	18.4
	Net Imports	0.8

The importance of energy trade and investment to the realization of IEA alternative energy objectives can hardly be exaggerated today. It can only increase in future years as energy demand grows on a global scale [See the IEA's 1994 *World Energy Outlook*, p. 18] and especially if the Agency is reasonably successful in pursuing its policies of enhancing energy trade and investment.

The I.E.P. Agreement treats trade and investment issues sparingly. For the oil sector, the Agreement [See Chapters III, V and VI and Article 47] has well-developed emergency sharing and oil information provisions which necessarily concern oil trade during periods of supply emergencies; and the oil information system serves in normal times as well. Yet trade and investment in the other energy sectors are not mentioned as such in the long-term policy Chapter of the Agreement, though the founders implied their presence in the broad framework provisions on long-term energy policy development. As with the other elements of long-term policy, the Governing Board is charged with the responsibility to develop and adopt appropriate trade and investment policies within the context of the I.E.P. Agreement objectives. The Board first exercised that responsibility in the Long-Term Co-operation Programme (LTCP) in 1976 [See Section A above].

Among the leading energy trade and investment issues in the mid-1970s were the "legislative and administrative obstacles and discriminatory

practices" which would be incompatible with the IEA long-term policies adopted in the LTCP. Chapter V of the LTCP bears a descriptive title referring to those obstacles and practices. It sets the basic IEA policy on promotion of trade and investment, the policy which is still operational in 1994. The objectives for Members are (1) to "work towards the identification and removal of legislative and administrative measures which impair the achievement of the overall objectives of the Programme" [Chapter V, paragraph 1]; (2) to afford "national treatment" to all nationals of IEA Members, "in particular with regard to *energy investments, the purchase and sale of energy, and the enforcement of rules of competition*" [Paragraph 2; emphasis added]; and (3) to "refrain from introducing legislation or administrative regulations in the energy field which would prevent them from affording the nationals of other Participating Countries treatment no less favourable than that afforded to their own nationals" [Paragraph 3]. A fourth objective directs the *Agency* "to pay particular attention" to the efforts of Members to carry out their commitments "to identify and progressively remove obstacles to their implementation and to assess progress achieved" by Members "in approaching the overall objectives of this Chapter and to keep the overall balance of the implementation of the Long-Term Programme" [Paragraph 4].

These are mainly political commitments, although they are framed as relatively soft legal obligations. Paragraph 1 provides that Members "*shall* work towards the identification . . .". Under paragraphs 2 and 3, Members "*shall* use their best endeavours to . . .". Paragraph 4, however, contains a more rigorous legal obligation, not on Members directly but upon the Agency, by stating that ". . . the Agency *shall* pay particular attention . . ." [Emphasis added]. Paragraphs 1, 2 and 3 are "soft" in the sense that they do not require Members to achieve the stated objective, but only to "work towards" it in the first case and "to endeavour" to do so in the second and third. Nevertheless, Chapter V of the LTCP could not be accepted by Canada or Australia, although it was accepted by all other Members. Both Canada and Australia cited their respective constitutional systems and particular energy situations in explaining their reasons for declining to accept Chapter V. In response, the other IEA Members stated their belief that both Canada and Australia would find it possible, as their respective policies evolved, to move closer to the position of the other Members as expressed in Chapter V [See IEA/GB(76)5, Item 2 (Canada) and IEA/GB(79)8, Item 2 (Australia)].

The Chapter V energy trade and investment provisions have been applied by the Agency in the reviews of Members' energy policies and have evolved in more specific formulations for several energy sectors, but they

have largely retained their subjective, inchoate, and somewhat hortatory character. However, in the future the character of IEA commitments in this sector could evolve further as a result of the European Energy Charter and Energy Charter Treaty negotiation process. Commenced in 1991, this process has sought to establish a much more robust system of commitments, not only among European countries, but also among non-European Members of the IEA and with the Central and Eastern European and other Charter participants, as will be seen below.

One other concrete provision adopted in 1976 in the LTCP to encourage and safeguard energy investment in IEA countries was the so-called "Minimum Safeguard Price" (MSP) as it is known generally or the "General Measure of Co-operation" as it is designated in the LTCP [Chapter III, D and Annex I]. The application of the safeguard price was expected to reduce the risk of investment in higher cost conventional energy sources, which could be jeopardized deliberately or through market forces by a drop in the price of much lower cost oil produced outside of the IEA area. Under the MSP system, Members agree not to permit imported crude oil to be sold in their domestic markets below the safeguard price corresponding (in 1976) to $7 per barrel of marker crude oil. While the MSP demonstrated IEA Members' commitment to the promotion of energy investment, the MSP level was soon out of date, and the supporting measures required to maintain the system's readiness were allowed to expire after a few years. The MSP has never been activated or updated. Additional background on this subject is found in Section C-2 above. The development of a more comprehensive and effective trade and investment policy came with the Governing Board's actions in 1977 on the "Principles for Energy Policy", and in later years on other measures.

The IEA "Principles for Energy Policy" [IEA/GB(77)52 (1st Revision), Item 2(c) and Annexes; see Section D-1 above] refined the substance of the investment policy. Principle 10 calls for the

> Establishment of a favourable investment climate which encourages the flow of public and private capital to develop energy resources by appropriate pricing policies, by minimizing uncertainties about the general directions of energy and other policies such as mentioned in Principle 2 (environmental, regional and security concerns and conflict resolution), and by providing government incentives where necessary, in order to:
>
> - give priority to exploration activities including those in offshore and frontier areas;

- encourage rates of exploration and development of available capacities which are consistent with the optimum economic development of resources.

The Principles were written in 1977, at a time of great preoccupation with oil. They are not intended to be legally binding, even in a soft sense, but only to express the Members' "firm political determination". Although the Principles did not refer specifically to trade (and investment policy was not specifically developed in the other Principles dealing with various energy sectors), the Principles as a whole imply that trade and investment policies are necessary to carry out the Principles successfully. Both trade and investment would have greater visibility in later measures adopted by the Governing Board.

The first of these measures is the Principles for IEA Action on Coal, adopted in 1979 [IEA/GB(79)32, Item 4(a) and Annex I; see Section D-2 above]. The Members' basic coal trade commitment is formulated in paragraph 15 of the Coal Principles as a common objective to *"expand . . . international trade in coal to meet increased demand"* [Emphasis added]. Members agreed, moreover, to

> do so on a basis which encourages the development of stable relations between consumers and producers, on fair, reasonable and competitive terms, especially by means of long term contracts. They will ensure that an economic, fiscal and investment climate prevails which is conducive to development of coal production, trade and utilization as envisaged in these Principles for IEA Action on Coal [Paragraph 22].

The Principles provide for Members which have measures on international coal trade in force to apply them "in a manner which fully supports these Principles". Members adopted a "standstill" agreement on new measures, stating that they would not introduce any new measures "which are inconsistent with these Principles . . . except for over-riding reasons concerning the national interest, in which case they will take full account of these Principles" [Paragraph 23; the exception stated at the end of this paragraph was included at the request of Australia and Canada, and it was accepted by the others on the basis of statements by these two countries]. Moreover, Members undertake not to interfere with the implementation of long-term contracts "unless they are compelled to do so by severe developments in the coal supply situation occurring in an individual country which threatens that country's wellbeing; or by a severe international energy

supply emergency in which latter case they will apply any restrictions on an equitable and non-discriminatory basis" [Paragraph 24]. Paragraph 26 states that Members agree, in order to maintain coal flow in commercial channels on a non-discriminatory basis, to "monitor the structure and growth of international coal trade as it develops".

Parallel provisions of the Coal Principles apply to investment in coal. Members agreed to assess their environmental and other policies, taking into account

> the need to provide long-term reliability for investments by minimizing revisions of environmental standards for existing facilities which disproportionately increase costs in relation to environmental benefits [Paragraph 16(c)].

The main Principle on coal investment, contained in paragraph 25, merits quotation in full:

> In their efforts to establish an investment climate which encourages the investment necessary to expand coal production, IEA countries will in general maintain positive attitudes towards investment for coal projects, including international investment flows. Insofar as IEA countries have measures in force which provide for review or control of international investment flows, they will implement and apply those measures in a manner which fully supports these Principles for IEA Action on Coal. They will not introduce new measures regarding international investment flows for coal projects which are inconsistent with these Principles for IEA Action on Coal except for over-riding reasons concerning the national interest, in which case they will take full account of these Principles for IEA Action on Coal [note that the exception at the end of this paragraph was made for the same reason as the exception in paragraph 23 on trade, as stated above].

The Coal Industry Advisory Board (CIAB) and the IEA Secretariat have followed up on this Principle with a number of detailed studies of coal trade and investment. In the IEA's annual policy reviews and the special coal policy reviews in the Agency's long-term work, the Principles have provided an essential measuring rod for assessing the Members' efforts in applying the IEA actions on trade and investment.

Some of the same can be said for natural gas. Natural gas investment and trade have also been the subject of Ministerial statements. In 1979, the Ministers "agreed on the need to encourage both indigenous production and international trade in natural gas" [IEA/GB(79)35, paragraph 11], although the relatively elaborate Principles adopted for coal were not established for natural gas. In 1983 the Governing Board adopted a policy statement on security of supply of natural gas and risks of dependence on single suppliers [See Section D-3 above on natural gas], which was essentially a formulation of natural gas trade policy.

Turning to broader statements on trade and investment, in 1981 the Governing Board adopted its more general "Decision on an Approach to Investment in Energy Projects to Promote Structural Change" [IEA/GB(81)86, Item 6, Annex II], which emphasized international co-operation on energy planning, the demonstration of achievements in energy policy, further development of country review procedures, and Secretariat contacts with international financial institutions with a view to providing energy information relevant to investment decisions. The following year Ministers recognized still more broadly "the importance of *energy investment* in bringing about a better energy mix" [IEA/GB(82)51 (1st Revision) paragraph 16]; they also noted "the general sluggishness of private investment in current economic circumstances and that several large energy projects that have high costs and long lead times have been recently deferred or cancelled". As a result the Ministers stressed "the important role that energy investment must play in assuring energy security".

Energy pricing attracted Ministerial policy interest in 1981, when Ministers supported an approach to consumer pricing which promoted world market prices, where markets exist, and the cost of maintaining supply in the long term, where they do not exist [IEA/GB(81)33(2nd Revision), paragraphs 11 and 12]. The document states that subsidies which discourage conservation should be avoided and that "a thriving energy trade should be developed". IEA Ministers also addressed electricity tariffs, which they said should not prevent utilities from raising revenue needed for future requirements, and considered tax policies and the transparency of energy prices. In 1984 the Governing Board reached conclusions on both energy *pricing* [IEA/GB(84)15, Item 3(d) and Annex II] and *barriers to trade* [IEA/GB(84)15, Item 3(e) and Annex III], which contain specific requests directed to particular Members to take action in a number of sectors, such as prices, (for example, Canada should continue moving gasoline prices upwards) and trade barriers (for example,

Germany and the United Kingdom should consider the disadvantages to international trade of protecting or subsidizing domestic high cost coal production).

The most recent comprehensive IEA policy statement on energy trade and investment is found in the 1993 IEA Shared Goals [See Section G below] which emphasized the establishment of "free and open markets" for energy as "a fundamental point of departure"[See the introductory paragraph to the Shared Goals]. Goal 8 addresses trade and investment briefly but directly:

> Free and open trade and a secure framework for investment contribute to efficient energy markets and energy security. Distortions to energy trade and investment should be avoided.

Goal 9 on co-operation among all energy market participants also refers to trade and investment. Co-operation "helps to improve information and understanding, and encourage the development of efficient, environmentally acceptable and flexible energy systems and markets worldwide. These are needed to help promote the *investment, trade* and confidence necessary to achieve global energy security and environmental objectives" [Emphasis added].

Moreover, the European Energy *Charter* process has produced on energy trade and investment a declaration, to which all IEA Members except New Zealand have subscribed, and the Energy Charter *Treaty* which was initially signed by all but five IEA countries. The Charter process grew out of a realization in mid-1990 that special opportunities were arising, particularly in Central and Eastern Europe and the Soviet Union after the end of the Cold War, for IEA countries to enter into mutually advantageous energy relations with governments in those areas. The IEA Secretariat participated in the development of these instruments from the outset, providing support from the Agency's staff responsible for non-Member relations, long-term policy, legal counsel, and other functions within the Agency. The IEA Secretariat produced a preliminary paper entitled "Improvement of Energy Investment Climate" which outlined typical investment improvement measures which might be considered. The Secretariat also participated fully in the Charter process and made a number of other contributions to the Charter.

In June 1991 IEA "Ministers noted with interest the expressed objectives of the draft **European Energy Charter,** namely to develop closer economic links with Central and Eastern Europe and the Soviet Union, to

protect the environment, to enhance security of supply, to promote free and undistorted energy trade, and to assist the process of their economic reform" [IEA/GB(91)42/REV2, paragraph 31]. The Communiqué declared that "the development of any Charter and protocols thereto should be non-discriminatory, and the European Community, the IEA and other international organisations should co-operate closely". Thereafter, the Governing Board requested that the IEA Secretariat continue its participation in the negotiating process of the Charter [IEA/GB(91)65, Item 4(c)(iii)]. On 17 December 1991, the European Energy Charter was signed at The Hague, as a political (not legally binding) document. In addition to the IEA Members, the parties included the Russian Federation, other Central and Eastern European states, and the European Communities. The parties undertake to "promote the development of an efficient energy market throughout Europe, and a better functioning global market, in both cases based on the principle of non-discrimination and on market-oriented price formation, taking due account of environmental concerns" [Title I, second paragraph, see IEA/GB/RD(91)3, December 1991].

The main policy thrusts of the European Energy Charter are in energy trade and investment policy. On trade, the signatories agree to take action to develop

> trade in energy, consistent with major relevant multilateral agreements such as GATT, its related instruments, and nuclear non-proliferation obligations and undertakings, which will be achieved by means of:
>
> - an open and competitive market for energy products, materials, equipment and services;
> - access to energy resources, and exploration and development thereof on a commercial basis;
> - access to local and international markets;
> - removal of technical, administrative and other barriers to trade in energy and associated equipment, technologies and energy related services.

In addition, the signatories agree to other provisions on the improvement of services and installations, transport infrastructure, access to capital, and access to transport infrastructure [Paragraph 1].

To promote the free flow of energy investments, the Charter signatories agree that at the national level they will "provide for a stable, transparent legal framework for foreign investments, in conformity with the

relevant international laws and rules on investment and trade" [Title II, paragraph 4]. In addition, they affirm

> that it is important for the signatory States to negotiate and ratify legally binding agreements on promotion and protection of investments which ensure a high level of legal security and enable the use of investment risk guarantee schemes.

Other commitments concern the right of investors to repatriate profits or other payments relating to investments and to obtain and use needed convertible currency. There is provision for the avoidance of double taxation. Many other energy policy elements, such as energy efficiency (including environmental protection), oil, natural gas, the nuclear fuel cycle, power stations, coal, renewables, R & D, safety, and major accidents are also developed in the Charter.

The policies set forth in the Charter have since been transformed into treaty obligations in a second instrument called The Energy Charter Treaty, which was negotiated after the Charter was signed in December 1991. The IEA has not itself become a party to the Charter and would not be expected to become a party to the Charter Treaty. Neither instrument states IEA policy as such, but all IEA Members have endorsed the Charter informally and all have supported the Charter Treaty generally (although all Members might not fully agree with all provisions of the Treaty). Hence the IEA status of the Charter policies is an informal but effective one. This was made clear in the IEA Ministerial Communiqué of June 1993, when Ministers gave their support to the early completion of the Charter Treaty, stressed the importance of the full range of measures "designed to ensure stability and transparency in trade and investment", noted the role this can play in "integrating the energy sectors of IEA countries with those of Central and Eastern Europe and the New Independent States", and stated that they "welcome the IEA's substantial assistance to the Treaty negotiations and support the IEA's active involvement in the ensuing Charter implementation" [IEA/GB(93)41, paragraph 31].

While the Charter states broad policy in terms which are not legally binding, the Charter Treaty is "designed to promote East-West industrial co-operation by providing *legal safeguards* in areas such as investment, transit and trade" [See Final Act of the European Energy Conference, AF/EECH/en 1, 12 December 1994; emphasis added]. The Treaty is intended to stimulate the flow of investment, capital, goods and energy, and it creates a continuing organizational structure for this purpose. The Energy Charter Treaty and its

Protocol on Energy Efficiency and Related Environmental Aspects were signed in Lisbon on 17 December 1994, the Treaty by forty-one states, the Protocol by thirty-nine states, and both by the European Communities. All but five IEA countries were among the initial signatories of both instruments, which will remain open for signature for six months and also provide for accession. Negotiations also were begun on two additional Protocols to the Treaty, on the subjects of nuclear safety and of hydrocarbons. The detailed provisions of the Energy Charter Treaty are summarized by the IEA Legal Counsel, Craig Bamberger, in a recent IEA publication entitled *The Energy Charter Treaty – a description of its provisions* (1995).

One effect of these developments has been to shift the focus from the essentially soft or non-legally binding nature of the Members' IEA trade and investment commitments (equally true of most other IEA long-term energy commitments) to legal obligations taken in a treaty formally binding under international law. With the Charter Treaty commitments in that binding form, the relatively soft provisions of LTCP Chapter V as well as the recommendation or declaration type IEA commitments on the same subjects might be reviewed, and this could result in moving IEA energy trade and investment policy and procedures a major step forward. One question would be whether these IEA commitments should also be formulated in more formally binding terms.

E. Energy and Environment

Environmental concerns are "horizontal" factors in the development of energy policy, much in the same way that trade and investment issues were considered in the foregoing Section. Environment policy too is viewed across the entire spectrum of energy options, as a policy not only to enhance the *protection of the environment*, but also to avoid unnecessary or disproportionate *constraints on energy policy* where a potential conflict with environment policy might occur. In IEA countries, environmental preoccupations include problems of clean air and water, acid rain, climate change, ozone depletion, waste disposal, nuclear safety, and the impacts of energy installation sites. In other countries, these problems may be even more troublesome, as in Central and Eastern Europe and the New Independent States where a rapid improvement in environmental conditions is particularly necessary in part for historical reasons relating to the policies followed by the former regimes during the period following World War II,

and in developing countries facing the environmental problems of rapid expansion of industrial activity and increased energy consumption. Throughout the world these concerns are a potential *constraint* on the use of oil, coal, and other energies presenting adverse effects, while these concerns tend to *support* policies promoting energy efficiency, natural gas, nuclear power, non-polluting renewable energies, and relevant energy R & D programmes. In the 1970s the term "balance" was often employed in speaking about energy and the environment; i.e. the balance between the quality of life as a social goal of environment policy, on the one hand, and the then prevailing strategic/economic goals of energy policy, on the other hand. By the 1990s, this notion of balance had been supplemented by the policy of "integrating energy and the environment", and by economic goals as well, as will be seen in the discussion to follow.

From the outset IEA policies have reflected Members' environmental concerns, although this occurred on a relatively modest basis in the early years of the Agency before the environment became a growing energy force in the 1980s and explicitly part of energy security policy in the 1990s. The I.E.P. Agreement which established the Agency in 1974 integrated environment policy *de jure* but not fully *de facto* into the IEA's programme on long-term energy co-operation, where it appears as a carefully stated element of policy on the development of alternative sources of energy. In establishing long-term policy, the IEA was enjoined to include co-operative programmes on "criteria, quality objectives and standards for environmental protection". This placed the IEA in the mainstream of the environmental policies of the day [I.E.P. Agreement, Article 42.1(b)]. In the IEA's Long-Term Co-operation Programme, adopted in 1976, environment policy was not spelled out as such, but was left to later development under broad policy guidelines on the accelerated development of alternative energy sources. Despite these early references to energy and the environment, at no time have the Members considered the IEA to be an "environmental protection agency for energy", and it is still not so considered today despite the enormous growth in IEA work on energy and the environment. More precisely, the IEA has moved from being an institution which took note of environmental concerns to one which has fully integrated these concerns into its comprehensive energy policies.

This movement was already visible in the 1980-1981 period, when co-operation between the Agency and the OECD Environment Directorate began to appear in the IEA Programmes of Work [See IEA/GB(80)59, Annex I, p. 13; IEA/GB(81)58, Annex I, p. 6]. By 1985 work in that field was accorded much more attention (yet only at the formal level of eight months of staff effort over the year), and the Programme of Work contained

broad provisions about an environment programme with little specific activity description [IEA/GB(84)28, Annex I, p. 13]. During this period the IEA maintained a preliminary "watching brief" consisting mainly of monitoring, analysis and policy identification. With the amount of Long-Term Office Staff time dedicated to the environment growing from eight months in 1985 to ninety-nine months in 1995 [IEA/GB(94)38/REV1/ANN1, p. 9], one can see the magnitude of the changes which were soon to come for IEA policy in this field.

In 1977 discussions were well underway between Europe and North America on the subject of long-range transport of air pollutants (acid rain), which was a major environmental concern. Coal, as a recognized major contributor to acid gases, could not be promoted without due attention to the environmental consequences, although at that time CO_2 was not a foremost environmental concern, even though the risk of climate change was known. In the IEA, firm policy declarations on environmental questions were emerging by 1979, when the Agency stepped up its efforts to develop coal production, use, and trade, and IEA Ministers adopted the Principles for IEA Action on Coal [See Section D-2 above]. In their assessment of the potential for coal, Ministers "agreed that coal must make a greater contribution to the overall energy balance and that the *serious environmental concerns about the use of coal have to be resolved*" [IEA/GB(79)32, Item 3(n); emphasis added]. They clearly recognized the trade-off between energy concerns and the environment, when they said that increasing the role of coal "must proceed under acceptable environmental conditions" and that "This will require careful planning from the beginning in order to assure a reasonable and continuing *balance* between energy requirements and environmental requirements" [Annex I, paragraph 9; emphasis added]. More specifically, Ministers stated in paragraph 16 that

> They will assess their *environmental policies*, provisions and practices affecting coal mining, transport and combustion, disposal of coal waste, and land reclamation and, where necessary, will amplify and clarify them, taking into account:
> a. technology which is already available and which can be more widely and effectively utilized in commercial applications;
> b. the need to develop technologies for additional improvements through research and development, and to commercialize them as soon as they are economically viable;
> c. the need to provide long-term reliability for investments by minimizing revisions of environmental standards for

existing facilities which disproportionately increase costs in relation to environmental benefits;

d. the need to minimize the complexities, costs and duration of procedures for obtaining necessary approvals [Emphasis added].

They also agreed to assess "the wider environmental impact of increasing coal production and combustion", taking into account an OECD Council Recommendation on the same subject [Paragraph 17]. This OECD Recommendation mentioned integrated energy and environment policies and the balance between the two, research, the definition of acceptable fuel qualities, the Polluter Pays Principle, the assessment of environmental and social consequences of a large scale introduction of coal, information programmes, and guidelines for Member countries [See OECD document C(79)117]. In addition, the IEA action supported R & D work and the rapid commercialization of improved technologies for coal combustion, including means for keeping the combustion cycle "environmentally acceptable" [Paragraph 8 of the Annex to the Principles].

As the tide of policy interest shifted in favour of stronger measures on energy and the environment during this period, both the Secretariat and the Coal Industry Advisory Board (CIAB) devoted considerable effort to environmental questions. After they jointly published *The Use of Coal in Industry* and after the IEA Coal Information System was established in 1982, the CIAB produced its 1983 report on *Coal Use and the Environment,* bearing the general conclusion that the use of coal could be expanded in an environmentally acceptable manner and suggesting actions which governments and industry could take to increase coal use. By 1983 the IEA was saying again that "Coal use must be environmentally acceptable", with emphasis on the "clean use of coal" and R & D regarding coal use technologies [IEA/GB(83)36(Final) and Annex I, paragraph 7]. High priority was assigned to work on the implications of environment concerns for the other energy sectors as well as for coal [IEA/GB(84)27, Item 2(c)].

The landmark Ministerial Conclusions on "Energy and the Environment" of July 1985 broadened the focus again beyond coal to more general considerations on the inter-relations between energy and environment policies [IEA/GB(85)46, Annex I, Chapter III]. This is still the IEA's most comprehensive and thorough policy statement on this subject. They confirmed much of what the Ministers had previously accomplished in the environment field, with the notable evolutions which will be seen in the following summary of the main points of the document:

General Principles

- Energy production, conversion, transport, and consumption should be carried out in an environmentally acceptable manner; reliable technologies and methods exist to control most of the relevant environmental impacts.
- Solutions to the environmental problems are fundamental to the maintenance of "adequate, economic and secure supplies of energy", and the *form* of solutions would be important to energy policy.
- "Ministers will therefore promote actively in their energy policies those *lines of action which advance the objectives of both energy and environmental policy,* paying particular attention to the development of new environmentally favourable energy technologies and to the efficient use and conservation of energy" [Emphasis added].
- Ministers recognize that many factors affect the formulation of energy policy, "including improvement of the energy mix, energy security, and minimisation of costs as well as protection of the environment", all of which should be taken into account "at an early stage in the formulation of energy policy".
- When these factors conflict, a balance must be struck between them, "taking into account all the costs and benefits involved, both nationally and internationally". The resulting decisions may "differ between countries according to their energy mix and degree of pollution".

Efficiency and Conservation

- Energy efficiency and conservation are (when applied on an economic basis) of "primary importance for achieving the objectives of both energy and environmental policy"; in general they lack environmental disadvantages and carry the advantage of using less energy.
- Ministers will thus promote these policies by "economic energy pricing, removing barriers to the effective operation of price signals through the market and adopting specific measures and programmes".

Research and Development

- The introduction of "improved technology" on an economic basis is fundamental to energy efficiency and to the resolution of other

environment questions. The development of cost-effective new technologies is particularly important. Proper weight will therefore be given to R & D programmes which enhance the efficient use and conversion of energy, coal combustion or conversion, the safe disposal of nuclear waste, and renewable energies which are environmentally acceptable and competitive.

- R & D information and the developing technologies should be exchanged among IEA Members.

Polluter Pays Principle

- The Polluter Pays Principle will assist in the reconciliation of energy and environment objectives, as will other lines of action such as: the use of natural gas, environmentally acceptable methods of burning coal, the better preparation and use of low sulphur coal, the development of nuclear power (under stringent health, safety, waste and non-proliferation constraints), the economic use of electricity produced in an environmentally acceptable way, the use of district heating, combined heat and power and other types of waste heat utilization, the manufacture and use of more efficient and less polluting motor vehicles, and the more efficient use of public transportation.

Giving Energy Policy Due Consideration

- "Just as the formulation of energy policy should give due weight to environmental considerations, so should environmental policy give due weight to energy policy considerations".
- In the early stage of considering changes in environmental policy, there should be consultation with all actors in the energy sector likely to be affected; environmental objectives should be clearly articulated; regulations should be flexible and avoid setting precise technical methods of control; in appropriate cases emission standards should be set by reference to the industry rather than specific plants.
- Environmental regulations should be subject to review, but requirements changes "should be infrequent and as predictable as possible"; new environmental requirements for existing installations and for new ones under construction should take account of the need for "a reasonable adjustment period".

Comparable Progress in All IEA Member Countries

- There is need for *comparable progress* in all Member countries, taking account of flexibility, environmental conditions, and prior progress over the years.
- There is also need for "close co-operation on the local, national and international levels between those responsible for energy policy and for environmental policy", and Ministers will consider whether co-ordination within their own governments needs strengthening.

Implementation in Consultation with the OECD

- The IEA Governing Board at official level is requested, in close consultation with the OECD Environment Committee, to implement the Conclusions, and in particular, to "give weight to environmental considerations in their work on energy policy" and to keep in touch with the OECD Environment Committee on relevant questions. Ministers invited the OECD Environment Committee "to take these Conclusions into account and to continue their co-operation with the IEA in their work in this area".

The 1985 Ministerial Conclusions on Energy and the Environment were integrated into the 1986 IEA Programme of Work, with the statement that special attention to these Conclusions would "affect all aspects of the work on energy demand and the future energy mix, but particularly the work on conservation, coal and nuclear energy" [IEA/GB(85)47, Annex I, pp. 12-13]. In 1987, Ministers explicitly confirmed these 1985 Conclusions [IEA/GB(87)33 Annex, paragraph 32] and acknowledged the follow-up actions which had already been taken. For the first time, IEA Ministers addressed the specific question of the increased atmospheric content of carbon dioxide stemming to a large extent from the burning of fossil fuels. Damage to climate, agriculture, and sea levels was cited as a reason for undertaking a "well co-ordinated multinational research effort . . . to assess the likelihood, extent, and timing of such consequences" [Paragraph 33].

Two years later in 1989 the IEA Ministers issued another general policy statement on energy and the environment, confirming their earlier work, but advancing fresh analysis and policy prescriptions. They "stressed the important links between energy and the environment, and consequently the need for integrated policies which further *energy security, environmental protection and economic growth*" [IEA/GB(89)36 Annex, paragraph 4(d); emphasis added].

This became known as the "Three Es" of energy policy on these subjects. Major specific concerns in 1989 were global warming and climate change. IEA Ministers spoke out on "the complexity and uncertainties of the relationships between greenhouse gas emissions from fossil fuels and atmospheric concentrations, and consequent climate change, as well as the world wide dimensions and implications of these issues". At the same time, IEA Ministers pledged to pursue this line of policy: "when fossil fuels are used, setting strict standards for [acid gases] SO_x and NO_x emissions and encouraging introduction of advanced cleaning and combustion technologies". Since greenhouse emissions arise not only in IEA countries, but also in a large and growing proportion in non-Member countries (with all countries being affected), Ministers stressed a "high degree of international co-operation" and "the need to pursue greater scientific understanding, to assess the kinds of policy responses which may be necessary, and to implement them on a global scale". Ministers agreed to integrate "*energy security* and environmental policies", and they supported continued co-operation with the OECD as well as IEA participation in the Intergovernmental Panel on Climate Change [Emphasis added]. In the wake of the *Exxon Valdez* oil spill disaster in 1989, the possibility of technological collaboration on "preventing and treating oil spills and other accidents in the petroleum production, transportation and processing system" was also envisaged. Ministers pledged broadly not to wait for all uncertainties in the environment area to be resolved, but to "act now by taking energy policy measures promptly to address these problems, focusing on *prudent* steps that take account of the various costs involved and are consistent with agreed IEA policies for energy security" [Emphasis added]. They also cautioned against quick solutions (such as "sharp tax increases or other abrupt changes in the economics of providing and using energy"), and remarked upon the importance of economic growth to the process of providing environmental protection. "They therefore stressed the need for a balanced, integrated bundle of realistically implementable and cost-effective energy-related and other responses, without losing sight of the need for energy security".

The evolutionary process of developing IEA policies on energy and the environment continued in 1991 and 1993, when the basics of established policies were restated in many cases and new features were added. In 1991 [IEA/GB(91)42/REV2, Chapter IV] Ministers cited work already accomplished in the IEA (among other contributions, the IEA had published the "broad brush" study entitled *Energy and the Environment: Policy Overview* on long-term impacts and policy choices), and the IEA had contributed to the Intergovernmental Panel on Climate Change (IPCC) and to the Intergovernmental Negotiating Committee on a Framework Convention on

Climate Change (INC). In June 1992, the Executive Director made an important address to the United Nations Conference on Environment and Development (the Rio Conference) in which she offered the free exchange of information and expertise of the Agency, which led to IEA assistance in the follow-up to the Conference. During this period, moreover, the IEA organized its procedures for obtaining advice from the energy industries on energy and the environment questions. Although the IEA received coal industry advice from the CIAB and other industry advice was also obtained on a pragmatic basis, the IEA's Executive Director arranged for such industry advice to be communicated in a more organized fashion. Following a preparatory meeting in 1990, the Executive Director on 1-2 December 1992 convened an Ad Hoc Industry Group on Energy and Environment to advise the Secretariat on IEA work in progress in this field, particularly on climate change, greenhouse gas emissions, energy subsidies and market distortions. When the Secretariat arranged for other productive channels to be used for this advisory purpose, the Ad Hoc Industry Group type of organized meeting proved to be no longer necessary.

The Agency took a number of additional energy and environment actions during the period 1991-1993. It continued to contribute to environmental elements of the work on the economies of Central and Eastern Europe, the Russian Federation, and Asia. In their 1991 meeting, IEA Ministers referred to the need to act on problems of energy facility siting, and highlighted "the IEA's ongoing work on emissions inventory methodologies and databases, and its analyses of policy instruments and technologies relating to major energy sectors, such as transport and electricity, and of important responses, such as energy efficiency". They emphasized "the important roles of industry and consumer awareness", urged more "energy education and information on the part of government, industry and consumers", and supported the bringing of industry expertise into IEA analytical work and R & D collaboration. The potential for improved energy efficiency policy work to reduce the environmental impacts of energy use, as well as the important role of governments in reducing the gap between new opportunities for improving energy efficiency and the decisions of consumers in the market place, were examined in the IEA's *Energy Efficiency and the Environment*, published during this period.

The year 1993 was also an important one for progress on IEA policy on energy and the environment. The global climate change issue continued to pose a challenge to energy policy makers, requiring greater efforts overall and the reflection of "external costs of energy production" in energy prices. The IEA had recently published *Climate Change Policy Initiatives*, a country-by-country record of energy source greenhouse gas emissions and Members'

commitments to reduce these gases (in 1994 it issued an updated version), and the IEA publication on *Cars and Climate Change* had appeared in May 1993. Ministers then urged the rapid ratification of the Framework Convention on Climate Change (FCCC), which had been signed by all IEA Members except Turkey, and they requested the IEA to augment its contribution to the implementation of the Convention. During this period the IEA assisted in the development of guidelines for the national communications to be made under the FCCC, for the purpose of combatting climate change and to achieve transparency and compatibility of national reports to be made under this Convention.

Ministers identified and highlighted several "Areas for Improvement" in energy and environment policy development and performance. These included energy efficiency, for which market forces ought to have priority to produce energy efficiency gains, but also "innovative and bold approaches are required by governments, in co-operation with industry" [IEA/GB(93)41, Chapter IV]. Following renewed support for energy efficiency and renewables, Ministers referred to the nuclear policies of IEA countries. Some Members emphasized, as a response to the greenhouse gas challenge, that nuclear energy had the advantage of emitting no sulphur dioxide, nitrogen oxides, or greenhouse gases, yet the division of opinion among IEA countries on the use of nuclear power continued [See Section D-4 above]. Ministers acknowledged "the need to further integrate environmental objectives into national energy technology research, development and demonstration programmes". They asked the IEA to analyze "the factors that influence new technology diffusion into the markets, identifying barriers and assessing policy options; the role international technology co-operation policies could have in meeting the objectives of the Framework Convention on Climate Change; and the effect environmental and other governmental policies have on the penetration of new, more environmentally benign, technologies". Ministers welcomed the IEA's Greenhouse Gas Technology Information Exchange (GREENTIE) to promote R & D co-operation in this area. Co-operation with non-Members had become a higher IEA priority because of the expected future role of those countries in CO_2 emissions growth control, leading to a request for the IEA to assess "joint implementation" with non-Member countries, in accordance with the Framework Convention; Members were asked to strengthen their bilateral co-operation with non-Members to this end. The OECD and the IEA joined in a project to provide guidelines for national communications under the Framework Convention in order to achieve transparency and comparability of national reports. They also carried out an *IEA/OECD Scoping Study: Energy and Environmental Technologies to Respond to Global Climate Change*

Concerns, published in 1994, which emphasizes the need to strengthen government and industry efforts toward longer-term technological breakthroughs [See Chapter V, Section B below]. The potential of biofuels to reduce dependence on petroleum products and to curb emissions of greenhouse gases is the subject of *Biofuels*, also published in 1994, as the first title in the IEA's new Energy and the Environment Policy Analysis Series.

In 1993 Ministers established for the first time a list of "Policy Instruments: A Mix of Measures" with which to respond to the emissions challenge. The list includes energy and carbon taxes, fiscal and other financial incentives, and regulations to reduce emissions. Ministers stated that the response of each country would be a "complex mix of possible measures" and agreed that "concerted actions by IEA Member countries are needed". Although each Member's respective stage of development and regional arrangements among countries should be taken into account, the effects of Members' efforts should be as comparable as possible. The IEA should develop "criteria and methodologies to permit an assessment of the comparability of country responses", and to do so Ministers should supply the necessary information.

At the same time, IEA Ministers adopted the "IEA Shared Goals" [See Section G below; IEA/GB(93)41, Annex I] which are based on the "Three Es" of energy: energy security, economic development, and energy and the environment, in a formulation which has come to symbolize current IEA energy policy overall. Energy and the environment is the subject of Goals 3 and 4:

> 3. The environmentally sustainable provision and use of energy is central to the achievement of these shared goals. Decision-makers should seek to minimise the adverse environmental impacts of energy activities, just as environmental decisions should take account of the energy consequences. Government interventions should where practicable have regard to the Polluter Pays Principle.
>
> 4. More environmentally acceptable energy sources need to be encouraged and developed. Clean and efficient use of fossil fuels is essential. The development of economic non-fossil sources is also a priority. A number of IEA members wish to retain and improve the nuclear option for the future, at the highest safety standards, because nuclear energy does not emit carbon dioxide. Renewable sources will also have an increasingly important contribution to make.

The comprehensive IEA Shared Goals contain other provisions which are less directly stated to respond to environmental concerns, yet do affect them, such as the introductory paragraph in stating the objectives of this measure, Goal 1 on diversity, efficiency, and flexibility within the energy sector, Goal 5 on improved energy efficiency, Goal 6 on research and development, Goal 7 on undistorted energy prices, Goal 8 on free and open trade, and Goal 9 on co-operation among all energy market participants. Most of these Goals, stated briefly and abstractly, reflect the IEA's policies on energy and the environment as they have evolved and strengthened over the years. While environmental concerns played a relatively minor role in the early years of the Agency and were not specifically mentioned in the 1977 IEA "Principles for Energy Policy", these concerns now constitute a major component of the Agency's most vital objective of maintaining energy security.

In early 1994 environmental concerns received still greater prominence as the topic of the IEA's first informal Ministerial "brainstorming" session on energy and the environment, which resulted in an improved understanding of efforts to reduce energy-related greenhouse gas emissions and provided policy directions for future IEA work in this sector. Ministers gave policy direction for IEA work in such areas as economic instruments and tax shifts, comparability of the effects of policy measures to limit greenhouse gases, joint implementation, voluntary agreements/partnerships with industry, and technology development and co-operation. Policy was seen as moving in the direction of a mix of responses to climate change, a mix which reflects IEA Members' national economic and political circumstances, rather than a uniform set of policies to be applied by all. It would follow that the entire range of policy instruments should be open to consideration in the context of free and open markets and without the adoption of new trade restrictions in the name of environmental protection [See IEA/GB(94)33, pp. 3-4]. Within the energy security conceptual framework, environmental considerations must now be seen as likely to continue as a major determinant of IEA energy policy generally.

F. Reviews of Members' Energy Policies and Goals

While it is one thing for international institutions to *adopt* broad statements on policies, it may be quite another for them to *monitor* the application of

these policies, to *assess* their effectiveness and to *recommend* or to *arrange* specific compliance actions by the individual Members. In international economic organizations, it is not an uncommon practice for such monitoring, assessment, and action functions in part to be carried out in the course of "peer reviews", as in the IEA where these functions are conducted annually in the long-term policy sector under a far-reaching system of individual country policy reviews. Briefly stated, the purposes of the IEA reviews include the provision of information and data on energy markets and policy developments in each country, the measurement and comparison of the reviewed country's implementation of policies adopted in the Agency, the provision of a mechanism for each country to learn from the experiences of the others, and the stimulation of Members' compliance actions and increased co-operation on energy policy.

Each year a number of IEA Member countries is the subject of an "in-depth" review which is essentially a "peer review" carried out by a team of officials from other Member governments and by the Secretariat, first on the basis of a questionnaire addressed to the country under review and the detailed data on energy policies and programmes submitted in the country's response. This is followed in a second stage by the Secretariat's preparation of a "main issues" paper, by the review teams' country visits, by discussions in the responsible long-term policy (SLT) and R & D (CERT) bodies, and by the conduct of comprehensive country assessments. In four year cycles, each Member receives an in-depth review. Each year the Members not having the in-depth review receive a "standard review", which consists mainly of a policy and factual update and a review of compliance with IEA long-term policy objectives. The results of the annual reviews, including the recommendations addressed to individual Members, are then published annually by the Agency.

These policy reviews were inaugurated in the 1976 Long-Term Co-operation Programme [See Section A above] which provides that Members "shall periodically review progress toward . . . [medium- and long-term] objectives and assess the adequacy of their national and co-operative activities" [LTCP, Chapter I, paragraph 3(a)]. More specifically for conservation [Chapter II, Article 3] and for alternative source of energy activities [Chapter III, A.1], the LTCP provides that periodic reviews are to be designed

- To provide a thorough and systematic assessment of evolving national programmes and policies on the basis of common criteria.
- To identify areas in which programmes might be improved.

- To promote co-operation in the area of accelerated production, including a detailed exchange of information, experience and expertise in the production of alternative sources of energy.

The pattern and frequency of the reviews have evolved over the years in accordance with Governing Board decisions taken for the purpose of strengthening the system. In 1975 the first alternative energies review assessed favourably the need for the LTCP, and called on Members to develop national energy development plans, if they had not done so, and to realize and strengthen their plans, if they already existed. The Board also stated broad policy support on the integration of national strategies for energy demand and supply, on national price and taxation policies in relation to alternative energy investment, and on the desirability of increased co-operation among Agency countries, *without* addressing recommendations on these subjects to particular Members [IEA/GB(76)24, Item 6]. In adopting the 1977 Group Objectives and Principles for Energy Policy [See Section D-1 above], the Governing Board instructed the Standing Group on Long-Term Co-operation (SLT) and the CRD/CERT [See Chapter V, Section A] to conduct each year a "thorough and systematic review", to take account of the "Principles for Energy Policy", and to make a full report, "together with conclusions and recommendations" to the Governing Board IEA/GB(77)52(1st Revision), Item 2(e)-(g) and Annex, paragraph 2(c)]. The Board also agreed that it would assess the contribution of each Member to the achievement of the Group Objectives, and that Members would endeavour to strengthen their policies, taking into account the results of the reviews. In the 1977 review assessment, the Governing Board added recommendations directed to particular Members as a means of making the reviews more specific and effective [IEA/GB(78)18, Item 2]. The Board also endorsed particular recommendations contained in individual country reports, and authorized the publication of the long-term and R & D sector reports on the review. Individual country recommendations and publication would become regular features of the IEA's review process in later years.

With the advantage of experience derived from two more review cycles, the Governing Board adopted the Agency's Country Review Procedures for 1980, which still guide the review process for the most part [IEA/GB(80)21, Item 11; IEA/GB(80)25]. The new Procedures confirmed the scope of the reviews (expanded to include oil import goals), the *annual* reviews for every Member (now called standard reviews), the *periodic* "in-depth" review (now at four year intervals for each Member), and the rapporteur lead system for the conduct of the reviews. New elements included the thorough discussion of

major issues, greater attention to results achieved, an emphasis on large economies, timing flexibility for in-depth reviews, and more effective communication of results to the reviewed countries. In 1980 and again in 1982 the Secretariat analyzed the areas where further action in individual countries could provide results, and Ministers agreed to give weight to this analysis [IEA/GB(80)58, paragraph 5 and Annex I; IEA/GB(82)51 (1st Revision) paragraph 9 and Annex].

On various occasions the energy policy review procedures have been further strengthened. In 1981 the coal review was separated from the general review [IEA/GB(81)30, Item 5 and Annex], and several separate coal reviews have been conducted over the years, with the participation of the Coal Industry Advisory Board. The reviews make recommendations on particular Members' situations and policies; sometimes particular country situations are the subjects of discussion in the Governing Board. The Board has often identified particular issues to be the subject of special attention in the review process, a process which offers opportunities for highlighting particular policies in need of special attention. In 1982 these issues included energy investment prospects, future electricity prospects, market imperfections, pricing policies, and taxation practices [IEA/GB(82)81, Item 3(d) and Annex I]. In the interest of efficiency and overall effectiveness, since the mid-1980s the long-term and the R & D reviews have been conducted together. The review results are submitted to, and sometimes commented upon, by the Governing Board, which authorizes their publication each year.

The reviews are conducted by teams formed by members of the IEA Secretariat and by Members' officials. The rapporteur is usually an official of a Member government who leads the work of the team. By 1983 the officials in some cases were representatives to the Governing Board and senior officials from national administrations, and this practice was endorsed by the Board [IEA/GB(83)17, Annex II]. The staff of the European Commission have participated as observers, upon their request, in reviews of Member States of the European Union. In certain cases, members of the Nuclear Energy Agency have participated in the examination of the nuclear aspect of an in-depth review of a Member with an important nuclear programme.

The most recent "review of the reviews" took place in 1993 when the Governing Board agreed that the review process model discussed above, seen as a key element in international co-operation on long-term and R & D policy in the IEA, needed to be retained [See IEA/GB(93)35, Item 5(b); IEA/GB(93)28; IEA/SLT/CERT(92)1]. The "peer review" concept was

retained as a vital principle providing for the Secretariat and energy experts representing Member countries to participate. The in-depth review cycle was extended from three to four years. In-depth reviews would focus on *major* issues of energy policy, like energy and the environment. Standard reviews would be developed annually, and they would examine the extent to which the Member had progressed since its last in-depth review or had responded to the recommendations made in that review. The Secretariat would ensure greater consistency of coverage between country reviews, using the IEA Shared Goals to facilitate that process. Finally, the Governing Board decided to continue the policy of separation of these reviews from the IEA's oil emergency response reviews [See Chapter III, Section F-2 above], a separation required to maintain the coherence of the two systems for reviewing quite different subjects of IEA energy policy and actions.

At the conclusion of the review process each year, the Agency publishes the *Energy Policies of IEA Countries* review for the year, which typically contains a general report on the review, current and background information and analysis concerning energy demand and efficiency developments, energy production, supply, and distribution, energy and the environment, energy developments in non-OECD countries, and other topics of current interest, as well as relevant statistics. This comprehensive and thorough review publication also reproduces the texts of the individual country reports and of the recommendations directed to each country as a consequence of the review. The appearance of the review is a major publication highlight for the IEA each year. In addition, at the close of each in-depth review, the IEA releases the report of the review at a press conference held in the capital of the reviewed country, giving additional visibility to this co-operation among Member governments. The IEA's 1992 publication entitled *The Role of IEA Governments in Energy* surveys government involvement in the energy sector of Member countries and the actions of the IEA and other international organizations in each of these countries, which are also taken up in the reviews.

The "peer reviews" in the long-term and R & D sectors have proven to be one of the IEA's most successful and influential institutional instruments. These reviews have resulted in many direct and pointed critiques and recommendations derived from Delegations of other Members, the Secretariat, and other participants in the reviews, and addressed specifically to the reviewed country, on the subject of its particular energy policies, programmes, and actions. The success of the reviews is doubtless due not only to the "peer participation", but also to the sharpening focus of the reviews on major issues of energy policy, to the constructive critique and

recommendation process, to the growing consistency among the individual country reviews and, more recently, to the usefulness of the agreed IEA Shared Goals as the common touchstone for policy review.

G. Freer Markets and IEA Shared Goals of 1993

Although the constant evolution of energy markets and of Members' policies has modified the economic and political context in which the IEA operates, the fundamental long-term policy problems identified by the IEA's founders persist twenty years later. Changes in the structure of the energy markets, the reduction in trade and investment barriers, the growth in environmental concerns, the transformation of the Former Soviet Union, the globalisation of energy interdependence, and the other changes which have taken place have not recast the essential *objectives* of energy policy, although these changes have altered some specific *policy content and the instruments* employed by the Agency and its Members. Thus energy security remains the key objective of the IEA, twenty years after energy security concerns led to the establishment of the Agency, and the IEA's long-term policies discussed above have played a major role in the efforts of the Agency to achieve that objective.

As indicated in the IEA's 1994 *World Energy Outlook*, the IEA will need to address in the future some familiar and recurring situations: world demand for primary energy will continue growing, to 48 per cent more energy in 2010 than in 1991; in the OECD, oil demand could increase 18 per cent over 1991; and this increase is expected to occur entirely in the transport sector; the long-term gradual decline in OECD oil production is expected to continue; imported oil could account for close to 70 per cent of OECD oil demand by 2010 (up from 58 per cent in 1991); most of the increase will likely have to be met by the major Middle East producers and Venezuela. "The forecast increase in energy and oil demand in [the rest of the world] is expected to be even more pronounced than in the OECD" [Page 18].

The rapid growth in oil consumption and the increased dependence of a growing number of industrial countries upon imported oil are reminiscent of the conditions which led to the 1973-1974 oil crisis, carrying again an unacceptable vulnerability to oil supply disruptions. But such vulnerability may be reduced or eliminated if the necessary energy policy measures are adopted and implemented on a timely basis. The search for "energy

security" is thus expected to continue as a main objective of the IEA's long-term energy policies and actions in the foreseeable future.

In 1992 the IEA took a fresh look at long-term policy contained in the "Principles for Energy Policy", adopted in 1977 [See Section D-1 above], in the light of the Agency's experience, of the changed circumstances of energy markets, and of Members' energy objectives and policies. The Agency also needed updated bench-marks for developing energy policies and for measuring the Members' efforts and accomplishments in carrying them out, as well as updated IEA goals as the Agency expanded relations with non-Member countries and sought to influence their energy policies. These considerations led to the adoption of the "IEA Shared Goals" by IEA Ministers on 4 June 1993 [IEA/GB(93)41, paragraph 4 and Annex I; the full text is reproduced in Appendix IV below]. These Goals have been mentioned throughout this Chapter as the latest major comprehensive Ministerial statement on long-term energy policy, and at the time of writing they continue to fulfil this function.

The new long-term energy policy requirements led naturally to the IEA's current and future work on creating freer markets and on realizing the "IEA Shared Goals" generally. The emphasis on the free market issues is reflected in the IEA's work on deregulation, reduced government interventions in markets (particularly with respect to price), privatization, greater competition, and increased productivity of undertakings in the energy sector.

IEA Ministers stated succinctly in the 1993 Ministerial Communiqué that they "believe that global economic development, energy security and environmental protection will be enhanced if all nations of the world subscribe to the goals which the IEA countries share". These "Three Es" of energy policy provide the base for the IEA Shared Goals [See Chapter II, Section J above]. They are reflected in the following themes of the IEA Shared Goals with respect to long-term policy:

Diversity, efficiency and flexibility within the energy sector

Environmentally sustainable provision and use of energy, with minimization of adverse environmental impacts and with energy security considerations taken into account

More environmentally acceptable energy sources, including clean and efficient use of fossil fuels, the nuclear option and renewable sources of energy

Improved energy efficiency

Continued R & D and marketing of new and improved energy technologies

Undistorted energy prices

Free and open energy trade and a secure framework for energy investment

Co-operation among all energy market participants to achieve global energy security and environmental objectives.

CHAPTER V

Energy Research and Development: Towards Long-Term and Still Longer-Term Contributions

Energy Research and Development in the IEA from the outset attracted policy interest of a high order, because R & D would become a major element of the IEA's long-term energy policy to reduce dependency on imported oil. R & D held exceptional promise of making critical contributions to many facets of energy conservation, nuclear safety, fossil fuels, and other energy areas. But a still greater contribution in potential R & D breakthroughs might also be envisaged in "new technologies", such as those exploiting hydrogen fuel, advanced geothermal energy, fast breeder nuclear reactors, nuclear fusion, and the renewable energies (solar, wind, ocean, and biomass). Yet these developments would require an extensive investment of resources, organization of research, and new forms of co-operation among countries undertaking or sponsoring the corresponding R & D efforts. This Chapter recounts the Agency's contributions to this co-operation, beginning with the founders' views on the role of energy R & D programmes, and followed by a description of the organization of R & D in the IEA and the policies and strategies developed in the Agency over the years in a number of critical studies. The discussion continues with a description in some detail of the IEA's system of collaboration, mainly in the form of energy project Implementing Agreements, and closes with a brief survey of the role and structure of the Agency's system of R & D country reviews and technology reviews.

The 1973-1974 crisis and the resulting energy policy reviews in the industrial countries provided a unique opportunity to organize co-operation in energy R & D. Important R & D policy lessons were there to be learned. In short order, the crisis changed energy from a low-cost situation to a relatively high one. If energy R & D had suffered during previous years from a cost-benefit analysis using high-cost assumptions on research and low-cost assumptions on oil, the crisis dramatically changed that

perception. High-cost oil could create opportunities for R & D to be carried out on a more productive basis, with greater incentives to investment and higher expectations that the cost-benefit analysis would now be sufficiently favourable for research to make the greater effort economically worthwhile [See OECD, *Energy R & D* (1975) p. 7].

The case for international co-operation on energy R & D could not be ignored under the conditions prevailing after the 1973-1974 crisis. Some of the general considerations as summarized in a 1975 OECD study were the following:

- R & D co-operation would facilitate the integration of R & D policies and activities with the broader long-term energy policy objectives of the group of co-operating countries.
- Co-operation could make greater resources available, in the sense of information, knowledge, and know-how necessary for the R & D activity.
- The whole R & D process, from research to application of the results, could be speeded up.
- In cost sharing, R & D co-operation could make larger projects possible when individual countries could not alone make the required investment.
- Co-operation could reduce the overall cost of R & D programmes, by more efficient use of financial resources, equipment, and skilled personnel, and by the avoidance of duplication.
- Co-operation could make possible a wider range of approaches to the particular R & D objectives [See OECD, *Energy R & D* (1975) p. 154].

Other factors noted in the cited 1975 study related more specifically to energy R & D conditions at the time. Prominent factors were the importance of the industrial countries' "stake" in energy, "the international dimension of all aspects of energy", the "vital importance of research" in helping to resolve the problem of dependence on imported oil, the "extent of the energy sector" (no country alone could do it all), and the "increasing complexity of the field". Moreover, in Members' R & D decision process, there was a need for broader energy policies and realistic prospects of the technological research to be given due weight. Although international co-operation in energy was not unknown even at that time, there was little more than information exchange in many cases, rather than an effective international co-ordination of

projects, and the pattern was "uneven in coverage and highly dispersed". The 1975 study also considered this:

> Research and development is one means of promoting the achievement of objectives set by an overall energy policy, and the size and content of R & D strategies should not be decided independently of that policy. In view of the time needed to implement research programmes and then to apply the results, this is a relatively urgent task, but one which needs to be correctly formulated before expensive R & D is commenced.
>
> Energy policies must clearly be based on the prospects offered by the various technologies, on the extent and distribution of the different energy resources, and on the economic and industrial structure as well as the scientific and technological capacity of each country. It is evident that any medium- and long-term energy policies or objectives must include R & D efforts as a key component [See p. 16].

Thus the stage was set not only for the increased governmental support for the development of energy R & D, but also for its links with the formulation of the industrial countries' broader energy policies and objectives, which would be taken up and agreed to within the IEA.

The Energy Co-ordinating Group (ECG), which met during much of 1974 to prepare the I.E.P. Agreement [See Volume I, Chapter II, Section C-3], fully recognized "the significant role Energy R & D including intensified international co-operation, can play in helping to solve energy problems". Early in its deliberations, the ECG created the Ad Hoc Group on International Co-operation on Energy Research and Development to make recommendations on the expansion of international co-operation on energy R & D, to develop criteria on appropriate co-operative efforts, to identify constraining factors, and to review the R & D programmes of ECG participants, all for consideration in preparing for the new energy agency. In its report [ECG/ERD/36 final, 6 June 1974], the Ad Hoc Group outlined findings and policies which anticipated those reached in the 1975 study as indicated above, and recommended actions in ten areas which were then adopted in the I.E.P. Agreement [Article 42.1(c), set forth below in Section A], thereby providing the basis for launching R & D work in the Agency and giving initial direction to this activity.

A. IEA Organization of R & D

In giving effect to the foregoing concerns about research and development, the Agency established a coherent structure for the management of R & D policy questions, collaborative projects, and related activities. Described briefly below, the structure evolved over the years in a continuing process of adjustment designed to safeguard the essential initial elements and to adapt to the changing policy and operational needs of Member governments.

The ultimate authority for direction of R & D efforts in the Agency, as for other sectors of the IEA activity, is the Governing Board, which has taken many decisions on R & D policy generally and on broad questions arising out of the projects programme. The I.E.P. Agreement confers this responsibility directly on the Governing Board, with little guidance on substantive R & D questions, as part of the Board's overall authority over long-term questions [Article 43]. The broad powers of decision and recommendation, conferred upon the Board in Article 51 of the Agreement, are also applicable to the R & D sector. Since the main objective in this sector was to tie R & D policy to the IEA's long-term energy policies, and since much of the useful R & D was thought to be already available, the founders did not create in the Agreement a separate Standing Group for research and development. Instead, the Agreement made specific provision for the integration of energy R & D into the general long-term energy policy provisions of the Agreement. Hence the Agreement confers upon the Agency's government expert Standing Group on Long-Term Co-operation (SLT) responsibility for examining and reporting on co-operative action in the R & D sector as well as in other long-term policy areas. On R & D the Agreement provides for consideration of

> Energy research and development, including as a matter of priority co-operative programs on
>
> – coal technology;
> – solar energy;
> – radioactive waste management;
> – controlled thermonuclear fusion;
> – production of hydrogen from water;
> – nuclear safety;
> – waste heat utilisation;
> – conservation of energy;

– municipal and industrial waste utilisation;
– conservation;
– overall energy system analysis and general studies [Article 42.1(c)].

The IEA gave immediate priority to the institutional and conceptual framework for R & D, and began work on the above energy areas, as well as on a broad range of renewable energies. At its first meeting in late 1974, the SLT established the "Sub-Group on Energy R & D" with a broad mandate to implement the ten programmes listed above and to consider the full range of energy R & D projects, subject to SLT guidance to ensure consistency "with the overall objectives and programmes of the Agency" [IEA/SLT/M(74)1, part IV]. The SLT also agreed that Sub-Group membership "include national R & D officials as well as officials who are responsible for energy policies". Indeed the Sub-Group and its successor Committee were Chaired by Mr. W. J. Schmidt-Küster of Germany, who had chaired the ECG Ad Hoc R & D Group mentioned above, and the IEA Sub-Group was seen in 1975 as tantamount to a continuation in Paris of the ECG Ad Hoc Group of R & D experts which had prepared in its Brussels meetings the basis for launching the IEA's work in this sector. The Sub-Group promptly designated working parties and lead countries, or lead organizations (the NEA and EEC), for nine project areas. Those areas consisted of the ten listed above, except for systems analysis, which was considered later. In the nuclear R & D field, the OECD Nuclear Energy Agency took responsibility for nuclear safety, radioactive waste management, fast breeder reactors, and high temperature reactors, while the IEA undertook R & D on thermonuclear fusion. The Sub-Group then embarked upon an ambitious programme to develop a number of projects, which soon became the subject of the Agency's first Energy R & D Implementing Agreements [taken up in Section C below], to act on R & D policy and strategy questions, and to prepare guiding principles and intellectual property guidelines for Agency R & D projects. Before long, however, IEA R & D work would require high-level R & D specialist representation in a body with higher status reporting directly to the Governing Board rather than in a Sub-Group which was institutionally subordinate to the SLT.

As a result of these considerations, in November 1975 the Governing Board established the IEA Committee on Energy Research and Development (CRD) [IEA/GB(75)94, Item 7, Annex II], an IEA plenary committee which is tantamount to an IEA Standing Group in all but name. (The main difference is that the Standing Groups are created by the I.E.P. Agreement, while the Committees are created by the Governing Board.) This action

ensured a more direct relationship between the IEA body responsible for R & D and the Governing Board, but kept intact the close functional co-operation between the Committee and the Long-Term Standing Group, thereby continuing the important link between R & D work and broader elements of energy policy.

The Board conferred upon the Committee a more comprehensive and structured mandate than that of its predecessor, requiring the Committee in effect to

- Submit "a strategy for energy research and development and to oversee the implementation of this strategy".
- Ensure, through consultation and collaboration with the SLT, a close co-ordination between the R & D strategy and other aspects of the Long-Term Co-operation Programme.
- Review periodically national R & D programmes in the light of the preparation and surveillance of the strategy.
- Identify opportunities for collaboration among Members (within the R & D strategy and utilizing the national reviews), and promote such collaboration.
- Continue the promotion and implementation of co-operation in energy R & D as decided by the Board on 21 November 1975 [See Section C below].
- Report to the Governing Board as appropriate (at least once each year) on the above subjects in conjunction with the SLT, and carry out such other functions as the Governing Board might delegate to it.

Since 1975 the formal mandate of the Committee has remained unchanged, except for the Governing Board's decision in March 1992 to change the name to "Committee on Energy Research and Technology" (CERT) [IEA/GB(92)17, Item 8(b)], the name it bears to the present day. However, the Governing Board has on numerous occasions since 1975 given instructions to the CRD and the CERT on specific programme questions. The Committee's current functions are thus in constant evolution. In order to avoid confusion in the remainder of this Chapter, references to the CRD will be shown in the text as "CRD/CERT", since the two names refer to the same Committee.

In addition to the CERT and its predecessor, specialized working groups have made important contributions to IEA R & D activities since the first groups were created by the SLT Sub-Group in 1974. A number of the earlier groups, following each of the ten initial areas of R & D co-operation,

were discontinued when their work was no longer necessary or could be consolidated with that of another group. Participation in the working groups and later in the Working Parties has always been open to all Members and to the Commission of the European Communities. In addition, in October 1982 the Governing Board authorized the participation of the then non-Member Finland in the Working Parties on Fossil Fuel Technology, End-Use Technology, and Renewable Energy, the only occasion on which such participation of a non-Member has been authorized [IEA/GB(82)81, Item 3(h)]. This followed from the participation of Finland in a number of Implementing Agreements in fields of interest to that country and from the prospect of Finland making a broader contribution to the Agency's work in this field. The participation of non-Member parties generally in the Agency's R & D project Implementing Agreements is discussed below in Section C-5.

Specialized work in R & D has been carried out in four Working Parties with their own mandates as adopted by the Committee and as set out in the OECD's *Bodies of the Organisation for Economic Co-operation and Development* updated each year. The four Working Parties are

- The Working Party on Energy End-Use Technologies.
- The Working Party on Fossil Fuels.
- The Working Party on Renewable Energy Technologies.
- The Fusion Power Co-ordinating Committee (Fusion Working Party).

Each of the Working Parties has general competence in the field appearing in its name, and the names carry a Committee policy statement as to the main areas of IEA R & D activity. While each Working Party has its own mandate reflecting its technology subject area, the four mandates state generally that the Working Parties are to provide "advice to, and support the activities of, the Committee on Energy Research and Development [CRD/CERT] and other IEA Standing Bodies" in the areas of the Working Parties' competence. Most of the mandates also provide for the Working Parties to identify priority interests common to Members and to promote collaboration by arranging studies, information exchange, conferences, workshops, and other activities. They are also to initiate, evaluate, and review Implementing Agreements and other collaborative activities, to co-ordinate their activities with other IEA sectoral bodies active in related matters, and to review, evaluate, and participate in related activities conducted by IEA bodies. In addition, each Working Party is to carry out particular functions in its special field.

One early R & D policy priority was the formulation of the R & D Chapter of the Agency's Long-Term Co-operation Programme (LTCP) adopted in early 1976 [See Chapter IV, Section A above] which contained *continuing* policy statements and established links between R & D and broader IEA policy developments. On the subject of energy R & D, Chapter IV of the LTCP contains four main elements:

- Members agree to carry out *national* programmes and, as may be agreed among them, *co-operative* activities, including jointly financed programmes and projects in energy R & D.
- Members adopt the Guiding Principles on R & D and the Guidelines on Intellectual Property contained in Annex II to the LTCP [See Section C below].
- Members agree to develop and implement "a strategy" for R & D, closely linked to, and co-ordinated with, the other parts of the LTCP. The strategy is to identify major *new* energy sources and *conservation* possibilities and their potential energy contribution. It is to identify the probable time scale of *commercial* implementation and define options. It is to provide for a periodic review of national efforts and identify possible new areas of fruitful co-operation. The CRD/CERT with the SLT is to propose a basis for the choice of such a strategy for consideration by the Governing Board.
- Members agree to *continue and intensify* their co-operation in the first ten areas listed above and to examine possibilities in the seven new areas of High-Temperature Reactors for Process Heat, Small Solar Power Systems, Geothermal Energy, Wind Power, Wave Power, Ocean Thermal Gradients, and Biomass Conversion.

With the CRD/CERT and LTCP in place and the Group Strategy exercise under way, the organizational requirements for continuing R & D work were achieved. The organization outlined above, with some adaptation, continues to the present day, while recent consideration of the role and organization of the CERT in the changing energy context is reflected in IEA/CERT(93)2/REV2 of 4 November 1993. In sum, IEA energy R & D activities are organized in an integrated fashion. The IEA Secretariat plays a significant role in initiating, promoting, and implementing policy and operational actions; it supports each of the Agency bodies active in this as well as other sectors. Technology expertise and policy considerations are conveyed from the Working Parties to the CERT which in turn supports the work of the IEA Governing Board

at both official and Ministerial levels, resulting in IEA feedback to each Member's R & D policy officials in capitals and to the administrators of the project Implementing Agreements and other IEA co-operative activities.

B. Research and Development Policies and Strategies

In contributing to the Agency's objective of reducing long-term dependence on imported oil, the energy R & D programme comprises essentially four interrelated activity areas. The first is developing appropriate policy and strategic approaches to R & D, taken up below in this Section. The second is the promotion of collaborative activities, including the establishment of Implementing Agreements, conferences, seminars and workshops [See Section C below]. The third is the conduct of annual country reviews of national energy R & D programmes, and the fourth is the sponsoring of "state-of-the-art" reviews of particular energy technologies [See Section D below]. Each of these activity areas has undergone a constant process of review and adaptation over the past twenty years. The IEA R & D activity which has perhaps evolved the most, in consequence of the strategic reviews, has been in the R & D policy and strategy area. Since these activities necessarily govern the other three overall, the policy and strategies area deserves first consideration.

In 1974 and 1975 R & D work got under way on the basis of the ECG Report mentioned above, with particular attention dedicated to the ten R & D priority areas identified in the Report and in Article 42.1(c) of the I.E.P. Agreement. The Agency soon investigated other possible areas of energy R & D, developed proposals for the R & D Chapter of the LTCP and for a group strategy exercise, and engaged overall in the process of formulating a coherent energy R & D programme.

In November 1975, the Governing Board conducted a special meeting on energy R & D in which Members were represented by their respective R & D chiefs. This was the only Board meeting to date so devoted to this sector, and it took a number of decisions on strategy and programmes. The Board endorsed the R & D work then accomplished in the IEA and noted that five Implementing Agreements on coal technology and one on nuclear reactor safety had already been signed. The Board also enlarged the IEA's R & D topics by the addition of those topics which were soon to be

enumerated in the LTCP and which are mentioned above in Section A; it also adopted the Guidelines on Intellectual Property, advanced the R & D Chapter of the LTCP, and adopted its decision establishing the CRD/CERT. In doing so, the Board endorsed the R & D policy assumptions of each of those actions. Moreover, on the important IEA R & D strategy, the Governing Board

> decided to develop, by initiating analyses, a strategy for energy research and development which would:
> (i) provide guidance to Participating Countries as to the potential energy contributions and probable time scale associated with different technology options, leading in turn to energy policy options;
> (ii) provide, in the course of its establishment and implementation, opportunities for periodic reviews of national programmes of energy R & D;
> (iii) be closely co-ordinated with the other aspects of the Agency's Long-Term Programme;
> (iv) provide guidance for the review of projects already undertaken in the Agency [IEA/GB(75)94, Item 3(a)].

Beginning in the summer of 1976, this work was undertaken by two multinational teams proceeding in parallel at Brookhaven National Laboratory in the United States, and at Kernforschungsanlage, Jülich, in Germany, under the direction of a Systems Analysis Steering Group established by the CRD/CERT. Preliminary reports were submitted in 1977 and 1979, and utilized by the Agency in its work during those periods. IEA Ministers in 1977 and 1979 reviewed progress on the Group Strategy and expressed their satisfaction with the results obtained, while giving policy direction for IEA activities then under way. The 1977 "report, as well as studies by others since then stressed the high probability of a fundamental imbalance between energy supply and demand during the remainder of this century" [See the final report completed in 1980 and published by the OECD under the title *A Group Strategy for Energy Research Development and Demonstration* (1980), also appearing as an IEA document in IEA/GB(80)32].

The purposes of the Strategy were:

> (1) To provide an assessment of the likely relative importance of individual technologies for the IEA nations as a group;

(2) To obtain estimates and from these develop targets for the energy impact to be achieved by new and improved technologies during the latter part of the century;
(3) To provide a tool for:
   – developing and assessing national R D & D policies and plans;
   – achieving the most effective relationship between the R D & D activities of the Member countries;
(4) To identify non-technology policy issues which can affect the ability of new technologies to contribute to energy requirements [See pp. 9 and 10].

Although the Strategy was not fashioned to be identical to individual country strategies and programmes, it was intended to be a *guide* for individual Members' RD & D programmes, permitting them to take into account the collective needs of the Agency in the light of defined priorities (the top ones offering the most energy in substitution for oil at the lowest cost). The Strategy recommended acceleration of the pace of technology development and introduction, emphasis on environmental considerations, and indicative actions as to future stages of development for each technology area. In addition, the Strategy tackled such questions as which new technologies the IEA countries as a group would need over the next several decades, and how much energy these technologies could be expected to contribute. The Strategy also addressed the question of how to structure IEA programmes in order to maximize the chance of having the technologies in commercial use when the need would arise. The Strategy produced a table of Generic Technology Priorities in four categories with Indicative Actions specified for the various technologies falling within each of the priorities (Priority One, for example, identified various specific energy activities in the fields of end-use, production, conversion and supporting technologies), and showed whether the indicative actions were classified as R & D, pilot scale testing, demonstration, or commercialization. In the Priority One category, for end-use the first subject mentioned was "Automotive Transport Systems"; for Production it was "Enhanced Gas Recovery"; for Conversion, "Advanced Converter Nuclear Reactors"; and for Key Supporting Technologies, "Environment-Protecting Coal Technologies" [See p. 14; also IEA, *Annual Report on Energy Research and Development and Demonstration - Activities of the IEA 1979-1980* (1980), p. 13].

In May 1980, IEA Ministers acted upon both the Group Strategy and the Report of the International Energy Technology Group (IETG). The Governments of Canada, France, Germany, Italy, Japan, the United

Kingdom, and the United States had created the IETG as foreseen in the Summit Conference held in Tokyo in June 1979. The IETG was designed to be linked to the OECD/IEA, and the IEA provided the Secretariat support for the Group, which then expanded to include high-level officials from seventeen countries, the European Communities, the OECD and the IEA. The IETG Report made a number of recommendations on the *acceleration of commercialization* of new energy technologies.

Acting on the IETG Report at their May 1980 meeting, IEA Ministers declared in the Communiqué that they would "attach greater political importance to energy research, development and demonstration, as well as commercialization of new technologies, as essential elements for ensuring that medium-term structural changes in their energy economies are carried over into the long term". IEA Ministers "endorsed" the Report of the IETG "and its recommendations for accelerating commercialization of new energy technologies" [IEA/GB(80)58, paragraph 15].

At the same meeting, the Ministers considered the more comprehensive and far-reaching Group Strategy described above, concluding this:

> Ministers noted that an IEA RD & D Group Strategy has been developed. They concluded that the Governing Board at official level will pursue the strategy's accelerated scenario, which minimizes oil imports for the IEA as a whole. They agreed that IEA countries will use the IEA RD & D Group Strategy as a guide for setting national priorities and funding levels as well as for IEA collaborative project priorities. The Committee on Energy Research and Development [CRD/CERT] will closely monitor and periodically consider the extent to which aggregate national RD & D efforts are consistent with the Group Strategy. The Coal Industry Advisory Board is invited to provide recommendations as to which new technologies should be pursued in order to further speed up expanded production and use of coal [Paragraph 16].

In their Communiqué Ministers also emphasized the "political aspects of energy RD & D issues" (and particularly in the follow-up to the IETG and Group Strategy Reports) and referred to consideration of an energy technology Ministerial Level meeting, but this meeting did not take place because of current oil market priorities during this crisis period. In the meantime, while the Group Strategy work continued, the CRD/CERT and the Governing Board took a number of complementary policy actions. In 1976 the CRD/CERT had developed a strategy "to make the most efficient use of

national resources" and to assist each Member country in selecting new technologies "most suited to its needs and national resource endowments". New Implementing Agreements on nuclear safety, thermonuclear fusion, energy conservation applications to building complexes, advanced energy systems, and solar heating and cooling had entered into force.

In the course of the development of the Group Strategy, in 1977 Ministers emphasized the strategic focus on the "most promising conservation and supply technologies", and the need for "new energy technologies" and for "rapid application of alternative energy sources" [IEA/GB(77)48 (2nd Revision), paragraphs 9 and 10]. Ministers undertook to examine "their countries' national energy research and development efforts" and endorsed work carried out "to establish for the group of IEA countries as a whole estimates and objectives for the contribution of new technologies to both energy conservation and supply programmes over the remainder of this century". There was agreement concerning "co-ordination in the planning of national R & D programmes" and concerning broader participation in "collaborative major hardware developments" in the interest of achieving significant economies. Commercialization in such fields as electricity, liquid and gaseous transport fuels, and energy efficiency received strong Ministerial support in 1979. A recurring Ministerial theme was expressed in support for "greatly expanded international collaboration through the IEA" as an aid in making the most effective use of resources where considerable additional funding and manpower were required [IEA/GB(79)35, paragraph 13].

During this period the IEA established its review procedure for national energy programmes [See Section D below]. In connection with the 1977 Paris Conference on International Economic Co-operation [See Chapter VII, Section B below], the Governing Board considered modalities of R & D collaboration with developing countries, and in particular their possible participation in R & D project Implementing Agreements. In cases where a developing country had currently under way or planned to sponsor an R & D programme in the subject area involved, those Agreements were opened by invitation to that developing country on the basis of the IEA rules applicable as well to Members [IEA/GB(77)23, Item 4 and Annex]. Moreover, during this period five Implementing Agreements on energy conservation topics were signed, as were ten other Agreements on coal gasification, small solar power stations, geothermal energy, fusion, hydrogen, and wind energy. There were additional efforts to develop liquid and gaseous fuels for transportation and for domestic and industrial uses. Substitutes for oil received high priority for R & D on energy supplies, and technologies which could "significantly improve energy efficiency" received strong support.

After the IETG Report received Ministerial support in May 1980, the momentum toward increased commercialization continued in policy actions taken in the years that followed. In July 1980 the Governing Board and the OECD jointly created for that purpose a High Level Group for Energy Technology Commercialization (HLG) [IEA/GB(80)56, Item 5] to focus on one of the groups of technologies that would be needed for the transition to minimum oil economies. The ITEG's Report of May 1981 stated that

> The HLG has identified those individual commercial scale projects with a high probability of realisation that are planned for completion by 1990 in the areas of Tar Sands and Heavy Oils, Oil Shale, Coal Liquefaction, Coal Gasification, New Coal Combustion Technologies, Fuels from Biomass and Liquid Fuels from Natural Gas and has distinguished these projects from those with uncertain prospects. Participating governments have also made projections of production capacity for 1990 under various scenarios, and a range of output levels has been estimated for the year 2000 that are achievable if industrial capability to deploy commercially these technologies is developed during the 1980s [IEA/GB(81)45, p.7-8; also in GETC(81)5 (1st Revision) p. 3].

Based upon a detailed study of projects and of future projections of output, the HLG concluded that the foregoing technologies could be producing the equivalent of between 1.6 and 2.6 million barrels per day by 1990 if present government policies were implemented and if certain constraints to commercialization were removed. The HLG recommended a phased approach to commercialization and set out a number of specific measures for adoption at the national level. The HLG concluded that commercial scale international co-operation could accelerate the rate at which technological developments in one country could be used in other countries and that existing IEA/OECD bodies should be charged with monitoring and assessment responsibilities and with making appropriate recommendations [Pages 11-12]. IEA Ministers, meeting in June 1981, endorsed the report and recommendations of the HLG and "stated their intention to work to establish conditions, by applying measures appropriate to national requirements, under which industry would be prepared to design, build and operate commercial scale plants by 1990 in the requisite technologies" [IEA/GB(81)34(Final), paragraph 12].

Within one year, however, the underlying economic situation had so changed that commercialization was again the subject of Ministerial

deliberations. In 1982 Ministers were constrained to stress "the continued importance of *energy RD & D*, despite changing expectations regarding the development and commercialization of new energy technologies. They noted the marked reduction in many countries in expenditure on commercialization, and questioned whether private investment would be available to provide adequate and timely development of some technologies that have high costs and long lead times" [IEA/GB(82)54(Final), paragraph 13]. A review of national programmes requiring significant funding would thus be in order, to "ensure that they are in line with current views of future needs and to see how further sharing of cost and expertise could contribute to more effective action". It was then observed for the first time in eight years that government energy R & D budgets were *levelling-off*. At the same time, continuing recessionary economic pressures on public expenditure supported a policy of encouraging industrial participation in new energy technology development. The results of annual R & D reviews during this period helped in the analysis of the prospects for large project commercialization, which came to appear less promising due to the general economic situation and the need for substantial amounts of high cost capital for these projects. Moreover, a number of smaller collaborative projects was completed or terminated during this period, but new ones brought the total to nearly fifty separate project activities being conducted under the auspices of the Agency.

In 1982 the Governing Board reviewed the R & D policy goals on the basis of a CRD/CERT Chairman's document [IEA/GB(82)79], and it endorsed "the principal orientation and direction of the IEA RD & D programme thrusts" towards removing impediments to the use of coal, co-operating with the NEA to reduce "impediments to the safe use of nuclear electricity generation", "continued vigorous pursuit of conservation and fuel switching technologies", and "long-range, high risk technologies such as fusion". The Board also requested the CRD/CERT to review the Group Strategy and to "make proposals as to whether it should be revised, and the programme actions necessary to do so" [IEA/GB(82)81, Item 2(a)]. The intention had been that the Group Strategy would be subject to review and take in increasing experience, changing circumstances, and evolving assumptions. In 1982 and again in 1983, the need to refine and update strategic planning was found to be appropriate to ensure that the Strategy take into account emerging long-term structural changes in IEA countries and current projections developed in the IEA [See IEA, *World Energy Outlook*, (1982), Chapter I, Section V].

The CRD/CERT in 1983 began a process of review of the Group Strategy, appointed a Study Advisory Group, and with the Secretariat

undertook the policy studies that would ultimately take the form of the IEA publication entitled *Energy Technology Policy* which appeared in 1985. The downward trends in oil prices and economic activity further reduced interest in energy R & D investment in 1985. However, work on this study helped to sustain political interest and support for energy R & D activities which may have been weakened by the softening of oil markets. When the Group Strategy study came before the Governing Board for reconsideration, positive action was taken to maintain the IEA's programme on course.

Work on this *Energy Technology Policy* (ETP) study was carried out over a period of several years in a process by which the Agency benefited from the work as it progressed and the study benefited from feed-back from IEA bodies, the Secretariat and R & D experts. The study re-examined the R & D sector comprehensively in the light of conditions expected in the mid-1980s and beyond, ranging from the underlying IEA objectives to the various current and future technologies in detail. Energy security requirements called for further structural changes in the Members' energy economies, changes in which energy RD & D would have a "decisive impact". The ETP study was intended to provide a basis for the decisions that would ultimately achieve this objective. Hence the study stated that energy RD & D should seek to address energy security concerns, to avoid damaging competition for oil and gas supplies, to safeguard against supply disruptions through diversification, to promote energy efficiency, to encourage environmental protection, and to "encourage the generation of, and provide access to, the basic technological knowledge and competence which will provide long-range energy options" [Pages 9-10]. Taking current economic conditions into account, the ETP study noted the "general belt-tightening" of that period, and the tendency of financial managers to marginalize RD & D by reducing expenditure which might appear not to result in measurable short-term achievements. A period of low-cost oil could provide opportunities for reducing vulnerabilities, however, through wise decisions on technology infrastructure on both the supply and the demand side.

With respect to the estimated annual public sector outlay in IEA countries of US$ 7 billion in energy RD & D, the more specific purposes of the ETP study were to identify issues and provide conclusions to aid policy makers in reviewing national activity portfolios. Drawing on ten years of experience, the study explained how technology could contribute to national goals, identified impediments to the development of those technologies which could contribute most immediately to IEA policy goals, and promoted the adoption of technical and policy approaches for the mitigation of those impediments.

The ETP study also developed a body of criteria for investment in this sector. Although IEA Members' individual perspectives would necessarily be diverse, the study developed *common criteria* concerning the timing of potential RD & D contributions, competition among technologies, project effectiveness, international collaboration potential, benefits vs. costs, the environment, and health and safety. The study noted the national interests of *governments* (e.g. long-term economic and energy security, as well as health, safety, and environment) and the interests of *industry* (e.g. economically competitive products, a reasonable market, time for commercial penetration, and acceptable returns on investment) which are driven by market influences. The study then observed that

> As a consequence of *differing* government and industry interests, energy RD & D supported by each may not coincide and technologies promoted by governments may not meet industry criteria. A smooth transition between the two cannot always be expected, *and policies may be necessary to overcome these differences* [Pages 13-14; emphasis added].

The ETP study examined in some depth the vulnerabilities associated with liquid fuels, energy security and diversity, environmental concerns, and policy issues within the particular technological areas. Concerning the latter issue, the study considered technologies in accordance with a number of pertinent criteria, including the degree to which the technologies make energy use more efficient, expand the use of conventional fuels (e.g. extend the life of oil and gas resources, and remove impediments to coal and gas), promise to contribute to longer-term energy supply (e.g. breeder technology, synthetic fuels, and fusion energy), and facilitate the use of renewables. The study's attention to the environment foreshadowed the Agency's shifting emphasis which soon thereafter, as will be seen below, raised environmental issues to a level of high interest and priority.

The ETP study found that *international collaboration* offered particular advantages in a number of technologies, especially when an "active programme of information sharing" best serves implementation, high technical risks exist, or design, development, construction and operation of a high-cost facility is sought. Other advantageous situations include those in which collaboration would increase the efficiency and/or pace of R & D or those in which unique trans-boundary implications are present.

The study went on to examine the current RD & D situation in the IEA countries, making a number of specific findings in the course of that

examination. The study's conclusions reflected the constant IEA theme about the need for "strong government commitment to maintaining overall energy RD & D investment", accompanied by the need for recognition in the technical community that technologies and projects must produce steady progress towards the objectives for which they were established. The conclusions stated that

> Significant energy RD & D initiatives have been undertaken since 1973-74, with mixed results. Some have resulted in technological advances, some have achieved commercial application, while others have demonstrated the inability of financial resources alone to assure technical or economic success [Page 23].
>
> In general, the lead times for new energy technologies to move from the laboratory to the point of making even modest contributions to the market (a few per cent) have generally been measured in decades. Thus, while some R & D on new technologies may offer little promise for solving short-term energy problems (to 1990), RD & D decisions made by governments in the near term can have a significant effect and benefits in the medium to long term.
>
> While government RD & D may have a lesser direct role in the short term than RD & D conducted by industry, there is much which remains to be done. The role of governments is to ensure that the proper climate exits for short-term technology development, including the identification and implementation of measures to promote the introduction of new technologies and the improvement of existing ones.

> International collaboration in the field of energy R & D already is important in certain technical areas and can make major contributions if properly planned and managed. Such collaboration can be particularly valuable when it:
>
> - increases efficiency of RD & D and resource application;
> - involves RD & D relating to technologies with transnational implications, particularly in the environmental, health and safety areas, such as acid rain and atmospheric carbon dioxide;

- is based upon joint planning leading to the identification and definition of major new facility or experimental needs;
- permits proceeding with expensive and/or high risk new undertakings which would be difficult or impossible for individual countries to do on their own; and
- allows more rapid technical progress than otherwise possible.

Given the unpredictability of oil and gas supply interruptions, governments should ensure that technical measures capable of addressing short-term supply disturbances or price shocks have been taken. This might include work on:

- more flexible and efficient end use;
- fuel switching technologies, e.g. burner design;
- reducing the lead time for the introduction of enhanced oil recovery and coal liquid mixtures; and
- alternative indigenous resources.

IEA R & D made use of the ETP study as it developed in 1983-1985 and in later years, for many of the points developed in the study remain relevant even to the present day. It was presented to IEA Ministers in 1985, when they adopted extensive formal Conclusions on IEA R & D policies. It is no surprise that Ministers recognized the need "at this time to improve the results of energy research and development through enhanced international collaboration" [IEA/GB(85)46, Section IV]. This improvement should proceed from *national needs and programmes*, and build upon existing bilateral arrangements and activities in other fora. The work of the previous ten years provided a basis for "more selective and rational planning of national programmes"; future aggregate effort was likely to be more effective through "early consultation at both the technical and political levels". Ministers agreed that the "increasing stringency in national energy RD & D budgets places greater urgency on the need for collaborative projects in support of national programmes, and the necessity for more effective monitoring". They supported continuing and new activities in fossil fuels, renewables, fusion, and efficiency, and agreed that "early consultations should be directed towards investigating possibilities for joint programme planning" in the clean use of coal, advanced techniques for resource exploitation, and energy technology information systems.

The 1985 Ministerial Conclusions also contained decisions on future R & D work in the IEA, with particular reference to the CRD/CERT, which

should serve as a "forum for discussion" and as a "catalyst for facilitating" enhanced R & D collaboration. According to this text, IEA work should ensure that an efficient process exists for *joint programme planning discussions,* bilaterally and multilaterally. The IEA should also "identify national barriers to collaboration" and "recommend measures for consideration by Member countries to reduce such obstacles". The Governing Board should receive annual reports on progress made on those decisions and on the results of the monitoring process.

In 1985 IEA Ministers noted "with satisfaction" that agreement had been reached between the European Communities, Japan, and the United States on a new fusion energy project (on large Tokamaks), and between the European Communities and the United States on two other projects in the fusion energy field. In the autumn of that year the Governing Board adopted conclusions on early consultation and joint programme planning, and endorsed the Secretariat's proposals concerning the modalities of conducting R & D workshops [IEA/GB(85)53, Item 2(b)]. In-depth reviews of synthetic liquid fuels programmes in a number of countries revealed a wide range of activities and significant differences in the sharing of RD & D efforts between industry and government. Although encouraging advances had been made (particularly in coal gasification), current economics did not favour widespread commercialization of synthetic fuels. However, during this period work began on a new coal combustion project, and the number of operating IEA R & D projects was maintained at the overall level of about fifty different activities.

Much of this direction of IEA and national R & D efforts continued into, and was given effect in, later years. Following the 1985 Ministerial Conclusions, in 1986 the IEA conducted three workshops on technological topics related to clean coal: one on coal liquefaction, another on pressurized fluidised bed combustion, and the third, hosted by Japan, on flue gas treatment. The IEA developed planning on information systems collaboration looking to co-ordinated exchanges through national computer-based systems linked to the United States Energy Data Base at Oak Ridge, Tennessee. Together with the European Economic Community and the United Kingdom Department of Energy, the IEA conducted a seminar on the dissemination of demonstrated energy technology, and it supported the establishment of an IEA information centre to focus on demonstrated energy efficiency technologies. A thematic review was conducted on the subject of clean use of coal technology, a high priority sector. The Agency completed a study of renewable forms of energy, examining a broad range of technologies in this sector. These and other activities, utilizing the results

of the ETP study, were designed to give effect to the 1985 and earlier Ministerial Conclusions on R & D policy for Members and for the IEA.

The problems of soft oil price trends and reductions in private and public RD & D expenditure did not disappear immediately. In 1987 IEA Ministers again evoked these problems, stating that "Technology continues to have a major role to play in providing alternatives for a more balanced and diversified energy mix to ensure medium- and long-term energy security", and concluding that "it is essential that those activities on which energy security depends should not be prejudiced" [IEA/GB(87)33 Annex, paragraph 25]. They re-emphasized their commitment to pursue "economically sound and environmentally acceptable energy technology options", undertook to seek to improve co-operation between government and industry in the end-use technologies, and agreed to examine with industry the means for assuring continuity in technology projects on the development of indigenous hydro-carbon supplies. Much of the sense of the 1985 Ministerial Conclusions found itself re-affirmed in 1987, with specific mention of energy efficiency, renewables, diversity in the transportation sector, joint consultations at an early stage of R & D planning, nuclear fusion, and strong support for enhanced international collaboration.

Of course, IEA activities during this period reflected the fresh statement of Ministerial views, and earlier ones as well. Eleven IEA countries established the computer based energy technology information system linked with Oak Ridge, and an Implementing Agreement on Multiphase Flow in Fossil Fuels was signed. The IEA also made progress in assembling the CADDET Centre project (Centre for Analysis and Dissemination of Demonstrated Energy Technologies). New workshops dealt with the technologies of coal/water mixtures and integrated gasification/combined cycle electricity generation, associated with the clean use of coal. The theme of the 1987 technology reviews of Members' energy policies was the efficient end-use of energy, still another high priority sector. Reflecting a broader perspective, the IEA published in the same year its study entitled *A Ten Year Review of Collaboration in Energy RD & D 1976-1986* (1987), containing descriptions of projects, an assessment of the IEA energy R & D collaborative effort, and suggestions on how this effort could best contribute to the achievement of IEA goals.

In September 1988, the Governing Board reviewed progress on energy R & D collaboration and energy related issues more broadly [IEA/GB(88)25, Item 2]. The Board concluded that energy technology would be, "in the future even more than in the past", a major determining element in increasing Members' energy security and ability to meet

challenges to environmental policies. The Board requested the CRD/CERT to make an assessment of a number of policy areas, thus beginning a new assessment process which continued on an evolving basis into 1995. On the same occasion, the Board "reaffirmed the roles of the CRD [CRD/CERT] in technology assessments and as a *technical advisor* to the Governing Board as well as the other bodies of the IEA"; and the Board also requested closer co-operation among IEA bodies "in order to improve the integration of energy technology programmes and energy policies". Other policy directions at this time referred to identifying factors inhibiting flows of technology into the market and possible remedies for them, technological options for reducing the emission of greenhouse gases, and the diversification of transport fuels.

Energy R & D work advanced along these lines in 1988. The CADDET information dissemination Centre was formally established with close links to the other IEA energy information centres. In accordance with the Ministerial recommendation, the IEA study on substitute fuels for road transport was completed. The Agency prepared and published a set of monographs on technologies adopted by eleven countries on energy efficiency or fuel substitution or both, in buildings, industry, and transport, with environmental aspects and constraints taken into account. The monographs evaluate the technical and organizational factors that may have a positive influence on the progress and dissemination of these technologies. As in previous years, the IEA initiated new collaborative projects, following direct contacts with Member countries and as a result of *ad hoc* workshops organized by host countries. Workshops organized in 1988 examined technology topics of industrial separation, advanced underground coal mining, advanced fuel cells, long-range opportunities for renewables, air quality, heating and cooling of buildings, geothermal energy, and natural gas conversion. An IEA specialist seminar was held in Japan to explore the possible applications of the new "warm superconducting materials" in the electricity sector.

Energy R & D received a further boost and additional direction from Ministers in 1989, reaffirming prior themes and technologies, but adding elements derived from recent trends and developments. Perhaps the strongest ever general statement of Ministerial support may be seen in the declaration that RD & D

> should be intensified in all Member countries across the full spectrum of laboratory development, testing, pilot plant and prototype demonstration, and dissemination and commercialization and within a context of strong international

collaboration; government and private sector participation within competitive energy markets; and cost effectiveness [IEA/GB(89)36 Annex, paragraph (e)].

IEA R & D policy as well as other aspects of long-term energy policy during this period were evolving toward greater emphasis on environmental considerations (which had always been present with lesser or greater priority) and, in 1989, particularly on the technology of possible responses to the growing greenhouse gas problems. Building upon the results of the OECD/IEA expert seminar on reducing greenhouse gas emissions, Ministers agreed that "the main priorities for future IEA RD & D activities" should include technologies for better energy efficiency, for a more environmentally acceptable use of coal, and for enhancement of low-cost indigenous oil and natural gas availability. In further response to the greenhouse gas problems, Ministers also supported technologies for accessing remote natural gas reserves, for integrating renewable sources of energy into energy systems, for upgrading the electricity sector, and for improving fission and demonstrating the feasibility of nuclear power fusion systems. Ministers considered that goals and directions for the orientation of future IEA RD & D activities should be defined on this basis, as was generally the case.

The year 1989 also brought work on a group of new IEA technology studies, including the "energy technology reference study" (Energy Technology Strategy 21), to assess again policy goals and significant actions in the various energy priority areas from a long-term perspective (thirty years) as must be done on a regular basis in order for the IEA to "keep current" in a rapidly changing world of energy policies, resources, and technological advances. Moreover, the Agency found that the prospect of global climate change raises complex problems of technology transfer to non-Member countries, and it thus undertook a feasibility study to define clearinghouse or other arrangements for the exchange of information on greenhouse gas related energy systems and options. The Agency also prepared a report on technology options for stabilizing and reducing emissions of greenhouse gases. Superconductivity was the subject of another report, as were technical and economic guidelines for assessing the potential of renewable energy sources. During the year, R & D collaborative projects became the subject of a periodic review, and two new Implementing Agreements entered into force, one on the new "warm" or higher temperature superconductivity materials in the electricity sector and the other on the cleaning of hot gases from advanced coal-fuelled power plants.

The year 1989 was also a landmark year for IEA conferences, seminars, and workshops, with increasing participation of non-Member countries. In the seminar on greenhouse gas emissions mentioned above, two hundred experts participated from twenty-four governments and international organizations, and the seminar received seventy-two papers prepared by individuals with first-hand knowledge of energy technologies. The IEA organized other seminars and workshops, as well, taking up such priority topics as clean coal technology, enhanced oil recovery, oil spill prevention and clean up, efficient uses of energy, renewables, and nuclear fusion energy devices. In many cases IEA sponsorship was extended to these events convened by IEA project "lead countries" or by project Executive Committees, with the participation of experts from non-Member countries for the purpose of providing their unique input to the meeting or to stimulate their interest in joining IEA R & D projects. A system of prior consultation was established to review non-Member participation in IEA activities. Under this system the host organization provides the IEA Secretariat prior notice of the intention to invite a participant or representative of a non-Member country or international or regional organization which does not have established links to the Agency. The CRD/CERT then notifies the officials of the interested IEA projects and the Working Parties, and the Executive Director may approve, or (in consultation with the Governing Board Chairman) decide whether to refer the proposal to the Governing Board [IEA/GB(89)42, Item 4(a); IEA/GB(89)40]. In that fashion the possible political considerations of non-Member participation are taken up at the political level in the Agency.

In 1990 IEA R & D activity continued largely on the basis of the same priorities and concerns as before, while the Energy Technology 21 energy technology reference study was still in progress. In recognition of the transnational nature of global climate change, the IEA undertook a number of related energy and environment technology programmes and actively sought the wider participation of non-Member countries. The IEA devoted considerable attention to the subject of improving the *commercialization prospects* for priority technologies through earlier industrial involvement, more rapid diffusion of R & D outcomes, and a clear focus on market entry requirements.

The IEA Ministerial meeting in 1991 again reviewed R & D strategy and major programme elements, recognizing the need for "an assessment of the long-term options in an energy technology strategy for future decades" [IEA/GB(91)42/REV2, paragraph 18]. This reflected the Secretariat's assessment work as it was expressed in the draft study entitled "Assessment

of Energy Technology Priority Areas: Energy Technology Strategy". Ministers declared in their 1991 Communiqué that

> Special emphasis should be placed on those technologies which enhance diversity, efficiency and safety, extend and improve prospects for utilising reserves of conventional fossil fuels, and make available new and alternative energy sources. Ministers underlined the importance of sustained and balanced R & D and demonstration funding for energy technology innovation if the goals set for energy security, environmental protection and economic growth in the long-term are to be achieved [IEA/GB(91)42/REV2, paragraph 18].

Largely building on previous policy statements, the foregoing paragraph of the Communiqué applied to R & D the "Three Es" of overall IEA policy: "energy security, environmental protection and economic growth". Ministers agreed that if the global climate change challenges are to be met, programmes should reflect new priorities "resulting from the integration of energy and environmental goals", particularly in such areas as renewables, nuclear power systems, innovative conservation technologies, CO_2 capture and utilization, and fossil utilization.

A "phased and flexible strategy" for technology development and transfer could be expected to help reduce energy related greenhouse gas emissions. The Communiqué emphasized again the need for "development and *diffusion into the market*" of new and improved energy technology options, and it explicitly extended the geographical reach of this policy not only to the OECD region, but also to "the non-Member country area", in recognition of the globalisation of energy markets and the growing impacts of energy policies worldwide [Emphasis added]. Referring to the importance of *access* to technology as a response to global climate change, Ministers invited IEA Members "to explore means for more effective energy technology transfer, information dissemination, and training for effective utilisation". They then requested an *early* evaluation of an information clearinghouse mechanism and information exchange system among innovative environmental technology programmes and suggested other practical proposals for realizing the goal of speeding the development and diffusion into the market of new and improved technology options to help reduce energy related greenhouse gas emissions.

Still again in 1991, Ministers pledged continued support to "multilateral R & D and demonstration collaboration" on new and improved energy technology and they endorsed further the broadening of participation

in the Agency's collaborative mechanisms, such as energy R & D project Implementing Agreements [Discussed in Section C below]. They pledged continued support for collaboration in order to minimize duplication of efforts and to enhance the impact of financial and other resources available to Members for "preparing new and improved energy technology". Ministers urged the early and full participation of the energy industry in this collaboration, and requested that a legal framework be developed to facilitate the participation of non-Member countries and multilateral organizations in IEA Implementing Agreements, later adopted in a system of "Associate" participation [See Section C-5 below].

IEA R & D activities during the period 1991-1992 reflected the policy guidance of Ministers summarized above, as the Agency shifted its policy interest from promoting large demonstration projects to technology deployment and qualitative questions, such as those relating to energy and the environment. As would be expected, *environmental concerns* now found their way across the broad spectrum of R & D studies, conferences, workshops, and collaborative project work. The Agency devoted intensified attention to information exchange on environmental questions. Based upon a 1991 feasibility study, further steps included the definition of management structure, resource requirements, information suppliers, and the customer base of a new technology information exchange system. A preliminary programme for an IEA/OECD Greenhouse Gas Technology Information Exchange, known as "GREENTIE", was launched in 1992. The objectives of GREENTIE are to create a directory of sources of information on technologies which contribute to the mitigation of greenhouse gases; there are also an information dissemination network and a query response mechanism for the use of developing and industrializing economies as well as for IEA and OECD Member countries. In addition to GREENTIE, the Agency continued its effort to establish information access links among the existing IEA information centres and to widen opportunities for non-Member country and private sector involvement.

The preparation and dissemination of IEA studies as well as conferences, symposia, and workshops continued at a rapid pace, giving a higher priority than before to environmental issues. In addition to the Assessment Study mentioned above, this period saw the appearance of the IEA Guidelines for the Economic Analysis of Renewable Energy Technology Applications. The Guidelines deal with the computation of costs of eight renewable energy technologies: active and passive solar systems, solar thermal and photovoltaic electricity generation, bioenergy, small-scale hydro power, geothermal energy, and wind power, which do not present the

environmental problems associated with fossil fuels. Additional studies were carried out on "Electric Vehicle R & D and Prospects for International Collaboration", as well as new work on a thematic review on Members' *energy technology dissemination mechanisms and policies.* The publication *Collaboration in Energy Technology: 1987-1990* (1992) carried forward a similar study for the years 1976-1986, with an assessment of collaborative efforts, recommendations for specific technology areas, and general suggestions for improving collaboration. The Agency emphasized in the technology selection process the market entry requirements and likely commercialization barriers in each instance, thus ensuring a realistic appraisal of the impact of individual technology options. Further efforts were also being applied to utilize the most efficient and cost effective diffusion processes, ranging from the removal of undue market barriers to the establishment of more clearinghouse mechanisms.

IEA conferences, symposia, and workshops offered opportunities for IEA technology contacts in non-Member countries, including Central and Eastern Europe and the Pacific area, as well as in Member countries. In 1992, Member countries supported more than twelve conferences, symposia, and workshops, on such topics as advanced electric systems for the next century, electric vehicles, carbon dioxide removal and disposal technology, and the Agency recognized the information diffusion and market entry advantages of these events which brought together Members, non-Members, and researchers as well as R & D marketers and users, with benefit to the objectives of each. Many of the leading project developments during this period were influenced by information exchange, analysis and ideas produced in connection with IEA R & D conferences and other meetings. During this period the Agency also identified its future work priority actions which included removing barriers to new technology *deployment*, monitoring technology developments and R & D trends in Member countries, framing a technology response to global environmental issues, developing technology information exchange on greenhouse gases, enhancing the elements of R & D collaboration to serve information diffusion as well as new technology objectives, and coping with the technology requirements of transitional economies.

Particular energy sectors also featured strongly in IEA work in the R & D field. The transport sector has been a troublesome one for energy policy makers. The persistent growth in energy use in this sector has resisted the efforts of Members to reduce oil consumption for transport purposes, although a variety of technology approaches has stimulated R & D co-operation, including electric vehicles and the use of alternative fuels.

Electricity supply was taken up in the Tokyo conference on advanced technology in this sector, providing a basis for increasing co-operation between governments and public utilities on the new global environment challenges. A workshop on energy fuel and life-cycle analysis focused on methods for carrying environmental costs into technology cost determinations. The IEA conference on urban transport and the electric car addressed the problems of mobility in cities in the light of environmental and energy security concerns. During this period, the Agency sponsored or established new programmes and projects on a natural gas technology information centre, photovoltaic power systems, electric demand-side management, nuclear fusion power reactors, and the arrangements for GREENTIE. Each of these topical events reflected the evolving concerns of IEA Ministers as stated in their Communiqués of recent years.

In 1993 IEA Ministers gave additional and strengthened impetus to energy R & D on the two major themes of technology promotion by governments: (1) to contribute significantly to mitigating and solving environment problems, and (2) to intensify energy technology co-operation among Members and with *non-Members* of the Agency, as an indispensable means of accelerating technological advances, and to enhance energy security and environmental protection. Ministers highlighted the *further integration of energy and the environment* to promote collaboration and co-ordination aimed at sustainable development and respect for intellectual property rights. Ministers noted the establishment of the IEA International Centre for Gas Technology Information. They asked the IEA to study "the factors that influence new technology diffusion into the markets, . . . the role international technology co-operation policies could have in meeting the objectives of the Framework Convention on Climate Change", and the effect "government policies have on the penetration of new, more environmentally benign, technologies" [IEA/GB(93)41, paragraph 19]. Ministers declared that "Access by individual developing countries and economies in transition to modern, cost-effective energy technologies appropriate to local circumstances will promote sustainable development". The "Adoption of clean, efficient technologies throughout the world" would help reduce greenhouse gas emissions, they said. Ministers welcomed GREENTIE and called upon the IEA to step up the promotion of international co-operation in energy R & D in this area [Communiqué, paragraph 20].

R & D work in the IEA during 1993-1994 reflected the foregoing Ministerial objectives, including the further development of the IEA energy technology Assessment Study mentioned above. This was the most recent in the series of strategy-type studies and assessments intended to keep the IEA's

R & D work up-to-date, relevant and useful. Begun in 1988, this Study aimed at providing guidelines for the review and evaluation of the Members' programmes and identifying opportunities for further collaboration over a thirty year period. It was developed by teams of energy technology experts, whose work in seeking a consensus was of considerable use to Members in helping them understand the importance of the options and in characterizing needed R & D activities. The evolving document has been discussed by the CERT on several occasions and has been employed in a number of countries in formulating policy. It develops priorities derived from a consideration of energy security, environmental protection, and changing relations with non-Member countries. It analyses barriers to technology diffusion for selected priority areas and examines the changing role of governments in promoting R & D results in the development of useful equipment, services, and energy systems. However, this broad effort has been widened and updated most recently in the IEA/OECD publication *Scoping Study: Energy and Environmental Technologies to Respond to Global Climate Change Concerns* (1994), which absorbed and broadened the previous assessment work and brought a sharper focus on climate change and related problems.

Most IEA and OECD governments have agreed under the United Nations Framework Convention on Climate Change (FCCC) to take actions to reduce greenhouse gas emissions; these are new commitments which will require the development and commercialization of new technologies. Although many existing technologies for the efficiency of energy supply and end-use are already available, they require more improvement, dissemination, and application. New technologies as well could play a pivotal role over the medium- to longer-term. The Scoping Study focused first on new technologies which are likely to be commercially available near the year 2010, and then on those which could follow around 2030 or beyond. The Study was conducted by the OECD and the IEA together, with an inter-disciplinary team of technology and policy experts. The Study aims at identifying *opportunities and strategies* to enhance international co-operation on "longer-term energy and environmental technology options that are still *pre-commercial*, but which could contribute to reducing or avoiding greenhouse gas emissions" [*Scoping Study*, p. 18; emphasis added]. Overall the Study's purpose is to help "accelerate the pace of future technology developments needed to respond to global climate change concerns" [See p. 20]. This comprehensive work examines such topics as factors influencing technological development, technology options and strategies, and national and international technological development efforts to reach conclusions for enhancing international technology co-operation in this field. Following up on the Study, an

IEA/OECD High Level Meeting was convened in late 1994 to discuss the Study and possible strategies on priorities to enhance the development of new technologies to respond to the global climate change concerns.

During 1993-1994, IEA R & D work also included the start of a major study on the market deployment of energy technologies, a study designed to evaluate the experience and barriers encountered in market deployment. The study, being carried out in co-operation with three of the R & D Working Parties, is also expected to produce suggestions for facilitating and accelerating the introduction of new and improved technologies into the market, and to offer proposals for international programme co-ordination and improved information exchange and collaboration. During this period, Member countries again supported a large number of conferences and like events on current technology topics relating to end-use, hydropower, carbon dioxide removal and disposal, natural gas, and clean coal for countries in the Asia-Pacific region. In December 1994, the IEA and the OECD conducted in Valbonne, France a Technology Transportation Forum on "Energy, Environment and Transport Systems Perspectives". The topics of other conferences supported by the IEA ranged from Energy Efficiency in Latin America to Carbon Dioxide Removal and Disposal. Working Parties and IEA R & D project groups operating under Implementing Agreements organized additional conferences, workshops, and symposia. In accordance with IEA policy, these conferences and other events enjoyed a widening participation from non-Member countries on subjects of shared interest. During the same period, the Agency applied new arrangements to facilitate non-Member participation in IEA energy R & D Implementing Agreements [See Section C below], giving new expression to the opening of IEA R & D to a wider world as the scope of IEA contacts with non-Members in this sector became an ever-broadening one. Meanwhile, IEA countries have had to face tightening budgets for energy technology, which has heightened interest in improving the relevance and value of their activities in this sector. The IEA has assisted Members in this process by establishing an Experts' Group on Energy Technology Assessment and Methodologies for R & D Priority Setting and Evaluation designed to enable Members to share experience in methods for improving their internal programmes.

IEA energy R & D policy was also strongly and directly stated in the "IEA Shared Goals" adopted by Ministers on 4 June 1993 [IEA/GB(93)41; see Chapter II, Section J above]:

> Continued research, development and market deployment of new and improved energy technologies make a critical

> contribution to achieving the objectives outlined above. Energy technology policies should complement broader energy policies. International co-operation in the development and dissemination of energy technologies, including industry participation and co-operation with non-Member countries, should be encouraged.

The "objectives outlined above" in the IEA Shared Goals are stated generally in the "Three Es" of energy policy: energy security, sustainable economic growth, and the protection of the environment, and more specifically in the support of open and free markets and in the recognition of global interdependence in energy. IEA objectives are also expressed in the more specific Shared Goals of diversity, efficiency, and flexibility within the energy sector, of prompt and flexible responses to energy emergencies, of the environmentally sustainable provision and use of energy with minimal environmental impacts, and of improved energy efficiency and co-operation among all market participants. Similar goals have appeared throughout this Chapter in the evolution of R & D policies and strategies over the first twenty years of the International Energy Program, with many of the Shared Goals being reflected in the energy R & D actions of the Agency.

C. System for International Collaboration on Energy R & D Projects

In surveying the evolution of the IEA's R & D policies since 1974, the preceding Section examined the origins and purposes of the *project* as well as the *policy* collaboration among Members in this field, and it identified a number of the specific project topics which have been developed under the auspices of the Agency. IEA energy R & D projects are carried out under a body of Governing Board decisions which inaugurated the "Implementing Agreement" as the principal mechanism for the establishment, administration, and dissemination of the results of the projects. This Section will review more specifically the R & D project policies of the IEA and their evolution to the present day. It will also examine the structure and operational points of its project system and the access of non-Members of the IEA to the projects, mostly as reflected in Governing Board decisions and in provisions of the Implementing Agreements.

1. Purpose, Scope, and Application

The objective of organizing R & D collaborative projects in research areas relevant to the Agency's long-term energy policies was evident in the preparatory work of the Agency as well as in the Agency's actions taken immediately upon its establishment. Co-operation on research was a top priority, because of the mutual advantages it would bring. The first ten areas of research were identified before the Agency was founded; others were added soon thereafter. All of the Agency's early R & D policy statements referred to project co-operation. Most of the advantages of co-operation on R & D policy, as invoked in the IEA, were in fact a reflection of the benefits to be derived from collaborative research projects. These advantages included the integration of R & D with the group's general long-term policies, the dedication of greater resources, more rapid research progress, cost-sharing to make possible larger projects, reduced costs of the participants' pooled resources, a wider range of approaches, the better dissemination of the results of the co-operation, and the avoidance of duplication, among others. In 1985, the objectives of IEA collaborative projects and the basic approach to be taken were summarized as twofold:

- To provide a framework in which Member countries can achieve the advantages of sharing costs and benefits from technology development activities of common interest;
- To demonstrate a cohesiveness in the individual approaches of Member governments to the longer-term objective of reducing dependence on oil.

It was decided from the outset that if such co-operation was to be worthwhile, the results would ultimately be destined for the marketplace. A business-like approach thus seemed most appropriate, which demanded a commitment of resources among equal partners, with provisions for both Government and industry participation, and for the protection of intellectual property. Such considerations have led to the use of a contract (or Implementing Agreement) among participants, and largely determined the content of the Agreements [Leslie Boxer, "IEA Energy R & D Co-operative Projects", *Table Ronde sur les Entreprises de Co-operation Technique Internationale*, written with the author, 1985, on file in the IEA].

The IEA's founders and early policy makers gave high priority to the Agency's objective of establishing R & D projects. The I.E.P. Agreement

referred to "co-operative programs" and listed the first ten sectors in which they would be carried out [Article 42.1(c)]; the Long-Term Co-operation Programme (LTCP) provided for "jointly financed programmes and projects" in energy R & D and adopted detailed Guiding Principles for them [Chapter IV, Article 1; see Section A above on the I.E.P. Agreement and the LTCP]. Early IEA concerns relating to technology co-operation did not question the desirability of promoting and developing collaborative projects on energy research in the Agency, but focused on the identification of specific subjects of R & D. Questions did address the priorities to be applied, the allocation of resources, the precise objectives of the work to be undertaken, the particular means to be employed to protect the resulting information and experience, and other questions of that nature. The answers to these questions have varied over the Agency's history, in consequence of the IEA's various R & D strategy studies which have been undertaken over the years, as the preceding Section shows. The Agency started with heavy emphasis on conservation, nuclear energy, and coal technologies, which are still priorities but which are now seen more broadly in the environmental and global context, as well as in the context of their inherent energy supply advantage. In the intervening years, they have been joined by a host of other technology fields which now appear on the IEA's actual or foreseeable project list, covering many if not all of the possible fields of energy R & D relevant to the IEA. The scope of these topics can be discerned at a glance in the list compiled in Appendix V below.

Another question to which the Agency had to respond almost immediately in 1974 was the *organization* of the projects. Once the topics had been selected on the basis of policy and of their technical merit for R & D, there were additional questions to consider. How would the final selection decision be made institutionally? What would be the relation between the project and the IEA? Who would carry out the work? Who would be eligible to participate in the project? What would be the management structure and procedures of the project? Would participants take legal obligations concerning the project? Who would have legal rights to the resulting intellectual property? What would be the situation of IEA Members not participating in the particular project? These and other questions of project management had to be understood or answered in an authoritative and reliable way before the projects could be established, and systematic co-operation could get under way. The structures and procedures which were devised in the IEA to enable the Agency's R & D projects to get off to a rapid, effective, and productive start are taken up in this Section.

2. Project Formation and Management

As it turned out, the Agency's consideration of management questions and the development of the first IEA energy R & D projects proceeded in parallel over the first few months, to come together in the course of 1975 when the management issues were largely settled in the IEA "Guiding Principles" for these projects and when the first five project Implementing Agreements prepared in conformity with the Guiding Principles were signed. In March 1975, the Governing Board authorized the first projects (waste heat utilization, municipal and industrial waste utilization, and the production of hydrogen from water). In July, the Board approved six more programmes in the areas of coal technology, nuclear safety, radioactive waste management, conservation, fusion, and solar energy [IEA/GB(75)54 and Corrigendum 1, Item 4(d) and Annex IV] and it adopted the essential project management rules in the Guiding Principles for Co-operation in the Field of Energy Research and Development (called the "Guiding Principles") [See Annex III].

The Guiding Principles, which provide for a decentralized project structure and management, were later re-adopted with the General Guidelines Concerning Information and Intellectual Property in Implementing Agreements (called "Intellectual Property Guidelines"), both placed in Annex II of the Long-Term Co-operation Programme in 1976 [See Chapter IV, Section A above]. However, the Guiding Principles entered into force immediately in July 1975, and the first Implementing Agreements (establishing five coal R & D projects, on Fluidised Combustion and on Services for Technical Information, Economic Assessment, the World Coal Resources and Reserves Data Bank, and the Mining Technology Clearing House) were signed on 20 November 1975. Governing Board authorizations of other projects followed shortly, and the number of signed Agreements rose rapidly. In a few years the total project activities approached the number of fifty (since some Implementing Agreements cover a number of separate project activities, there are fewer Agreements) and it has remained at about that level with some rise and fall to the present day. The projects have been described generally in a series of Explanatory Notes presented in each case to the Governing Board in support of the request for Governing Board approval. More detailed information is contained in the various IEA activities reports and reviews of the projects [See particularly, *A Ten Year Review of Collaboration in Energy R D & D 1976-1986* (1987), followed by *Collaboration in Energy Technology 1987-1990* (1992); a third review covering 1991-1994 is in preparation for publication in 1995]. Further information, including the formal details of each Implementing Agreement and of each Task Annex contained in multiple task or "umbrella"

Agreements (technology area, Contracting Parties, Task participants, dates of formation, expiration, last renewal, expected results, and so forth), is available on the IEA's "Computerized Register for Implementing Agreements" which was inaugurated in 1993 [See IEA/CRD/EU/WP(92)2].

The IEA's formal arrangements for the projects run through several levels, beginning with the I.E.P. Agreement, then Governing Board decisions, including the Guiding Principles, the Implementing Agreements for the project (including project Annexes of multiple project, umbrella-type Agreements), and the decisions of an Executive Committee established for each project. They are also governed typically by the national law of the country in which the project is conducted and by contractual arrangements made on behalf of the projects, usually by an Operating Agent designated for the project by its participants.

At the apex of this hierarchical system of arrangements, the rules concerning the Agency's decision authorizing the individual projects are contained in Article 65 of the I.E.P. Agreement which provides the procedure for a group of less than all Members to agree upon special activities within the scope of the Agreement. These Members may themselves make the decision without interference of the other Members which are not participating in the activity, for those other Members are required to abstain from taking part in the decision and are not bound by it. The Members participating in the special activities are required to keep the Governing Board informed of them. Since all activities falling within the scope of the I.E.P. Agreement are eligible for the Article 65 special activity procedures (except for activities required to be carried out in the oil emergency provisions of Chapters I to V of the Agreement), virtually all IEA energy R & D activities and interests are qualified under that Article. In practice the proposals for new Implementing Agreements are reviewed in the appropriate Working Party and then in the CERT where they are made known to all IEA Members. When the proposal goes forward to the Governing Board, it is accompanied by a brief description of the project or programme background and objectives, the initial means for carrying it out, the duration, possible participants, and finance. A recent example is the Process Integration Technologies Programme covering the application of methodologies for system-oriented and integrated approaches to industrial process plant design for both new and retrofit applications [See IEA/GB(94)37, Item 11(b) and Annex]. Typically the Governing Board approves the addition of the new project or programme as a "special activity under Article 65 of the I.E.P. Agreement", and the Explanatory Note is annexed to the Board's Conclusions. Thereafter, reports on the

progress of the project are to be submitted at least annually to the Governing Board [Guiding Principles, Article X(b)].

The importance of the Article 65 decision formality by the Governing Board cannot be over-estimated. It provides the link between the decentralized project and the IEA. It affords the project participants the right to use the IEA mechanism and name, which otherwise would not be properly available to them. If the project departs seriously enough from the IEA management rules in administering the project, it is not excluded that the Agency could consider the possibility of rescinding the decision and thereby removing the IEA link, although the Governing Board has not had occasion to do so. Some have considered the Article 65 decision of the Governing Board authorizing the project as tantamount to an agreement among the participants, initially as an oral agreement made in the Governing Board proceedings, then as confirmed in the written Conclusions of the Board. The definitive agreement is concluded among the Contracting Parties to the Implementing Agreement in the next stage of development of the project.

Once the Governing Board's authorizing decision is made, the participating Members and other authorized parties may proceed to sign the IEA Implementing Agreement, prepared in accordance with the Guiding Principles and with other applicable Governing Board decisions. The Governing Board initially adopted the Guiding Principles in a "decision" on 28 July 1975, "to serve as the framework for carrying out individual programmes and projects", noting that the Members' agreement on guiding principles "would significantly contribute to facilitating and accelerating the implementation of their programmes and projects" [IEA/GB(75)54, Item 4(b) and Annex III]. However, in Article II of the Guiding Principles, the Board stated that

> The Implementing Agreements establishing such programmes and projects shall, *as appropriate*, take into account the Guiding Principles set forth herein" [Emphasis added].

When the Governing Board integrated the Guiding Principles into the Long-Term Co-operation Programme (LTCP) in 1976, the Board adopted as well the Guidelines on Intellectual Property annexed to the Guiding Principles [LTCP, Chapter IV, paragraph 2, and Annex II]. Insofar as the Implementing Agreements are concerned, the Guiding Principles are to be taken into account "as appropriate" and the Guidelines on Intellectual Property are framed as a "recommendation" rather than a binding decision. There is also provision that the termination or modification of the Guiding Principles "shall

not automatically affect either the carrying out of any programme or project undertaken in accordance with this Decision or the provisions of any Implementing Agreement previously concluded", and the projects must accordingly be fully able to stand on their own. The foregoing rules have been carried into the Implementing Agreements, so the rules apply contractually to the parties to these Agreements. The Guiding Principles and the Guidelines, as their names suggest, provide useful guidance but not rigid rules to be followed where unreasonable or harmful results might occur. These instruments thus offer management direction on a relatively "soft" basis, which can give way to more compelling priorities. Yet both instruments have been generally followed in practice, and cases of major departure have themselves been the subject of authorizing Governing Board actions, as will be seen below with respect to the participation of non-Members.

The commitments to participate in information exchanges and to identify and promote programmes and projects, including joint activities in this field, appear in Article I of the Guiding Principles, which states that Members shall

- Encourage and implement exchanges of information among all Participating Countries regarding national programmes, public and private, on energy R & D and energy-related technologies; and
- Identify and promote programmes and projects in which two or more Participating Countries can join for their mutual benefit or for the general benefit; this may include the formation of consortia, involving both public and private interests, to implement certain joint activities.

Article II of the Guiding Principles states the Members' commitment to *contribute* as follows:

> Each Participating Country shall contribute as fully as possible to the programmes and projects identified in accordance with Article I of the present Decision and shall endeavour to secure the necessary scientific, technical and financial resources, as appropriate, by attracting both public and private support to such programmes and projects.

These commitments are accompanied by the project provisions which guide such subjects as the content, form, participation, financing, and operation of the activities generally, and specifically of the Implementing Agreements, all with a certain measure of flexibility to meet special situations and

evolving conditions. The financing provision is important, because the Agency does not finance these projects and it leaves this element to the participants. Perhaps most fundamentally, the governing principle of "equitable sharing in IEA energy R & D projects" is stated in Article IV(a):

> Participation in programmes and projects under the present Decision shall be on the basis of *equitable sharing of obligations, contributions, rights and benefits.* Participants in programmes and projects shall undertake to make a constructive contribution, whether technical, financial or otherwise, as may be agreed [Emphasis added].

This principle of equity permeates the Guiding Principles as well as the Intellectual Property Guidelines, and it finds expression in the Implementing Agreement provisions on the scope of obligations and the level of contributions of participants (which are determined by them as appropriate), as well as on their rights in the management of the projects and their share of the resulting intellectual property.

The possible subjects of projects, outlined in Article V of the Guiding Principles, are quite extensive, including *information* exchanges on national programmes and policies, on scientific and technological developments, and on legislative and other subjects. There are many such activities conducted as specialized information projects or as parts of projects embodying other forms of co-operation. *Meetings* to identify programmes and projects are frequently employed, as are *visits and exchanges* of scientists, technicians or other experts. More ambitiously, there are

> *Special programmes and projects* in the form of co-ordination and planning of specific R & D studies, works or experiments carried out at national level, with subsequent exchange, joint evaluation and *pooling* of the scientific and technical results acquired though such studies, works or experiments [Article V(d); emphasis added].

These projects are called "task sharing" in IEA terminology. They are many in number, and they are potentially highly productive of pooled intellectual property, as will be seen below. While task sharing projects are inherently highly decentralized, another modality is the more centralized jointly-funded programme or project, reflected as follows in the Guiding Principles:

> Creation of programmes and projects, including participation in the operation of special research or pilot facilities and equipment provided by a Participating Country, or in the form of joint design, construction and operation of such facilities and equipment [Article V(e); the joint development and harmonization of technical criteria is foreseen in paragraph (f)].

The Guidelines do not specify in any detail the particular areas in which energy R & D might be carried out under IEA auspices. Article I refers broadly to "energy R & D and energy-related technologies" without limitation. In practice, the IEA projects have covered most research topics which might come to mind, including the relevant possibilities for diversifying energy demand and supply, in the fields of conservation and efficiency, enhanced oil recovery, coal technology, natural gas, renewable energies, thermonuclear fusion, advanced nuclear fission, environmental research, and comprehensive information services and systems analysis, as may be seen in more detail in Appendix V where the individual Implementing Agreement topics for the period 1975-1994 are listed.

In the formative years of the Agency, projects were often initiated by the Member governments which had been assigned lead country responsibility for particular technology sectors. Later the initiatives came from a broader spectrum of Members and other sources and they were channelled through the IEA's R & D management structure described above, the Secretariat, the Working Parties, and the CRD/CERT, at times after having been developed in the Executive Committees of established projects. There is no prescribed channel for the initiation of projects; they have been initiated at each level in this system, and this procedural flexibility is encouraged.

Viewed from the Agency's perspective, IEA energy R & D collaboration has always been carried out on a decentralized basis. The laboratory research, construction, testing, pilot plant, and prototype demonstration and much of the dissemination are conducted under *national* rather than IEA authority; i.e. the IEA itself does not carry out or finance such research activity itself. There are no IEA energy R & D laboratories or other research facilities. Since the research is conducted in Member countries, the Guiding Principles contain few provisions on the administration of the collaboration. Article IX(c) maintains the lead country concept adopted in the early days of the Agency, whereby a Member or international organization "may be invited to assume responsibilities in relation to the initiation of programmes and projects or the practical arrangements necessary for the preparation or execution of them". The designation of a lead country is typically made in the

early phase of development of a new activity, and the lead country frequently provides the Operating Agent, which often has the major responsibility for conducting or co-ordinating the work. A further element of decentralization in IEA practice is the absence of international entities which might have been created to carry out the work. Normally the work is carried out directly by the participants, sometimes by the Operating Agent, more frequently by a number of participants in the task sharing projects. The projects are subject to the "applicable laws and regulations" of the Participating Countries; in practice this means the laws and regulations of the country in which the project operates, frequently the country of the Operating Agent.

The Guiding Principles make general provision for the content of the Implementing Agreements [Article VI]. These Agreements "should establish the terms of the contribution for scientific and technical information, know-how and studies, or manpower, or capital investment and other forms of financing to be provided by each participant" [Article VI(e)]. The Agreements are to assign the responsibility for the "operational management" of a project to a single entity which is to be accountable to a specific Member country, in practice the Operating Agent of the project (always from a Member country or participating organization; never the Agency itself). The Implementing Agreements are intended to establish contractual relations among the parties. They become legally binding on the parties in order to create firm commitments on participation and contributions, so that each participant can rely on the specified funding levels and other contributions which may be required in the aggregate to make the project viable. The Agreements also grant the participants legal rights of access to the resulting intellectual property, so that they are assured of receiving the benefits of the work to which they have contributed. The Agreements are also made legally binding upon an Operating Agent by means of a separate instrument when the Operating Agent is not a Contracting Party to the Agreement. However, the Agreement is *not* binding on others; for example, it is not binding on the IEA itself (to date the IEA has never become a Contracting Party to an Implementing Agreement), and the Agreement is not binding on a Member which designates one or more non-governmental Contracting Parties from its country and when the designating government does not itself become a Contracting Party.

3. Financing and Facilities

Financing arrangements for programmes and projects are also the subject of the R & D Guiding Principles, in two provisions which state the basic financial concepts:

> Subject to provisions in specific Implementing Agreements relating to the sharing of expenditure, each participant shall bear the cost of its own participation in the programmes and projects under the present Decision [Article IX(a)].
>
> Programmes and projects shall be subject to the applicable laws and regulations of the Participating Countries *and shall be subject to the appropriation of funds of the Governments and their national agencies concerned* [Article IX(d); emphasis added].

Funding is thus entirely in the hands of the participants in the projects. The IEA does not fund any of these projects. The participants do not contribute project expenses to the IEA to be disbursed or allocated to particular projects, but contribute to the project directly. This enables the participants to exercise jointly and directly full financial autonomy in the conduct of the project, thus avoiding the need for an IEA Secretariat function in the administration of the funds or the conduct of the work. The Agency has not developed the infrastructure that would be required to carry out responsibilities of that nature.

Accordingly, the participants normally bear all of their own direct expenses, except to the extent that joint funding or other arrangements are fixed in the Agreement or adopted by the project Executive Committee. There is no requirement that *all* IEA Members participate in the projects, nor that all Members contribute to them, although there is a general commitment to contribute as fully as possible in the broad sense and to endeavour to secure the necessary "financial resources, as appropriate, by attracting both public and private support" to the projects [Article II]. The Members are free to participate or not; if they do, they assume legal obligations for the funding as provided in the Implementing Agreement. If they do not participate directly as Contracting Parties, Members do not incur financing obligations under the Agreements, although they are free to make their own financial support arrangements with others, for example with an entity which the Member might designate as a participant from the Member's country.

In task sharing projects each participant bears the costs of carrying out its particular Task. In such cases there is normally no need for funds to leave the contributing country, for the commitment of resources is for work to be performed within the participant's country. The participants decide their respective commitment levels among themselves, usually in terms of person-years of effort to be dedicated to the work which will produce information

for the project pool. The cost of visiting technicians is usually met by the participant sending the individual to work in the facility of another participant, although the receiving participant might bear some of the local costs. Hardware projects are often carried out mainly by an Operating Agent, usually (but not always) a participant from the host country for the project, at relatively high-cost levels (e.g. initially in the range of the equivalent of US$ 90 million for the Grimethorpe Fluidised Bed, US$ 32 million for the Small Solar Power Systems, and US$ 13 million for the Testing of High-Temperature, High-Pressure Filters). The various IEA technology information centres are also jointly funded by the participants in much the same way. Some projects for the commissioning of technology studies have found it convenient to fund the work in this fashion. In such cases it is appropriate for the costs to be shared in accordance with fixed levels or with a formula set forth in the Agreement or adopted by the project Executive Committee, or both methods may be employed. In practice the scales of contributions have been established pragmatically, with the differences in ability to contribute and the differences in priority assigned to the particular technology by the different participants having roles to play. Often the contributions are determined by reference to a percentage of the participant country's national GDP, to a percentage of the Member's IEA contributions, to a percentage of the relevant national expenditure on R & D, or by a combination of these measurements. In all joint financing projects, the participants contribute to a "common fund", usually held by the Operating Agent it its country, which involves a transfer of funds from the contributing participants to the common fund account. Audits and other safeguards of financial integrity are always provided in the Implementing Agreements in which common funds are to be established. There are no requirements that the common funds be expended proportionately in participants' countries and there is no other provision for "a fair return" to participants in the placement of contracts, although the financing arrangements are subject to the general principle of "equitable sharing" mentioned above.

In addition to financing in the strict sense, the Guiding Principles call upon IEA Member governments to assist on a "best endeavour" basis with the "formalities" required for the purpose of the project. Although there are no provisions in the Guiding Principles or the Implementing Agreements for the "privileges and immunities" usually granted to international organizations, the Guiding Principles state this:

> Each Government of a Participating Country shall use its best endeavours to facilitate the accomplishment of formalities

> involved in the exchange of persons, the importation of materials and equipment and the transfer of currency, which are required for the purpose of the programmes and projects undertaken under the present Decision [Article IX(b)].

While this provision is carried into the routine provisions or "boilerplate" of the Implementing Agreements, it has been necessary only in rare cases to make special arrangements to facilitate the "formalities". In the case of the Small Solar Power Systems Project, carried out in Almería, Spain, there were extensive provisions for privileges and immunities for Stage 2 of the Agreement, on construction and operation. In the Stage 2 Supplement to the Agreement, signed on 22 May 1979, in addition to the obligations of the host with regard to the site, special arrangements were made on the provision of services, indemnity of the Operating Agent, and protection of the site; to these were added provisions on currency transfer privileges, on the exemption of project property from direct taxes, customs duties, and local contributions, on facilities for the Operating Agent's personnel, and on other matters [Article 8].

4. Intellectual Property

The IEA's General Guidelines Concerning Information and Intellectual Property in Implementing Agreements were developed in the CRD/CERT following the Governing Board's request of July 1975 [IEA/GB(75)54, Item 4(c)] and were adopted as an Annex to the Guiding Principles which were attached to the Long-Term Co-operation Programme in 1976. The Guiding Principles [Article X] and Intellectual Property Guidelines stated a broad principle supporting the widest possible dissemination of project information to all IEA countries, and the Guidelines adopted a few broad principles on the protection of intellectual property, the treatment of background intellectual property utilized in the projects, and the allocation of rights to arising intellectual property in several different types of projects (e.g. exchanges of scientists and experts, and jointly funded R & D). In recognition of the difficulty or impossibility of forecasting the nature, value, and cost of the intellectual property or the future surrounding circumstances, the Intellectual Property Guidelines were cast as a recommendation not legally binding on the participants. It was understood that the Agreements would be developed "with regard to the special circumstances of each programme or project, taking into account" the Guidelines set forth in the recommendation [Article 1]. That indeed was done quite rapidly, before the

Guidelines were finally adopted, and the first Implementing Agreements, as well as all those which have followed, have largely given effect to the Guidelines in the situations in which they were applicable. As it turned out, the problems of future uncertainty left the Implementing Agreement draftsmen with little choice but to employ general principles and procedures in the Agreements and to defer the substantive decisions until the issues would arise and could be determined in the light of the actual situations.

Accordingly, the Implementing Agreements normally contain principles governing the right to publish, the protection of proprietary information, the production of information by the Contracting Parties to the Agreements and by the governments of IEA countries, and the acquisition of information for the project. When proprietary information or patents may be produced, the Agreements provide for the holding of the rights (e.g. by the Operating Agent or by a Contracting Party individually or jointly, acting on behalf of all Contracting Parties) or the division of ownership rights among the participants. The Agreements then provide for compulsory licensing of such property and patents as well as the underlying intellectual property supplied to and used in the project. As will be seen below, however, it has not proved possible to remove all of the uncertainties in this field. For that reason the Implementing Agreements usually provide in the first paragraph of the intellectual property Article a clause such as this:

> *Executive Committee's Powers.* The publication, distribution, handling, protection and ownership of information and intellectual property arising from activities conducted under this Agreement, and rules and procedures related thereto, shall be determined by the Executive Committee, acting by unanimity, in conformity with this Agreement.

This paragraph vests in the Executive Committee the residual decision power over the subjects listed. Yet the Agreements provide that most of the difficult decisions are to be taken by unanimity, which creates a negotiation framework with which the Contracting Parties must ultimately come to terms and in which the rights and equitable interests of the possible minority are fully protected.

The arising patent licensing provision in joint hardware projects usually contains a text along the following lines:

> *Licensing of Arising Patents.* Each Contracting Party shall have the sole right to license its government and nationals of its

country designated by it to use patents and patent applications arising from the Project in its country and the Contracting Party shall notify the other Contracting Parties of the terms of such licences. Royalties obtained by such licensing shall be the property of the Contracting Party. Other licences under such patents and patent applications shall be granted by the Operating Agent:

(1) To each Contracting Party, its government and nationals of its country designated by the Contracting Party for use in all countries on favourable terms and conditions as stipulated by the Executive Committee, acting by unanimity, taking into account the equities of the Contracting Parties based upon the sharing of obligations, contributions, rights and benefits of all Contracting Parties;

(2) To the government of any Agency Participating Country and nationals designated by it for use in such country on reasonable terms and conditions as stipulated by the Executive Committee, acting by unanimity, in order to meet its energy needs.

Royalties obtained from such other licensing shall be held by the Operating Agent for the benefit of the Contracting Parties.

It will be noted that the foregoing provisions contain subjective standards such as "favourable terms and conditions", the "equities of the Contracting Parties", and "reasonable terms and conditions". The key decisions on these subjective standards are to be taken by the Executive Committee (composed of all the Contracting Parties) "acting by unanimity", which means that there would have to be a negotiation taking into account past and present circumstances as well as estimates of future conditions and values. Thus the key elements are left to future negotiations under continuing conditions of uncertainty; in the worst case the issues could be submitted to arbitrators, under dispute resolution procedures provided in the Implementing Agreements, but this has not become necessary. The project participants and the Agency have considered the kind of negotiation described above as about the best outcome that could be foreseen for Agreements of this type. There has been no substantial change in this approach over the history of the Agency.

The situation for "task sharing" projects is clearer, but similar uncertainties remain. In task sharing, each Contracting Party undertakes a particular Task as part of an R & D project and typically agrees to furnish

to all of the other Contracting Parties all background intellectual property, as well as all arising intellectual property, in a pool-type arrangement, on a royalty-free basis (sometimes called "fully paid royalty basis") where this is possible. Thus the Implementing Agreement may state this in a task sharing project:

> *Licensing of Inventions.* Each Contracting Party agrees to license all pre-existing inventions covered by patents owned or controlled by it which are necessary for practising the results of its Task and which have been utilised in the Task, and all arising inventions to the Contracting Parties, their governments and the nationals of their respective countries designated by them:
> (1) Royalty-free for use in their country only; and
> (2) On reasonable terms and conditions for use in all other countries.
>
> Each Contracting Party agrees to license all such arising inventions to all Agency Participating Countries on reasonable terms and conditions for use in their own country in order to meet their energy needs.

Here the problem of uncertainty disappears with regard to the royalty-free exploitation rights, because the Agreement definitively fixes these rights, but uncertainty continues under the "reasonable terms and conditions" provision of paragraph (2) quoted above and in the requirement of licensing across the board to IEA countries. Again, the retention of some uncertainty has appeared to be the best option under the circumstances of uncertainty mentioned above.

5. Participation

Implementing Agreement participation, first regulated by the Guiding Principles in 1975, has undergone a process of constant expansion. Even at the outset, the projects were in practice more open to non-Members of the IEA than would have seemed to be the case under the strict terms of the Guidelines. As early as 1976, the Governing Board admitted the first non-Member (Finland, not yet an IEA Member) to an Implementing Agreement (nuclear safety); then in 1977 Agreements were opened under Governing Board decision to developing countries, in the first formal change to the applicable rules. During the ensuing years the Board agreed to the participation on a "case-by-case" basis of a number of non-Members, some of

which were OECD Members, and some not; and in 1991 the Board formalized the non-Member admission process by establishing "Associate" participation in accordance with rules adopted as amendments to the Guiding Principles. The decision on Associates gave strong support to non-Member participation, in keeping with the Agency's growing recognition of the globalisation of energy policy in recent years.

Participation is governed by the Guiding Principles, by *ad hoc* decisions of the Governing Board, and by the decisions of the Contracting Parties to the Agreements. Despite the "soft" formal nature of the Guiding Principles, which provide that the guidance should "be taken into account" and which do not require absolute compliance, the Principles and the Board's *ad hoc* decisions on *participation* have always been scrupulously respected. As originally adopted in 1975, Article IV of the Guiding Principles provided for four narrow categories of participation:

- Governments of IEA Member countries.
- National agencies, public organizations, private corporations, companies or other entities which have been *designated* by their governments as the vehicle of their participation.
- The European Communities (EU).
- Other Members of the OECD, with the agreement of the Governing Board.

Each of the foregoing categories of participants has been employed extensively. In many cases the government, a ministry or another governmental entity participates directly. Designations of public or private Contracting Parties in place of the Member government have been quite common, although designations of public entities have been the more frequent of the two. The European Communities (EU) participate in a number of Agreements through the European Commission or EURATOM. In 1990 a new category of participant, called a "Sponsor", was devised on a pragmatic basis in order to permit an important non-governmental institution from a Member country to participate in a project, when the Member government was not ready, for internal reasons, to make the designation in the normal way, but had no objection to this participation. Non-governmental bodies in which one or more entities from Member countries are represented present another situation for participation as a "Sponsor" rather than as a Contracting Party in the usual sense. In 1993 the Guiding Principles were amended to establish the detailed procedures to be followed for participation by Sponsors [Article VIII; see IEA/GB(93)57, Item 7 and Annex 1].

The Guiding Principles also determine the cases in which the agreement of the Governing Board is required for participation in an Implementing Agreement. There is no need for such agreement in individual cases to participation by IEA Members, by entities designated by Members, or by the European Communities. However, the participation of OECD countries which are *not* IEA Members has from the outset of the Agency required the Board's specific approval. The practical need for such approval has receded with the growth of IEA membership to include all OECD Members except Iceland and Mexico. When Finland and France were non-Members of the IEA (but were Members of the OECD), they did participate in a number of Implementing Agreements. In each such case the Governing Board was able to give its agreement to their participation without difficulty. Indeed, while still a non-Member, Finland was quite active in a number of IEA R & D sectors: it participated in the relevant Working Parties and received a formal "open invitation" to participate in all Implementing Agreements in those sectors, if it and the other participants so decided [IEA/GB(83)57, Item 4(d)], and they did so in a number of projects. France first indicated interest in joining the IEA Energy Technology Data Exchange Implementing Agreement, and the Board agreed in 1988; France later joined several other projects as well before becoming an IEA Member in 1992. In recent years the Agency has given particular attention to the possible participation of non-Member countries, including Korea, the Russian Federation and developing countries.

The Guiding Principles were initially silent on the question of the possible participation of countries *not Members of either the IEA or the OECD*, but this question would soon arise in connection with the 1977 Paris Conference on International Economic Co-operation (the North-South Conference), when the IEA Governing Board considered possible modalities of R & D collaboration with developing countries, and in particular their possible participation in R & D Implementing Agreements [See Chapter VII, Section B]. Where a developing country would have currently under way, or have planned to sponsor, an R & D programme in the subject area of an IEA project, the Agreement for the project was opened by invitation to the developing country on the basis of the IEA rules which applied as well to Members [IEA/GB(77)23, Item 4 and Annex]. This was done in the IEA's "Preliminary Guidelines for Collaboration on Energy R & D Between the IEA Countries and Developing Countries", which indicated that such participation was not intended to offer another international mechanism for aid, but would open the possibility for developing countries to be invited to participate on the basis of the Guiding Principles, taking

into account the "special circumstances" of the developing countries "consistent with these principles" [Preliminary Guidelines, paragraph (c)].

Under these Guidelines, the modalities of collaboration with developing countries included

- Invitations to participate in technical discussions in the IEA R & D Working Parties when the countries "have underway or seriously plan to sponsor an R & D programme in the subject area involved".
- Invitations to participate in information exchange projects when their contribution in whatever form is substantial, and in task sharing projects "when they have programmes underway, or plan to finance such programmes, which are reasonably comparable to those of the IEA Participants".
- Invitations to participate in jointly-funded projects on bases reasonably equivalent to that of IEA country Participants. If the developing country received financial or technical aid through other international mechanisms, and thereby could satisfy the above Guidelines, it could participate.

Developing countries would be able to suggest new projects in three categories (information exchange, task sharing, and joint funding). Applications for participation would be considered initially by the CRD/CERT, which could refer them to the appropriate IEA R & D sectoral Working Party for examination. The CRD/CERT would make its recommendations to the Governing Board, which would make the decision in each case. The Guidelines also provided that "In deciding on programme priorities, industrial countries should take account of the technologies needed by the developing countries" [Paragraph (f)].

These decisions undoubtedly heightened developing country interest in such participation, and a number of non-Members' requests were thereafter approved: Mexico (Geothermal Equipment, IEA/GB(78)32), Brazil (Alcohol and Alcohol Blends as Motor Fuels, IEA/GB(81)75; Brazil ultimately did not join the project), Egypt (Enhanced Recovery of Oil, IEA/GB(83)69), and Yugoslavia (Atmospheric Fluidized Bed Combustion, IEA/GB(87)29). Since the participation is contractual in nature, in each case all of the Contracting Parties to the Agreement in question also had to agree to the admission of the new party, which is the case for all new participants in Implementing Agreements, including IEA Members.

The most recent and comprehensive Governing Board action to open IEA R & D projects to a wider spectrum of non-Members of the OECD was

the 1991 decision on "Associate" participation [IEA/GB(91)79]. "Associates" are defined as "participants from non-Members of the OECD and from international organisations in which non-Members of OECD participate" [Guiding Principles, Article IV(e)]. In addition,

> The Associate may be the government of a non-Member of OECD or a national agency, public organisation, private corporation, company or other entity designated by that government or by the Governing Board or an international organisation in which non-Members of OECD participate" [Article VII(a)].

Under the 1991 decision, the Governing Board, as before, retains the decision responsibility, but the principles to be applied are now spelled out in more detail. Admission also requires that the Associate "be able to make a substantial contribution to the programme or project", and that it participate under the terms of Associate participation reflecting the Guiding Principles and "any applicable Governing Board decisions", and in accordance with the terms of the "formal arrangements for such participation" [Article VI(d)].

The level of Associate participation is a matter of agreement between the Associate and the Contracting Parties to the Implementing Agreement. The terms, conditions, and duration of Associate participation are "to be agreed in each case on an equitable basis" as they are for the Contracting Parties. However,

> unless the Governing Board decides otherwise in specific cases, Associate participation shall not give rise to voting rights on the following structural and policy questions: the admission of new Contracting Parties or Task participants, adoption of new Tasks, adoption of Annual Programmes of Work and the determination of intellectual property questions. Associates which participate on an equitable basis in the funding of the Budget shall enjoy a corresponding right to vote on the Budget, Annual Programmes of Work and relevant activities. They shall not serve as Operating Agents or as Executive Committee Chairmen [Article VII(c)].

The procedure for the admission of Associates is much as it was for developing countries under the 1977 Guidelines, but participation by the project Executive Committee has been formally added, and the IEA Committee on Non-Member Countries is to be informed. A request is made by

the Executive Committee for review by the CERT which reports its views to the Governing Board. The Secretariat informs the Committee on Non-Member Countries. The final decision is taken by the Board, which remains fully competent to amend the foregoing rules or to decide in particular cases not to apply them or to apply other rules as appropriate to the particular situation. Overall the effect of the Associate participation arrangements has been to encourage *greater* non-Member participation, and thus to widen opportunities to develop the projects, but at the same time to define the limits of such participation on a narrower basis than had previously been the case. Since the decision on Associate participation was adopted in 1991, the Governing Board has given its approval in the following cases:

Governing Board Approval of Associate Participation in IEA Implementing Agreements
(1991-1994)

Region	Agreement	Reference
Asia		
Korea	GREENTIE	IEA/GB(93)57
	CADDET	
	Energy Technology Data Exchange	
	Demand-Side Management	IEA/GB(94)13
	District Heating and Cooling	
	Photovoltaic Power Systems	
Malaysia	Advanced Heat Pumps	IEA/GB(92)17
Central and Eastern Europe		
Poland	Energy Technology Data Exchange	IEA/GB(94)13
	IEA Coal Research	IEA/GB(94)54
Russian Federation	International Centre for Gas Technology Information	IEA/GB(93)57
	SolarPACES	IEA/GB(94)13
	Stellarator	IEA/GB(94)54
	Environmental, Safety and Economic Aspects of Fusion Power	
Ukraine	International Centre for Gas Technology Information	IEA/GB(94)54

Governing Board Approval of Associate Participation in IEA Implementing Agreements *(continued)*
(1991-1994)

Region	Agreement	Reference
Latin America		
Brazil	Energy Technology Data Exchange	IEA/GB(94)54
Venezuela	Greenhouse Gases	IEA/GB(94)54
Middle East		
Israel	SolarPACES	IEA/GB(92)17
	High-Temperature Superconductivity	IEA/GB(92)45
	Photovoltaic Power Systems	IEA/GB(94)13

Thus the new Associate participation has been approved in a total of 19 cases from non-OECD countries, and more are expected in the years to come.

In completing the provisions on participation, the Guiding Principles also anticipated the possibility of the withdrawal of a Contracting Party from an Implementing Agreement. Article VI(b) thus provides that "a participant may withdraw from an Implementing Agreement in accordance with the terms and conditions defined in such Agreement", and the Agreements contain detailed provisions on this subject. These typically provide for a right of withdrawal with the unanimous agreement of the Executive Committee or after a period of notice, usually one year following an initial period of operation of the project. In hardware projects where the firm financial contributions of all participants are essential to the success of the project, there may be a withdrawal right only with the unanimous agreement of the Executive Committee. Over the first twenty years of operation of these projects, there has been a number of voluntary withdrawals, but there was only one case of withdrawal arranged by the Governing Board, and that occurred after the Board determined in 1993 that the "dissolution of the former Socialist Federal Republic of Yugoslavia (SFRY) had brought about the extinction of the Board's invitation to the SFRY to be a Contracting Party" to one of the Implementing Agreements. The other Contracting Parties were asked to take the necessary action, and that was done [See IEA/GB(93)11, Item 6].

6. Functions of the Implementing Agreements

The main functions of the Implementing Agreement texts are to establish the project in formal terms, to identify and legally commit the participants to the

project, to fix their contributions and benefits, obligations and rights, to identify the R & D work to be carried out, to assign the responsibility for the execution of the work, and to make the necessary administrative arrangements for the project to commence, to operate as foreseen, to carry out its work, to distribute the project results, and eventually to terminate, effectively and smoothly. The texts contain provisions dealing with all of these subjects in legal terms. The text is also the vehicle for ensuring that the Guiding Principles and Intellectual Property Guidelines are taken into account, and that the project decisions under these instruments are respected by all of the participants.

Sometimes the Implementing Agreements provide for a single project, for example a single hardware construction project. But they can also provide for multiple projects (called Tasks), each with its own project activities, parties, financing, intellectual property rights, and operating provisions. These are called "umbrella agreements" in IEA terminology, for they "shelter" a group of separate Tasks in one general area of R & D and thereby avoid the need for multiple agreements with their respective multiple preparations, clearances, signatures and administration. The grouping together of different IEA project Tasks in the same activity area has proved to be an efficient and useful process. It was begun in 1977 with the Buildings and Community Systems project. The umbrella form has since become the preferred IEA instrument, when the conditions for it exist. There have been cases where a single hardware project has been converted, upon the completion of the hardware phase, into an umbrella of mostly software-type Tasks for research, information exchange, assessments, and the like. The umbrella form contains in the general part of the text the usual Implementing Agreement "boilerplate" found in most Agreements and consisting of much of the material described in the preceding paragraph. Then the particulars of each Task under the umbrella are provided in a separate "Task Annex", of which there may be any number desired by the participants; there have been as few as one and as many as 28 Task Annexes in a single umbrella Agreement.

In more specific terms, the Implementing Agreements typically contain formulations concerning the background of the activity (preamble), the definition of objectives and scope of the activity, the project Executive Committee (powers, membership, responsibilities, procedures, voting, and reports to the Agency), and the Operating Agent(s) (designation, scope of authority, reimbursement of costs, replacement, accounting). The Agreements also provide, as appropriate, for finance (common fund, obligations, financial rules, accounting, programmes of work and budgets, and audit), and information and intellectual property (acquisition of rights,

publishing, licensing, and copyrights). Additional subjects usually covered include legal responsibility and insurance (liability of the Operating Agent, indemnification), legislative provisions (formalities, applicable law, decisions of the Governing Board, settlement of disputes), the admission and withdrawal of parties (new parties, contributions, withdrawal, change of status of a party, and failure to perform contractual obligations), and final provisions (term of Agreement, termination, amendment, and depositary).

There have been various provisions on the duration and termination of the Implementing Agreements. Some early Agreements were made for an initial period (of three years, for example), and indefinitely thereafter until they would be terminated by a unanimous decision of the Executive Committee; others provided for termination by majority decision of participants after the passage of a specified period of time; still others provided for a fixed term duration. The desire of Members to exercise closer control over the duration of Agreements (in which not all the Members might be participants and significant numbers of participants might be non-governmental entities) led to a request in 1987 that the R & D Working Parties set a maximum initial term for new Implementing Agreements [IEA/GB(87)44, Item 3(e)]. The Secretariat has sought to apply a maximum initial term of five years [See IEA/CERT(92)10]. In addition, the CERT in 1992 agreed that the Secretariat take appropriate steps (1) to limit to the same maximum term the Agreements which have expired and for which the appropriate Working Party has recommended continuation, and (2) to recommend that the Executive Committees of all Agreements with unlimited terms agree to set a new maximum term of five years starting from the date of this CERT action [IEA/CERT/M(92)1]. Under the current policy, there is a review of each Implementing Agreement every five years, and the Governing Board's prior agreement is sought before the term of an Agreement is extended.

While the Implementing Agreement has been largely the vehicle of choice for the establishment of IEA collaborative projects since the first Agreements were entered into in 1975, collaborative projects have been developed for which a simpler formal mechanism would be sufficient. Such projects might include those in preliminary stages in which a "Statement of Intent" or "Memorandum of Understanding" would contain early arrangements before an Implementing Agreement would be necessary, but this is a seldom used approach which has not given full satisfaction. However, where a number of participants might wish to collaborate on a regular basis on IEA sponsored conferences and technical meetings or on the exchange of unprotected information on R & D programmes in preparation

for thematic reviews or the establishment of energy technology priorities, the arrangements could take a simplified form without a full Implementing Agreement text. In simple forms of energy technology co-ordination projects where the activities do not require resource transfers, task sharing, intellectual property, or other contractual provisions, the participants might prefer to proceed informally, either without any formal arrangements or with simplified forms of agreement, and the Agency has thus taken these possibilities into account.

IEA Implementing Agreements are the subject of a regular review process. Each Executive Committee typically is required to provide the Agency annually with reports "containing technically substantive, non-proprietary information on the progress of the Project and its results", and the Secretariat regularly monitors the projects. Each project is also subject to the five year review mentioned above, to examine the accomplishments and the costs of the project and to determine whether it should continue. The Executive Committee of the project undertakes this review in co-operation with the CERT and at times with the aid of an external peer group. The CERT's recommendation is then transmitted to the Governing Board for its decision [See also Section D below on country reviews and thematic reviews].

More general reviews of projects have taken place periodically over the life of the IEA. The Ten Year Review (1976-1986) and the 1987-1990 review, mentioned above, described the projects and assessed their outcomes and objectives, new project possibilities, the wider participation of governments and industry, the duration of projects, and the diffusion of results, as requested by the Governing Board [IEA/GB(88)25, Item 2]. After considering the 1987-1990 review, the Board requested the CRD/CERT and the Secretariat to "implement the recommendations of the review" and

> to undertake regular reviews of the Implementing Agreement process [IEA/GB(92)17, Item 6].

Pursuant to that request, the R & D Working Parties and the Secretariat have conducted a further review covering the period 1991-1994. This review is expected to be published in the course of 1995. Similar reviews are to be expected as well on a regular basis in response to the Governing Board's 1992 request. "Guidelines for Review of Technology Collaboration Activities" are considered in IEA/CERT(94)40. In October 1994, the CERT

> Agreed to strengthen, simplify and streamline the IEA Implementing Agreement review process; to request the CERT

Working Parties and Advisory Bodies to report to the CERT annually on actions taken to improve the efficiency and effectiveness of the IEA Implementing Agreements for which they are responsible, and to request the Secretariat to develop guidelines for reviews and reports on IEA Implementing Agreements [IEA/CERT/M(94)3/PROV].

7. Role of the IEA

While the IEA R & D projects are fully decentralized, in the sense that the project activity is usually carried out in Member countries (and not in the IEA or in facilities of the IEA), and in the sense that the Agency is not a Contracting Party to the Implementing Agreements and provides no financing, the Agency does play a vital role in the formation and operation of the projects. The IEA provides an overall framework for the projects, brings the prospective participants together, and keeps in the forefront the advantages of the Members' collaboration in place of their "going it alone" in the field of energy R & D. Such a programme requires a central place for consultation, strategic thinking, joint planning, and information exchange on objectives, projects, and modes of operation as well as unobtrusive monitoring of the overall project portfolio. For IEA Members, the Agency has proved to be the best place for these functions to be carried out. The Secretariat works with representatives of Members and with the project parties and staff to ensure that they are informed of current Ministerial policies and priorities and that they are developing strategic plans and annual reports on their activities and accomplishments. The Secretariat also ensures that project participants are aware of the activities taking place in related projects and that all related projects are co-ordinated as appropriate. These liaison and information functions are also carried out in a number of other meetings, conferences and workshops.

Notwithstanding the national venue of most of the project activities, the *Secretariat* has responsibilities in all of the foregoing Agency functions. The Secretariat brings prospective participants together, acts as a catalyst in forming new projects, provides experience and advice on organization of the projects, helps negotiate and draft the Implementing Agreements, and at times nurses them into existence out of a precarious preparatory stage. After the Implementing Agreement enters into force, the Secretariat follows project activities, participates in Executive Committee meetings, continues to offer advice and assistance, and serves as a constant link between the

project and various bodies of the Agency. The Secretariat continues to provide advice, assists in the administration of the project, and performs agreement depositary and other legal functions.

As part of the IEA R & D team, the Secretariat joins with the Members' representatives to the IEA's Working Parties, the CERT, and the Governing Board, together with officials in capitals, the various Contracting Parties, both in the public and the private sector, and with the institutions and individual researchers, investigators, scholars, and their supporting staff and services, to make the IEA's R & D projects contribute to the objectives Member governments seek to achieve in the Agency.

D. Country Reviews and Technology Reviews

As in the long-term and emergency response sectors, policy reviews in the R & D sector have provided valuable information on Members' policies and activities, assessments and recommendations. In the R & D sector the reviews began in 1977 as national policy reviews, but expanded to include a focus on the "state-of-the-art" of particular technologies and of collaborative projects. The first reviews were specialized R & D reviews which were merged in 1986 with the long-term reviews, and the two have since been conducted together on an annual basis.

The Long-Term Co-operation Programme in 1976 included specific provision for a periodic review of national efforts in the R & D sector [LTCP, Chapter IV, Article 3]. In 1977 the IEA established a review procedure for national energy R & D programmes. The first R & D review was conducted in that year, and the results were published in 1978 [See *Energy Policies and Programmes of IEA Countries - 1977 Review*, (1978)]. At that early date, the reviews were expected to find and did find that much remained to be done. The CRD/CERT found some basic problems: that a number of countries had not yet adequately *defined* their objectives and policies in this field, that there was more room for improving the tie between energy policy and R & D, and that a number of countries should increase their R & D efforts to ensure the availability of new technologies to meet national goals. The CRD/CERT also referred to the need for more national R & D effort on non-conventional oil deposits and renewables, for strengthened organization and planning, for commercial use of technologies, and recognized the potential for independent national programmes to give rise to collaborative projects.

The R & D reviews continued in the following year, with nine countries reviewed in-depth in 1979. By 1980 the IEA was completing the first cycle of these reviews. A new cycle was then prepared with the inclusion of progress on commercialization of technologies. Work was begun on a *thematic review* of technologies which could contribute significantly to energy supplies, beginning with a review of constraints on commercialization of heat pumps and of coal liquefaction processes in Member countries. Annual statistical monitoring of IEA Members' RD & D budgets and an evaluation of national programme balance were continued. Indeed, in that year Ministers "called for a comprehensive review of the IEA programme of collaborative R & D projects to ensure proper balance, timeliness of completion, cost effectiveness and technical prospects" [IEA/GB(81)34(Final), paragraph 12], and noted the results of the 1980 reviews. The three systematic collaborative programme reviews covering the periods 1976-1986, 1987-1990 and 1991-1994 are noted in Section C above].

In 1982 the IEA carried out the in-depth reviews of heat pumps and coal liquefaction mentioned above, and recommendations were made supporting the significant future contributions of these technologies and the need to build the economic incentives vital to their future development and application. Analytical work on these technologies continued during 1983, when the Agency also conducted technology reviews on the clean use of coal and on combined power/district heating which carried into 1984. Moreover, the 1983 annual review helped to sharpen the focus of objectives of RD & D planning, but found that the Members' desire to achieve economies appeared to be leading them to a more *selective* approach to government support in this field. The 1985 in-depth review of technologies employed in a number of countries in their synthetic liquid fuel programmes revealed a wide range of activity, significant national differences in sharing of RD & D effort between governments and industry, and economic difficulties which did not favour widespread commercial applications. During this period, the Agency also reviewed renewable sources of energy and the use of microprocessors in energy related functions in buildings.

Beginning in 1986 the Agency's R & D reviews were conducted jointly with the Agency's more general long-term energy policy reviews, but the thematic technology reviews of selected countries were continued, and the separate ten year review of collaborative projects was carried out. The topic of the thematic review for 1986 was again the clean use of coal; for 1987 the theme was the efficient end-use of energy. In more recent years the thematic-type reviews have been conducted by the R & D Working Parties, and by CERT Roundtables where the topics have included energy technology and

R & D activities related to the United Nations Conference on Energy and Development, implementation of the recommendations made in the IEA policy reviews, the effects of recent events on activities in the energy R & D sector, policy initiatives concerning dissemination and market deployment of new and improved energy technologies, changing energy policy priorities, evolving government vs. energy industry relations, proposals for increased international co-ordination and collaboration in this sector, building links between national laboratories and industry, and environmental problems and competition.

The evolving pattern of the joint long-term and R & D annual reviews is described in Chapter IV, Section F above on long-term energy policy and need not be re-examined in this Chapter. However, the R & D elements of the SLT/CERT Annual Questionnaire for Country Submissions should be noted here [Most recently appearing in IEA/SLT/CERT(94)12/REV1 for 1994 reviews]. The Questionnaire calls for the responding country to give a brief summary of major energy and environmental policy issues, recent achievements, and general objectives, with inclusion of R & D elements for each of these subjects. Material on government organization for energy R & D is also requested. More specifically on R & D, the Questionnaire requests detailed information on overall objectives, major research programmes and priorities, government activities, industry and non-government supported R & D, technology demonstration, market deployment, transfer of technology to other countries, and international collaboration. The Questionnaire also requests information on energy efficiency and the leading particular energies utilized. Statistical information on RD & D expenditure is to be supplied on energy RD & D budgets of governments, industry, and nationalized industry. Beginning in 1993 efforts have been made to improve the quality and the transparency of energy R & D expenditure data. The response material derived from the Questionnaire is gathered, assessed, and processed for publication in the annual *Energy Policies of IEA Countries* publication.

This annual publication contains a General Report for the year and individual country reports developed in the annual review process, with analysis of the relevant information, a critique, and recommendations for action by Members. The analysis usually covers general political and economic developments, energy price trends, government R & D policies, funding levels, budget priorities, and emerging directions for RD & D collaboration. In the 1988 Review, for example, the analysis noted the reallocation of R & D resources and suggested that partial relief might “come from indirect government actions such as the removal of institutional or other barriers to increased competition within private industry and to greater

international co-operation [Page 53]. The following year's Review referred to increased competition, reduced government regulation, and "more open markets", but noted that "greater market competition is also apt to focus attention more on near-term and less on long-term profits", and that "Governments will need to carefully monitor developments and stand ready to fill the gaps as they become evident" [See p. 44]. In more recent years there has been greater emphasis on energy and environment questions and on the importance of non-Members of the Agency, in keeping with overall IEA policy.

The 1993 Review identified the subjects of the Members' strategic technology focus, including advanced technology for clean coal supply and use, for efficient natural gas use and transportation, and for enhanced hydrocarbon exploitation. The Review also listed technology using new and renewable sources (and its integration into conventional energy systems), advanced nuclear fission systems and their safety, and the demonstration of advanced nuclear fusion systems. The Review list mentioned optimal resource use in electricity production, "clean car" technology, and alternative transport fuels, and improved end-use technology to enhance energy efficiency in all sectors [See pp. 73-74]. With this strategic focus appearing in the 1993 Review, published in the autumn of 1994, the Agency's R & D analysis was well placed to contribute to future R & D developments as Members make the adjustments to the increasing energy demand forecast to the year 2010 [See Chapter II, Section J above; and the IEA's *World Energy Outlook*, 1994, p. 18].

The International Oil Market: Transparency and Information Dissemination

This Chapter traces the history of the IEA's policies and actions in relation to the international oil market, a high priority preoccupation of the founders of the Agency in 1974. These oil market policies are first reviewed broadly in order to set the scene for discussing the principal IEA oil market information system actions. The result of these actions was the creation of the "general oil market information system". The need for this system was one of the compelling reasons for establishing the Agency in the aftermath of the 1973-1974 oil crisis. The founders sought to bring about what they called "transparency" in the international oil market, in the sense of more complete, reliable, and accurate information on oil market structures, operations, prices and trends, and they wished to make that information available to IEA Members and to the public. The main sources of such information at the outset were the oil industry and the governments of industrial countries, and that remains the case in 1994. Hence the co-operation of the oil industry with the IEA is featured in the discussion which follows; it includes co-operation not only in the group called the (oil) Industry Working Party (IWP) which advised the IEA systematically on oil information system questions during the early formative period, but also in the Agency's formal framework for consultations with oil companies and in the extensive informal contacts of the Secretariat, by which the IEA is informed by companies on a wider range of industry issues.

While the Agency *gathers* from these sources the information it requires in carrying out its missions, the IEA also *disseminates* oil industry information. Dissemination takes place as required within the Agency and to Members, as will be seen throughout this Chapter, to enable the Agency to do its work in the oil market sector. Dissemination is also directed to industry and the general public, as will be seen particularly in Section D

below. This Chapter examines all of these developments as well as the evolutionary process by which the Agency's general information system reached its present state of effectiveness and acceptance. Oil market policies with respect to non-Member countries are considered in Chapter VII below.

A. Oil Market Information Policies

The IEA's oil market information system is a direct outcome of the oil market information difficulties which the industrial countries experienced during the 1973-1974 crisis. In the course of that crisis, the industrial countries were not able to activate the then existing OECD oil apportionment system or to mount any other coherent response measures. Ulf Lantzke, one of the leading industrial country managers of that crisis and the first IEA Executive Director, stated the generally understood reasons for that unenviable situation of the industrial countries. There were problems in achieving the necessary agreement of the industrial countries and concerns about offending the oil exporting countries,

> but *lack of information* must be regarded as the really decisive element [Ulf Lantzke, "The OECD and Its International Energy Agency", *Daedalus,* Vol. 104, (Fall 1975), p. 217, 220; emphasis added].

Oil market information needs accordingly featured prominently in the list of major lessons which the industrial countries were to draw from that crisis. The "information" lesson is described as follows:

> **Information Systems.** Systems should be devised to develop more relevant and detailed information for oil market *transparency generally* and for the particular information, including confidential and proprietary data, required to operate the oil emergency sharing system. Arrangements should be made for the dissemination of such information as appropriate [See Volume I, page 40; emphasis added].

The "lessons" also included the need to make "arrangements with oil companies" on a "regular and systematic" basis in order "to provide to the new institution relevant information" available to the companies. In this

formulation the "new institution" is, of course, the IEA, and the information to be provided by companies is the general oil market information which is the subject of this Chapter (as well as emergency response measures data which is taken up in Chapter III, Section B-6 above). The industrial countries needed "close relations with oil companies and better understanding leading to more transparency in the international oil market", that is, a general oil information system, designed to provide "an accurate assessment of conditions in the international oil market". This would lead to entirely new reporting systems for "crude oil costs, crude oil and petroleum product import prices, and oil companies' financial structure and capital investments". The overall system would be organized to provide "transparency in the oil market without impairing competition within the oil industry" [Ulf Lantzke, "The International Energy Agency", *European Yearbook*, Vol. XXVI (1978), pp. 41, 56-57].

These concerns found concrete policy expression in Chapters V (Information System on the International Oil Market) and VI (Framework for Consultation with Oil Companies) of the I.E.P. Agreement which call for the Members to establish an Information System, including "a General Section on the situation in the international oil market and the activities of oil companies" [Article 25.1] and a permanent framework for consultation with oil companies [Article 37]. These provisions are intended to ensure that the Agency receives from governments and oil companies the information it requires in order to carry out its functions in connection with the oil market. They also require that the System be operated on a permanent basis [Article 25.2] and assign responsibility to the Secretariat for the operation of the System and for the dissemination of the information compiled to the Member countries, as will be seen below.

In this sector, the central commitment requires Members to make available on a regular basis a set of precise data to be identified by the Governing Board from a list of "subjects relating to oil companies operating within their respective jurisdictions" [Article 27.1]. The list of subjects covers corporate and financial structure, capital investments, crude oil access arrangements and rates of production, allocations to affiliates, stocks, crude oil and product costs, and prices. Other subjects may be added by the Governing Board, acting by unanimity [Article 27.1]. A key commitment with respect to oil companies appears in Article 27.2:

> Each Participating Country shall take appropriate measures to *ensure* that all oil companies operating within its jurisdiction make such information available to it as is necessary to fulfil its

obligations under paragraph 1, taking into account such relevant information as is already available to the public or to Governments [Emphasis added].

The Agreement charges the IEA government expert group on the oil market, called the Standing Group on the Oil Market (SOM), to report on the identification of the particular topics mentioned above and on the procedures for obtaining such data on a regular basis. In this exercise, the SOM is to consult with the oil companies, to identify problems, to identify specific data for resolving these problems, and to work out information harmonization standards and confidentiality procedures. The SOM is charged with responsibility for reviewing the operation of the general information system and for making proposals for changes in the system in the event of changes in the conditions of the oil market. The SOM is also responsible for carrying out the broad general information functions assigned to it in Chapters V and VI of the Agreement "and any other function delegated to it by the Governing Board" [Article 56]. It is competent to review any matter within the scope of these Chapters and it reports to the Governing Board. The Agreement also provides that the SOM "may consult with oil companies on any matter within its competence". However, unless the Governing Board delegates decisional power to the Standing Group, all decisions in this sector of IEA operations, as with the other sectors, are taken by the Governing Board itself. In all of its activity, the SOM is supported by the IEA Secretariat, which provides significant support in the information sector as in other sectors of IEA responsibilities. As will be seen below in Section C-1, the oil Industry Working Party provided the SOM with indispensable industry advice on the various general information actions which the Agency took during its formative years.

The main IEA activities in the general information sector have been (1) the establishment, operation, and updating of the oil market information system which provides the base for the work of the SOM in advising on oil market and related developments, (2) the development and operation of the system of formal consultations with oil companies in the early period, (3) the analyses and assessments of the oil market and of particular questions about it as they arise, and (4) provision of oil market data and assessments to the Agency and its Members on a regular basis, and dissemination of data and assessments to the public. In its early years, the Agency pursued these objectives largely by the installation of a system which has been repeatedly modified to produce the essential information required by the Agency over the years. The SOM and the Secretariat have

continuously provided oil market information and assessments, as required, in virtually all situations of supply shortfall, or when measures were being considered, to complement the information available from the SEQ emergency data system, as well as in other special situations and in stabilized or relatively "normal" market conditions.

Soon after the Agency was created, the SOM began producing reports, at the Governing Board's request, on such key issues as oil prices, following the December 1974 meeting of OPEC, the procedures for consultations with oil companies, and the broader scope of the international oil market information system. At its February 1975 meeting, the Board approved the procedures for consultation and the system for collecting, processing, and submitting crude oil import price information [IEA/GB(75)8, Item 8]. In April the system was broadened [IEA/GB(75)25, Item 4] to include product import prices in the data supplied to the Secretariat, and in the following month the IEA conducted the first oil company consultations. Meeting for the first time in May 1975, IEA Ministers confirmed the underlying policy approach to the oil market. They

> noted the importance of the collection and analysis of information on the oil market in order to ensure greater understanding and transparency in international oil trade. They agreed that the oil market information system should be promptly completed and evaluated [IEA document PRESS/A(75)20, paragraph 4].

The Board also gave early attention to some of the technical problems which had arisen in the information system, including the far-reaching problem of reconciling data security requirements with the Secretariat's need to have data which could reveal individual company positions in areas other than the emergency data system. This was the solution that was reached: in order to preserve confidentiality, the oil companies normally submit their data not directly to the IEA, but to their respective governments, which in turn report the data to the Secretariat in a form which preserves as much detail as possible without revealing individual company data. The Secretariat may further aggregate the national reports before the data is submitted to the Members. Some delegations saw oil market transparency as requiring the provision of detail which could in some cases include individual company data, while others considered aggregated data to be sufficient. After extended consideration in the SOM and the Governing Board, in May 1976 the Board adopted the "Chairman's Compromise Procedure for Requesting

Unaggregated Oil Market Data" [IEA/GB(76)24, Item 5(g)-(m)]. Under the Chairman's Compromise, as it came to be known, an elaborate procedure was devised by which the Executive Director reviews unaggregated data insofar as necessary to reconcile anomalies or inconsistencies in the aggregated data submissions. The Executive Director first consults the SOM and the Legal Counsel. If the Executive Director then "deems it necessary in order to reconcile anomalies or inconsistencies" with respect to the data, he may request one or more Members "to review with the Secretariat, on a company-by-company basis if appropriate, unaggregated data" submitted by such Members for the purpose stated. The Board also "reconfirmed that no unaggregated company-by-company data made known to the Secretariat by these means will be made available to any Participating Country or to any oil company". The handling of oil company data, it will be recalled, is subject to strict controls under the Agency's security rules [See Volume I, Chapter VIII, Section B-1].

In 1977 the Governing Board decided to widen the application of the Chairman's Compromise to possible price disputes under the Agency's Emergency Sharing System [See Chapter III, Section B-5(a) above]. In its Guidelines on Oil Pricing Disputes, the Board decided that

> the Chairman's Compromise procedure for requesting unaggregated oil market data, adopted by the Governing Board on 21st May, 1976 [IEA/GB(76)24, Item 5, paragraphs (f) to (m) inclusive], will be applicable in an oil supply emergency under the same conditions in which the procedure is applicable in non-emergency situations [IEA/GB(78)18, Item 7(b)].

[The implementation of the Chairman's Compromise is described in IEA/SOM(77)45, and the results of its invocation in 1977 are assessed in IEA/SOM(77)111].

The Governing Board considered in December 1976 a number of other oil market issues, including the outcome of the OPEC Ministerial meeting held in Doha, and particularly the possible repercussions of the OPEC decision resulting in a "dual pricing" system on the world market. The Board emphasized the "urgent need" to obtain the underlying facts and "to make an in-depth analysis of the impact of this situation on the IEA's overall energy policy objective". The Board also requested the SOM to report on a number of related questions, including stock changes, supply patterns, price structure, and "possible scope for co-ordinated policy approaches if necessary to minimise market confusion" [IEA/GB(76)56, Item 2]. During this period at

each meeting the Governing Board was receiving systematic reports with information and assessments of the current situation in the oil market. In March 1977 [IEA/GB(77)17, Item 5] it "agreed to include as a regular item on its agendas a review of the current situation and main problems" of the oil markets, a practice which evolved into the IEA's monthly *Oil Market Report* and is maintained to the present day [See Section D below].

With the establishment early in 1978 of the financial section on oil industry activities, the main elements of the general oil market information system, as initially foreseen, were essentially completed. Included at that time in the financial section was data on the financial structure, sources of capital, investment, and revenues of some thirty international oil companies. The SOM's activities continued to reflect other particular concerns of this period, notably worldwide oil exploration and reserves, and the future balance between oil product demand structure and crude oil supply quality. With the oil market information system in place, the SOM was well situated from an information standpoint to assist in the market analyses which became necessary during the crisis period of 1979-1981 occasioned by the Iranian Revolution and the Iraq-Iran war.

The management of the 1979-1981 crisis, described in Chapter III, Section C-1 above, required stepped-up oil market information and assessments, in addition to the emergency supply data developed under the Questionnaires A and B [See Chapter III, Section B-6 above], which were activated for that crisis period, and the IEA's system of Monthly Oil Statistics. The Governing Board was well supplied with oil market assessments to support the IEA's responsive actions, including the 2 million barrel a day oil demand reduction decision of 1-2 March 1979 and the Board's follow-up actions. Some of the data reporting was accelerated; for example, the Members' reports to the Secretariat on crude oil prices and costs were moved up from a quarterly to a monthly schedule with effect from 1 March, and steps were taken to expand the system to include product imports as well as crude oil. The SOM and the Agency's government expert group on emergency questions (SEQ) agreed in a joint meeting on the use of a special questionnaire addressed to Members to develop additional information on measures taken to deal with the market imbalances at that time, and to enable the Board to evaluate those measures more effectively [IEA/GB(79)14, Item 2]. In May the Board agreed "to publish weighted average IEA crude oil import price data for the period 1973-1978 taken from the Oil Market Information System" [IEA/GB(79)28, Item 9]. Confirming earlier action of the Board at official level, Ministers in May requested an analysis of

> (i) the impact of a fragile market situation on spot prices; (ii) the impact of spot prices on the overall price structure; (iii) changes in oil market structures; and (iv) the effect of increasing competition for limited supplies of oil. The purpose of such analysis will be to improve understanding of the operation of the oil market [IEA/GB(79)35, paragraph 4(d)].

As the crisis continued, the autumn of 1979 brought a number of new efforts to improve the oil market information system and to increase the ability of Members to avoid undesirable developments in the market. The Board agreed in principle to set oil import targets for 1985 and for 1990, to revise the 1985 Group Objective of 26 mbd, and to increase efforts to realize the March 1979 action on restraining demand [See Chapter IV, Section C-1 above]. All of these actions involved informational and analytical contributions from the oil market as well as the emergency sides of IEA operations. The Governing Board decided to implement the first steps towards a "register of international oil import transactions", on which an early start would be made, even if all Members were unable to participate immediately [IEA/GB(79)64, Item 3]. This broad register was instituted for crude oil, on a monthly basis beginning in November 1979, while technical work on the system continued in a SOM Ad Hoc Group. The Board also asked for rapid development of the oil products register. It requested the SOM to examine the possibility of a "Quick Response System" to monitor the oil spot market. In December, IEA Ministers assessed the changing oil market structures, noting that

> a rapid change in the channels through which crude oil flows from the producer country to the refinery has reduced flexibility in the overall supply system and has contributed to upward pressure on price, to general uncertainty and to tension in the market [IEA/GB(80)2, Item 5].

This judgement was accompanied by agreement "on the necessity of improving understanding of and ability to cope with changing oil market structures". One step was to shift priorities on IEA work towards expanding the international oil transactions register by adding to the register data on products, by expanding the list of Reporting Companies [See Chapter III, Sections 6 and 7], by "obtaining more information regarding state-to-state transactions, and introducing a rapid price reporting system if required" [IEA/GB(80)2, Item 5(d)(i)]. Another step was to study the possibility of "enhancing the stability of oil markets" through a more "co-ordinated

approach" to spot market activities, in order to bring "more order into the oil market". Changes in the "nature of the spot market in 1979 and particularly the dramatic growth in crude oil trading which accompanied the rapid increase in spot prices", gave rise in the Governing Board to the suggestion (which was considered but not adopted) that the following items should be added to IEA measures:

- A national, and possibly international, system for registering all entities engaged in oil trading.
- A code of conduct to set out the basis on which governments expect oil trade to be carried out under normal conditions.
- Procedures designed to "cool down" oil markets in periods of excessive disturbance [IEA/GB(80)2, Item 5; see IEA/GB(80)16].

While none of these suggestions ultimately proved to be necessary, and none was formally adopted or carried out, short-term concerns continued to focus on rising oil prices during this period. Recognizing the important role of oil stock building on upward price pressures in 1979, IEA Ministers decided in May 1980 to adopt a stock assessment and consultation system, whereby the Secretariat would increase its monitoring of stock developments and provide assessments to the SOM and to the Board, which in turn would seek to identify "undesirable features of stock trends, such as heavy stock-build which is putting a strain on supplies, or differences between the position of different Countries which seem likely to create market disturbances, and recommend possible remedial action" [IEA/GB(80)49, Annex III, paragraph (ii)]. Following the outbreak of hostilities between Iraq and Iran in September 1980, the Board adopted another group of measures to respond to the new market disruption. Members agreed to take measures

> urging and guiding both private and public market participants to refrain from any *abnormal purchases* on the spot market,

as well as other measures designed to influence the market [See IEA/GB(80)61, Item 2 and Annex; emphasis added].

In December the Board provided for parallel measures to be applied through the first quarter of 1981, and it adopted the "Decision of the Governing Board for Correcting Imbalances" [IEA/GB(80)97, Item 2(g) and Annex I]. This decision was designed to correct "serious imbalances which remain despite national efforts to correct internal imbalances and which are likely to result in undue market pressures on price", the measures consisting

largely of Secretariat consultations with Members and companies and Members' consultations with companies, for the purpose of identifying and bringing about appropriate corrective action. For company imbalances, the government of the country concerned would carry the main responsibility, with the possibility of the matter being brought to the Governing Board if governments found the need for international action or if the imbalance extended beyond any one country's jurisdiction. This decision was applicable during the first quarter of 1981, but it could be continued thereafter or be kept available for further use. In the end, there was no need to extend the decision beyond its initial duration. On 31 March 1981, the Board decided that the Decision on Correcting Imbalances would "be kept available for future use if necessary" [IEA/GB(81)21, Item 2(d) and Annex], but no occasion has arisen for it to be invoked since that time. By spring 1981, the market was returning to more normal conditions, and IEA market policy entered a different phase in response to lowering prices and more stable supply. Thereafter, the question of applying market intervention measures in a supply disruption did not arise until the Gulf crisis of 1990-1991. In the meantime, IEA policy had moved decisively towards supporting free markets, as will be seen below.

The early 1980s saw relatively calm market conditions and at times lower oil prices, which enabled the Agency to strengthen its general information system and its arrangements for dissemination of oil market information. Yet in June 1981, IEA Ministers adopted a cautionary approach:

> Ministers recognized that the oil market situation remains fragile, and that continuing stability depends upon avoidance of complacency and upon significant levels of supply from several major producing countries. They noted however that continued decline in oil consumption (due in part to the effect of conservation) and stable supply have improved the oil market situation, and expressed satisfaction that policies adopted earlier had contributed to avoiding serious market disturbances in the second half of 1980 and in 1981 [IEA/GB(81)34(Final), paragraph 2].

Similar themes appeared in the 1982 Ministerial Communiqué, when Ministers also "emphasized the important role that *market forces,* supplemented where appropriate by government action" could have in contributing to the realization of IEA objectives [IEA/GB(82)54(Final), paragraph 1].

During this period, the Agency systematized and strengthened its monthly (initially quarterly) oil market assessments on short-term supply, demand, and stock developments. The assessments employed data submitted under a new, simplified information system (called Questionnaire C, discussed in Chapter III, Section B-6 above), among other sources. Initially designed for the use of Members, IEA bodies, and the Secretariat as an aid to understanding oil market developments within and outside of the IEA, the assessments could also be disseminated widely to the interested public, with only slight adjustments to exclude sensitive data. Accordingly, the Governing Board decided to publish these assessments, which have since become well known as the IEA monthly Oil Market Reports [See Section D below].

Work on improving the oil market information system also continued throughout this period. In October 1982 the SOM submitted a comprehensive analysis and report on information requirements to the Governing Board [IEA/GB(82)73]. With this document in hand, the Board adopted a number of technical amendments to the Crude Oil Cost Information System and to the Crude Oil Import Register, as proposed by the SOM, and continued them on a permanent basis [IEA/GB(82)81, Item 3], subject to later review, amendment, or discontinuation "at any time should this become desirable". However, in July 1984 the Board decided to maintain the Crude Oil Import Register, but to discontinue the Crude Oil Cost Information System, and agreed that the Secretariat should continue its analysis of acquisition costs on the basis of information from other sources [IEA/GB(84)27, Item 2(e)]. By that time, the financial information system had also been discontinued, and the SOM Chairman could report to the Board on the SOM's satisfactory use of available financial information on the situation of the oil industry, in place of the discontinued system [IEA/GB(84)27, Item 3(c); see IEA/GB(86)31, Item 2(e)].

As this work continued, the changing oil products and oil refinery situation of industry led the SOM and the Secretariat to carry out a study of the oil refineries in Member countries. After reviewing this situation, in July 1985 Ministers agreed

> to pursue expeditiously a common approach whereby they would maintain or create conditions such that imported refined products could go to the markets of the different IEA countries and regions on the basis of supply and demand as determined by market forces without distortions [IEA/GB(85)46, p. 5, paragraph 4].

Ministers also instructed the Secretariat to monitor product trade developments, and the Governing Board at its next meeting set in place an oil product monitoring procedure calling for quarterly reports from the Secretariat on product supply and consumption, trade measures, or other policies in Member countries affecting international oil product flows and refinery trends in non-Member as well as Member countries [IEA/GB(85)53, Item 2(a)], a procedure which has since been discontinued.

In 1984 and 1985 the IEA gave special attention to the ways in which the structure of the international oil market had changed over the period since the Agency was founded. Long-term contracts with fixed prices had given way to the trend towards short-term contracts, spot-market sales, and futures trading. The number of traders in the market had substantially increased. The large international oil companies had lost much of their hold on a number of sources of supply around the world. The market had become correspondingly broader and more complex. In this process, oil trading was taking place more in a "true market" in the traditional sense, and the IEA recognized these as well as other structural changes in the market and the implications they would have for future IEA operations.

In the 1980s important structural changes were also occurring in the IEA's approach to oil disruptions, as discussed in Chapter III, Sections C and D above. Following the "lessons" of the 1979-1981 crisis, the Board adopted two major response system decisions, the first in December 1981 on "Preparation for Future Supply Disruptions", and the second in July 1984 on "Stocks and Supply Disruptions", known as the "Co-ordinated Emergency Response Measures" (CERM). Each was developed with extensive assistance from the Agency's oil market governmental and Secretariat experts as well as those engaged in the IEA's emergency response sector, and each would give rise to new responsibilities for the SOM, as well as the SEQ and the Secretariat. According to the 1981 Decision, the Chairman of the SOM (among others) is to be consulted in the event of a supply disruption, before the Executive Director begins the process of refining the Secretariat's assessment of the situation, and before the Executive Director activates the emergency information system's Questionnaires A and B [See Chapter III, Sections C and D]. As in the 1979-1981 and the 1990-1991 crises, the SOM is expected to play a major role in providing assessments of the oil market aspects of the disruption (both the emergency data and the SOM general oil market data have important roles to play, for each views the supply situation from different but useful perspectives). The CERM Decision in 1984 is a follow-on to the 1981 Decision, and it charges the Secretariat, the SOM, and other IEA bodies, as appropriate, to examine a number of technical subjects

related to the CERM [See Chapter III, Section D]. In a crisis, oil market considerations would have a prominent role to play in the Agency's consideration of oil supply disruptions and in its decisions about effective responses.

By 1984-1985, the international oil market information system was well-developed for the needs of the time. No new systems have been adopted during the remainder of the period covered in this *History*, although technical changes were made as recently as in 1993 to the Crude Oil Import Register reporting form [IEA/GB(93)65, Item 4(b)], and much more data is being obtained through informal and direct contacts with industry and other sources than was the case in the earlier period. Indeed, the basic pattern of IEA oil market information dissemination was also established by the mid-1980s. By that time, the Agency had made substantial progress towards its dual objectives of oil market information transparency and dissemination. Since then, in this sector the Agency has focused on the *operation and expansion* rather than the *construction* of the information system. The expanded coverage is now truly global in scope and provides more information than before on such subjects as pricing and refinery operations. [The various oil market reporting systems are discussed in Section B below].

Still in the period of calm oil markets, in 1986, the Governing Board addressed the problems of *lower* prices in crude oil transactions, noting "the satisfactory progress which has been obtained over the past decade in moving towards a better balance of supply and demand through market forces and sound energy policies" [IEA/GB(86)15, Item 2(a) and Annex I, paragraph 1]. However, the Board also "took note of the volatility and relative lack of transparency in day-to-day oil market conditions", and it agreed that

> In the long term, neither concerns about energy supply security, nor the need for continuity in energy policy objectives have been removed by lower oil prices. On the contrary, a prolonged period of relatively low oil prices might intensify those concerns and bring forward the period when tighter energy markets can be expected [Annex I, paragraph 4].

Oil information policy and systems can reveal such problems as increasing eventual risks of tighter energy markets, but the existence of the information and its dissemination do not resolve them. In this case, the solutions the Board found were "flexible, open and resilient markets,

supplemented by government policies consistent with the national circumstances of each country and based on the long-term outlook and not on short-term developments alone" [Annex, paragraph 6(a)]. The chief policy responses were found in the long-term and oil security sectors of the Agency's activities. The Board also noted the Executive Director's statement that these issues would be developed in greater detail by the Secretariat and the SOM "particularly as regards the impact of lower prices on the energy market as a whole and on exploration and drilling" [IEA/GB(86)24, Item 2].

In the years since the mid-1980s, the operation, use, and expansion of the system have been evident in four different respects: (1) in making numerous studies on relevant oil market information questions, (2) in responding to the 1990-1991 Gulf crisis, (3) in collecting the relevant data and in making and disseminating the monthly oil market assessments, and (4) in expanding the IEA's information coverage globally in recognition of the increasing impact of energy developments in non-Member countries. During this period, the Agency's receipt of oil market advice and information from the Industry Working Party (IWP) and from formal consultations under the I.E.P. Agreement gave way to the contributions from increasing numbers of industry speakers at SOM meetings and to direct contacts between industry and the Secretariat.

Throughout the Agency's first twenty years, the IEA's oil market sector has produced many studies on particular questions, on its own initiative or at the request of the Governing Board. A number of these studies made during the period 1974-1985 are mentioned above. More studies on topics of current interest were carried out during the ten years that followed. In 1986-1987 an important concern was short-term developments in supply, demand, and pricing, and the effect of *lower oil prices* on exploration and development. This work continued in 1988-1989, with studies on industry restructuring and new market conditions. Various aspects of the oil industry in both upstream and downstream sectors were also featured in reports in 1990. The following year saw a range of SOM papers on market mechanisms, demand developments, industry financial analysis, and the impact of environmental legislation on the refining industry (e.g. bunker fuel sulphur specifications), with growing attention to non-Member countries. In the period through 1994, additional topics included international crude oil pricing, OECD oil trade and stock developments, downstream investments by major producing countries, downstream integration in the industry, and other structural changes in the oil industry.

Oil market information was an essential element of the IEA preparations made during the 1990-1991 Gulf crisis, as discussed in Chapter III, Section E above. At its first meeting on the Gulf crisis, held one week after the crisis began, the Board's review of the supply and demand situation led to the conclusion that

> The present oil supply situation is such that, given the availability of supplies at sea, the high level of company and government controlled stocks, as well as the possibility of higher output from oil producers, including OPEC Member states, sufficient oil supplies are currently available to compensate for the loss of Iraqi and Kuwaiti crude and product to the market. Therefore, there is no need for recourse to the IEA emergency response system at this time [IEA/GB(90)24, Annex].

This market assessment was to be confirmed throughout the crisis, on the basis of information derived from a number of sources, including the Agency's oil market information system and its internal expertise, developed in reports of the SOM and the Agency's *Oil Market Report*. With the combination of elements from the general oil industry information system and the emergency data contained in the responses to the emergency Questionnaires A and B, the Agency could produce clear assessments of the situation following the embargo of Kuwaiti and Iraqi oil [See Chapter III, Section E-1 above], and of the likely implications of the Coalitions' military actions against Iraqi forces. When the Governing Board adopted the Contingency Plan in January 1991, the Board had at its disposal well developed and current oil market information and assessments, permitting it to note not only the level of available oil stocks (some 3 600 million barrels) and the "ample availability of oil to the market", but also the "heightened uncertainty and volatility" which could occur "as a result of the possible temporary shortfall of some Gulf supplies". This information and analysis were essential building blocks of the Contingency Plan. Because of the utility of the IEA's information systems in adopting the Contingency Plan, the Governing Board also

> **Requested** that the Secretariat, the Standing Group on the Oil Market, and the Standing Group on Emergency Questions continue to monitor closely the oil market situation and, if

activated, the implementation of the contingency plan [IEA/GB(91)1, Annex (g)].

Following the Executive Director's activation of the Contingency Plan on 17 January 1991, the Governing Board convened on 28 January 1991, reviewed the situation, and decided to keep the Contingency Plan in effect. The Board then had available fresh assessments showing that "despite the hostilities, the world petroleum market continued to be amply supplied, with oil stocks high, and additional oil refinery capacity available if required". The Board also concluded that the Contingency Plan "was comfortably within the capacity of OECD countries, that countries had taken or were in the process of taking all necessary actions for its implementation, and that higher levels of emergency response could be maintained for an extended period if necessary" [IEA/GB(91)3, Annex]. The Board also continued the monitoring functions referred to above. Chapter III, Section E above describes the IEA's preparations leading up to the Contingency Plan, the Contingency Plan itself, the outcome of the Agency's response to this crisis, as well as the lessons that the Agency drew from that experience. Overall, the industrial countries had never been so well informed — and thus forearmed — in any of the earlier oil supply disruptions as they were in the 1990-1991 Gulf crisis, and that favourable position was possible only because of the IEA's information systems, together with the work of the Secretariat and the government expert groups on emergency preparedness (SEQ) and the oil market (SOM).

The IEA's continuous collection of information and the preparation of the more routine monthly oil market assessments must be mentioned in order to complete the current picture of the IEA's oil market information function. The information systems are described generally in the next Section. The monthly Oil Market Reports are reviewed in Section D below. The monthly assessments, which appear in part in the published Reports, represent a major contribution to the understanding of the oil market and to the visibility of the Agency to the public. The Oil Market Reports are increasingly accepted as the most authoritative source of information on the short-term oil market. In the aggregate, these activities are perhaps most valuable in ensuring that the Agency maintains the capability of anticipating major changes in the market and keeps IEA Members' policy makers informed of current developments and future trends.

In 1993 IEA Ministers made their most recent general energy policy statement in the "IEA Shared Goals" [See Chapter II, Section J above] which contain this broad declaration on IEA oil market policy:

> In formulating energy policies, the establishment of *free and open markets* is a fundamental point of departure, though energy security and environmental protection need to be given particular emphasis by governments. IEA countries recognise the significance of increasing global interdependence in energy [IEA/GB(93)41, Annex I; emphasis added].

Oil market policy today is also strongly affected by the Goals dealing with diversity, efficiency, and flexibility within the energy sector [Goal 1], with undistorted energy prices [Goal 7], and with free and open trade [Goal 8]. Moreover, the statement in Goal 9 has direct application to oil market policy:

> Co-operation among all energy market participants helps to improve information and understanding, and encourage the development of efficient, environmentally acceptable and flexible energy systems and markets worldwide. These are needed to help promote the investment, trade and confidence necessary to achieve global energy security and environmental objectives.

At the beginning of 1995, the Agency's objectives in this sector retain the sharp focus on improving the *transparency* of the global oil market and on identifying relevant policy issues, especially those relating to energy security. The Agency's oil market work is expected to continue the close monitoring of developments concerning oil supply and demand in the short-and medium-term global markets for both crude oil and products. The dissemination of relevant analyses to governments, industry, and the public will also continue. The highest priority is being assigned to the improvement of monitoring of short-term market developments, with particular attention to the Former Soviet Union, to Asia, and to the Pacific. Greater attention is to be given to medium-term changes in the structure of the oil industry, to the development of oil markets, to the evolution of governmental policies, and to the impacts of environmental legislation in oil markets. Although the Agency's oil market objectives remain essentially as they were formulated in 1974, the IEA general oil market information system was well constructed and it is fully operational. The Agency continues to maintain and operate the system which ensures that oil market information activities will respond to new topical issues as they arise.

B. General Oil Market Information System

While Section A above surveys the full sweep of the Agency's general information system and related activities over the history of the Agency, this Section looks at more technical detail in each of the particular systems and refers to the documents where more complete information on them may be found. This Section begins with the group of early IEA information systems on crude oil and product import prices, crude oil costs, financial information, and the product price register, all of which have been abolished or suspended or, as in the case of financial reporting have become periodic but not regularly scheduled. Market changes and technical considerations led to the adaptation or displacement of many of the early IEA systems, with the 1979 Crude Oil Import Register remaining as the main survivor. While most of the formal systems were being phased out, more information was actually becoming available from public sources, from the IEA's informal consultations with the oil industry, and from other relevant sources, as the Secretariat has expanded and now continues to expand its direct and regular contacts with industry sources of market information. When all of these information sources are taken into account, over the years the oil market's "transparency" has been substantially improved on a regular basis to meet the needs of the Agency and its Members.

1. Early IEA Systems

The ***Crude Oil Import Price Information System*** was the first oil market reporting system to be established in the IEA on an operating basis, and it was quickly adopted in February 1975, three months after the Agency itself was established [See IEA/GB(75)8, Item 8]. This system called for *quarterly* crude oil price reports by companies to their respective governments, which in turn aggregated the individual company data in the Members' reports on this subject for transmission to the IEA. Timeliness of the data was assured by having each company transmit its data to its government within thirty days after the end of each quarter and by having the governments' reports submitted to the Agency within forty-five days after the close of the quarter. This System called for data, as set forth in the table below, on each of seventeen designated categories of crude oil imports. The left-hand column shows data submitted to each Member government by *companies* operating in its jurisdiction. Once the company data was collected and aggregated, they were forwarded by the recipient *government* to the IEA Secretariat, as shown in the right-hand column.

Crude Oil Import Price Information System
[IEA/SOM(81)11, p. 13]

Data from Company to Member Government for Each of 17 Designated Crude Categories (Disaggregated)	**Data from Members to IEA Secretariat for Each of 17 Designated Crude Categories (Aggregated)**
Volume	Aggregate quarterly volume
Average FOB price	Weighted average FOB price and 10th and 90th percentiles
Ocean freight, insurance, other costs	Number of companies reporting
Average CIF price	Weighted average CIF price and 10th and 90th percentiles
Real average API gravity	Real average API gravity
Length of days credit	Length of days credit
Whether purchased from an affiliate or a non-affiliate	Total purchases from affiliates and from non-affiliates

The IEA maintained this system until the fourth quarter of 1979, when it was in effect replaced, following a transition period, by the Crude Oil Import Register, discussed below. The Register would prove to be more effective in providing details of *all* transactions on a *monthly* rather than quarterly basis, and it produced price data on individual transactions rather than a weighted average of aggregated imports. The Register was judged to be better suited as a device for monitoring high-priced purchases in a disturbed market or in a full emergency [See IEA/GB(81)52; IEA/SOM(81)22, page 4]. The Industry Working Party provided recommendations and technical advice in support of the foregoing actions.

In April 1975 the ***Petroleum Product Import Price Information System*** was established by the Governing Board on the same reporting calendar as the Crude Price System. Product price reporting began with the first quarter of 1975 on the following products: straight run naphtha, mogas premium, mogas regular, kerosene turbo fuel, gas oil, regular sulphur fuel oil, and low sulphur fuel oil [See IEA/GB(75)25, Item 4; IEA/SOM(75)10]. The left-hand column below indicates the data submitted to each government from those companies importing a minimum of 10 000 tonnes

of a designated product per quarter. Once the data were received and aggregated by Member governments, they were forwarded to the IEA Secretariat, as shown in the right-hand column.

Petroleum Product Import Price Information System
[IEA/SOM(81)11, p. 14]

Data from Company to Member Government for Each of 7 Designated Categories (Disaggregated)	**Data from Members to the IEA Secretariat for Each of 7 Designated Categories (Aggregated)**
Volume	Aggregate quarterly volume
Weighted average CIF/border price	Weighted average and 10th and 90th percentile CIF/border prices
	Number of companies reporting
For 16 designated supply sources	For 16 designated supply sources
Whether purchased from an affiliate or non-affiliate	Whether purchased from an affiliate or non-affiliate

This Product Price System was maintained to the close of the first quarter, 1980, when it was replaced by the Product Price Register, discussed below. The advantage of the Register was the production of price information at the national level on *each* import in place of the older system's quarterly, weighted average prices of aggregated imports, an advantage parallel to that of the Crude Register over the former Crude Price System mentioned above [See IEA/GB(81)52].

The ***Oil Product Import Price Register*** was short-lived, but theoretically it was an improvement over the former Product Price System. The Product Price Register, begun in April 1980, called for *monthly* rather than quarterly reports on essentially the same products as did the former system. Companies were to report to their respective Member governments within twenty days after the close of each month, and Members were to report to the IEA within thirty days after the end of the month. This resulted in considerable improvement in timeliness. As shown below, the contents of the reports were much more specific than those in the prior system's reports. Companies registered with their respective governments all imports of 2 000 tonnes or more of the designated

products, as shown in the left-hand column below. Aggregated company data submitted in turn by Member governments to the IEA are shown in the right-hand column.

Oil Product Import Price Register
[IEA/SOM(81)11, p. 11]

Data from Company to Member Government for Each Import by Designated Product (Disaggregated)	**Data from Members to IEA Secretariat for Each Designated Product (Aggregated)**
Volume	Aggregated volume
CIF price	CIF price (weighted average and masked minimum and maximum)
Whether purchased from an affiliate or non-affiliate	Whether purchased from affiliates or non-affiliates
	Number of reporting companies
Loading point and delivery point	
Delivery date	
Whether or not acquired under a continuing supply arrangement	

This Product Price Register never lived up to its expectations, essentially because the information on products was fragmentary and difficult to monitor and report. A reporting volume threshold of 2 000 tonnes meant that considerable volumes in the aggregate escaped the Register. The problem of insufficient data joined with practical difficulties of reporting performance, delays in data submission, inaccuracy of the data, and security problems to make the Register much less workable than the corresponding Crude Oil Import Register [See IEA/SOM(81)11, p.11]. Although the difficulties were not insurmountable, the considerable effort required to resolve the Product Price Register problems was not thought to be cost effective, so in accordance with the advice of the Industry Working Party, the Agency abolished this Register [IEA/GB(81)30, Item 8(e)] with effect from 30 June 1981. In the years that followed, the Agency has not found it necessary to resurrect either of the previous product registers or to develop new ones.

The other IEA system developed shortly after the Agency was established was the ***Crude Oil Cost Information System***, created in 1976. This system required monthly (initially quarterly) reports, beginning early in 1975. Companies lifting oil above a specified amount outside of the IEA area reported to their respective Member governments, and Members transmitted their reports to the IEA on the same schedule adopted for other monthly systems. This system was operated under carefully designed data security arrangements known as the "Black Box" procedure [See IEA/SOM(75)52], whereby a courier from each Member government brought the Member's report (on data processing cards) each month to a designated secure computer facility at IEA Headquarters in Paris and physically inserted the reporting cards into the IEA computer for processing. The computer aggregated all of the individual Member reports as required, and then suppressed and destroyed the bulk of sensitive data (most items reporting on less than three countries), thus ensuring the security of the data. The data submitted by individual companies to Member governments (not seen by the IEA Secretariat) are shown in the left-hand column, while the aggregated data submitted by the Member governments to the IEA are shown in the right-hand column below.

Crude Oil Cost Information System
[See IEA/SOM(84)19, p. 5]

Data from Company to Member Government (Disaggregated)	**Data from Members to IEA Secretariat (Aggregated)**
By reporting company	By country aggregate for each of the 19 designated crude streams
Volumes acquired and average dollars per barrel for each of the following: – FOB purchases – All other acquisitions – Total	Volumes acquired and weighted average dollars per barrel for each of the following: – FOB purchases – All other acquisitions – Total
	10th and 90th percentile for each of the following: – FOB purchases – All other acquisitions

Designed to provide transparency of crude oil import acquisition costs, this System was expected to show the degree to which cost terms for "equity" or "concession" oil differed from cost terms of companies importing oil acquired on an "arm's-length" basis. The system provided information which helped measure the differences between "official selling prices" and FOB purchase costs, particularly in the rising price market of 1979-1980 when special premia and increased spot sales pushed FOB costs higher than the official selling prices, and the net economic effect was obscured. A similar situation existed in the assessment of FOB and CIF transactions, for which comparisons had to be made in order to understand the market actions of the sellers. Although the Crude Cost System provided useful information for assessing market actions, the market structure was transformed in the ensuing years by a major reduction in the amount of "equity" or "concession" oil or of other "official selling price" oil available for sale, with a corresponding increase in the volumes sold on "arm's-length" or market terms. Eventually the small amounts of official selling price oil made it difficult or impossible to carry out an assessment of the advantages it offered, and the system lost its practical usefulness. On 11 July 1984, with supporting advice from the Industry Working Party and the SOM, the Governing Board,

> agreed that the Crude Oil Cost Information System be discontinued from the date of this decision and that the Secretariat continue its analysis of acquisition costs on the basis of information from other sources [IEA/GB(84)27, Item 2(e); see also IEA/GB(84)19, IEA/SOM(84)27 and Addendum 1 and IEA/SOM(84)19].

In addition to the foregoing information systems, the Agency also developed an oil industry ***Financial Information System***. In November 1977 the SOM proposed that the Governing Board adopt the first elements of the Financial System on an annual reporting basis, to cover capital investment and the source and use of funds [IEA/GB(77)57], beginning with 1976 data which had been developed in consultation with the Industry Working Party and outside consultants. The SOM described the objectives of the Financial System as follows:

> The main purpose for which this part of the General Section is being developed is to achieve a better understanding of the financial structure and structural changes which are taking place

in the oil industry: in effect mainly to find out to what extent and how the industry can be relied on and will be able to continue to provide an important fraction of total energy supplies in the future. The greater transparency thereby gained will give Participating Countries a better basis for policy decisions [IEA/GB(77)57, paragraph 3].

The SOM had considered using either data already being collected by the Chase Manhattan Bank or data collected from companies via Member governments; in the end, the SOM's recommendation was to adopt the latter procedure. As initially constituted, the Financial System contained three categories of information (developed by separate questionnaires), summarized as follows:

1. Worldwide Capital and Exploratory Expenditures
This data is broken down by region and expenditure category covering all aspects of oil company operations including other energy and non-energy. It is to be supplied by a selected number of oil companies with international interests and submitted in a largely disaggregated form containing single company (non-proprietary) information. Some categories and regions will, however, be aggregated by Member governments before forwarding to the Secretariat.

2. Domestic Capital and Exploratory Expenditures
This data follows the same functional breakdown as above, however it is intended to be used by Member governments to obtain information on local capital investments from companies operating in their jurisdictions (including affiliates of international companies). The number of companies is determined by the government concerned, which would then estimate total national expenditure based upon the information collected using this questionnaire and other information available to it and forward the total to the Secretariat.

3. Worldwide Source/Use of Funds Statement
This information refers to the source of funds for capital investment and the other uses of these funds. It is submitted on a single company basis by the companies reporting on item 1 above [See IEA/GB(77)57 for detail on the foregoing].

Although the Industry Working Party recommended that the system include "gross revenue" and a statement of net income, the details for these subjects had not yet been worked out in final form and they were left for later addition once the system was in place. Questionnaires on those subjects were added to the system in September 1978 [IEA/GB(78)32, Item 4; IEA/GB(78)20 and Corrigendum].

The Financial System never became fully operational in a satisfactory fashion. The SOM conducted a number of reviews, but the data submitted proved to be fragmentary and not fully useful. Following an SOM recommendation to discontinue the system in April 1983, the Governing Board in October 1983

> agreed that reporting under the Financial Information System should be suspended while keeping the system in place;
>
> agreed that the Secretariat, for a trial period of two years, should use its best efforts to prepare and report periodically to the SOM financial information on the oil industry using available sources of information [IEA/GB(83)57, Item 3(c)].

Later developments in this sector have proceeded along the lines of the foregoing Governing Board Decision. In January 1986 the SOM made permanent the replacement of the system with the Secretariat's periodic analysis of information from public sources. The Secretariat has done this on a number of other occasions without setting a fixed schedule [See, for example, IEA/SOM(90)16], and the next Secretariat report is scheduled for the March 1995 meeting of the SOM.

Looking over the range of information systems considered above, one may note that none of them survived fully intact in late 1994. Each was either formally abolished or permitted to remain theoretically available but out of regular current use. In some cases this resulted from changing market conditions, while in others the cost-benefit analysis was unfavourable, or the necessary data could be derived from other available sources. Nevertheless they served useful purposes in providing whatever information they could, and they served to educate the responsible officers in Member countries and in the Secretariat, thus helping to make the Agency's later decisions more effective. Finally, in the case of the crude oil systems, the establishment of a superior successor system, the Crude Oil Import Register taken up immediately below, was seen to meet major future needs.

2. Crude Oil Import Register

The Crude Oil Import Register is the chief survivor of the various information systems adopted by the IEA since 1975. Inaugurated in 1979 [IEA/GB(79)64, Item 3], initially for a one year period to obtain reports on a *monthly* basis, the Register provided its first data reports for the month of November 1979 and it has continued to do so to the present day. As described in an SOM document some years later, the two main objectives of the Register are to:

- Provide reliable crude oil price information which can be particularly useful in changing oil market situations as well as during supply disruptions.
- Increase government knowledge of pricing aspects of the international oil market including:
  - Import prices for particular crude streams in one country vs. another.
  - The shift in volumes over time among crude streams including trends in average API gravities.
  - Trends in price differentials between crude streams imported into IEA countries [See IEA/SOM(87)18, paragraph 8].

The reports are scheduled to be made by companies to their respective governments within twenty days after the close of the month (see left-hand column below) and by Member governments to the IEA within thirty days after the end of the month (see right-hand column). The following data are currently reported on a CIF basis for crude imports:

Crude Oil Import Register
[See IEA/GB(93)58, Annex]

Data from Company to Member Government (Disaggregated)	Data from Members to IEA Secretariat (Aggregated)
For each individual import by crude category	Country total for each of the over 100 crude categories
Volume	Aggregate volume imported for each crude category
Dollar value	Total dollar value

Crude Oil Import Register *(continued)*
[See IEA/GB(93)58, Annex]

Data from Company to Member Government (Disaggregated)	Data from Members to IEA Secretariat (Aggregated)
CIF cost for each crude category	Average weighted CIF cost for each crude category (value divided by volume)
Per cent sulphur content	Weighted average sulphur content
API gravity	API gravity (weighted average) for each crude category

The Register has been updated a number of times to adjust to changes in market structure or to make the system more realistic or easier to manage. Early requirements that reports contain data on continuing and non-continuing supply arrangements and on affiliated and non-affiliated company transactions were dropped in 1988, as were requirements for reporting minimum and maximum days of credit. Important new crude oil streams have been added to the Register (e.g. from Canada, Dubai, and Oman) [IEA/SOM/M(88)2; IEA/SOM(88)29(2nd Revision)]. In 1993 changes were made in categorization of crude oil flows to improve the accuracy of reporting and to simplify the system. Crude oil categories have been created for a number of "new" exporting countries, e.g. Vietnam, Denmark, Yemen, and Papua New Guinea. The break-up of the Former Soviet Union and the subsequent increase in crude oil export streams from its territory have been reflected in the provision of separate categories for each of the main exporting republics. The reporting problems associated with the transit of Russian crude oil and condensate through adjacent non-Russian republics are acknowledged in the system's reporting papers. In 1993 sulphur content was also introduced in order to provide information relevant to environmental standards and refinery emissions [IEA/GB(93)58].

The data derived from the Register continue to be used essentially in three ways: (1) for both Members and the Secretariat, to enhance understanding of oil price developments and patterns in general; (2) when necessary, to provide the base for analysis of short-term price developments and oil quality changes; and (3) to supply information to be used in the IEA quarterly publication *Energy Prices and Taxes* and in the monthly *Oil Market Report*. As the SOM concluded in 1987

> The important thing to bear in mind is that the Register is used for assessing historical information and trends, not as a tool for making immediate decisions, and that it is not possible to obtain the information which is reported in the Register, with the same level of coverage and comprehension, from the trade press, industry contacts and other available sources [IEA/SOM(87)18, paragraph 34].

In the foregoing broad review of the IEA oil market information system and the present state of refinement of the Crude Oil Import Register, some of the contributions of the oil industry have been noted, and this requires now a closer look at the overall co-operation of the oil industry with the IEA in constructing and operating the system.

C. Role of the Oil Industry

It was quite clear to the founders of the IEA that their objective of oil market "transparency" could not realistically be achieved without the extensive co-operation of the oil industry in both the construction of the system and in its operation. In parallel with the IEA's emergency information system, the oil market system required industry expertise in developing relevant and workable information flows and in functioning as the ultimate source of much of the desired information. What the Agency sought to make more "transparent" was precisely the oil industry's international operations; and for the most part, the companies themselves had the best if not the only knowledge of these operations. Hence the SOM received full competence to develop such co-operation between the IEA and the oil industry, while the Members undertook to ensure that the co-operation of companies under their jurisdiction would be provided. Indeed this co-operation has been forthcoming from the outset of the IEA and regularly thereafter, and this even before the Agency was formally established in November 1974.

1. Industry Working Party (IWP)

After the Brussels Energy Co-ordinating Group (ECG) negotiating the I.E.P. Agreement in 1974 had made substantial progress in drafting the text of the Agreement, the ECG agreed that arrangements should be made for it to have the benefit of early advice from the oil industry and that

representatives of the ECG and industry should meet for that purpose. The meeting was designed to explore and promote the willingness of a number of key international companies to co-operate in the implementation of the I.E.P. Agreement and to identify particular aspects of the Program which would require participation by the companies [ECG doc. No. 82, 10 September 1974]. The invitation to the oil companies was extended on behalf of the ECG by its Chairman Viscount Davignon. As the companies later reported to the SOM

> At a meeting in London on October 23/24, 1974, representatives of the governments constituting the Energy Co-ordinating Group received comments on their proposed International Energy Program (IEP) from representatives of a number of oil companies. The government representatives asked Exxon to convene an Industry Working Party (IWP) to develop suggestions concerning design of the General Section of the IEP's Information System on the International Oil Market and Framework for Consultation with Oil Companies [IEA/SOM(75)1, p. 5].

On 26 November 1974, about one week after the IEA was founded, Exxon dispatched a cable to the companies concerned setting forth the proposed mandate of the IWP [Copies of the cable are contained in the IEA archives in Paris]. As stated in this cable: "The objective of this Working Party will be to prepare suggestions and recommendations for consideration by the Standing Group on the Oil Market". The cable continued by saying that the Working Party would

A. Propose a set of objectives upon which the design and content of the General Information System and the Framework for Consultations on the International Oil Industry might be based.
B. Identify the type of information and data on the international oil industry that will be needed to meet these objectives.
C. Develop recommendations both on procedures for obtaining this information and data, and with respect to the operation of the General Information System.

The cable then outlined in some detail the information flows, the respective roles of the parties principally concerned (individual companies, the IEA

governments, and the Agency itself), the procedures for periodic IEA review of the content of the system, and other matters. The consultations went forward promptly.

The IWP's co-operation was essentially a pragmatic arrangement between the Agency and the oil industry, since the I.E.P. Agreement had made no specific reference to an industry working party, which has since been regarded as established by the companies themselves outside of the formal IEA framework (unlike the oil Industry Advisory Board (IAB) which was established by the Governing Board and was foreshadowed by Article 19.7 of the Agreement) [See Chapter III, Section B-7(b) above]. It has not, in the end, proved necessary for the Governing Board to take any action on the formation or procedures of the IWP, because the pragmatic approach has proved to be an adequate one.

The IWP immediately set to work on the General Section of the Information System, holding its first meeting in December 1974, one month after the IEA was established, and submitting in January 1975 its first report on implementing the oil market section of the information system [IEA/SOM(75)1]. During the period 1975-1986 when the various elements of the oil market information system were being developed, reviewed, modified, discontinued, or maintained, the Industry Working Party participated constantly and advised or made proposals as required, often in the form of written comments on proposed SOM papers. The IWP took part in most of the SOM meetings during that period and advised on the objectives, activities, and information requirements of the SOM as well. The IWP advised the SOM systematically on the Agency's oil market information system, including the need for and establishment of each part of the system, the content of reporting forms, the practical use of the data to be supplied, amendments, retention or discontinuance, methodological issues and publication of oil market data.

As the information system stabilized and took its continuing form, however, the need for IWP participation was reduced, and the IWP met less frequently. Both of the Agency's oil industry advisory bodies (the IWP and the IAB) sought to simplify their procedures and reduce the costs of their participation. In some cases the two government expert bodies concerned, the SOM and the SEQ, met together or on successive days, in part as a convenience to industry to help reduce the time expended on IEA questions and other costs, but these did not prove to be adequate solutions. A suggestion that the two industry bodies merge did not present a practical solution because the specialist expertise for each would not always be available when necessary (the IAB required expertise on oil industry

operational questions and oil supply disruption response measures, while the IWP required oil market information expertise). Moreover, institutional arrangements would have to be made, and legal uncertainties would have to be clarified. In the end, no steps were taken to effect a merger of the two bodies. Each remains separate to the present day, although the IWP as such has been largely inactive since 1987, while mainly bilateral contacts between the Secretariat and individual companies have provided the necessary industry advice.

Although the IWP's work has been largely confined to the information system details outlined above, there has been IEA interest in having the IWP's views on the Secretariat's assessments of the oil market situation and on related policy questions, such as the potential impacts on industry of environmental measures. However, the IWP was concerned about whether its participation in such questions might fall outside of the antitrust defence for United States companies [See generally on the antitrust defence, Chapter III, Section B-7(c) above]. Since in practical terms the defence was limited to IWP work on the *information* provisions of the I.E.P. Agreement, advising on broader market assessments and other policy issues could present an antitrust problem. Accordingly, in 1982 the IWP declined to advise on such questions, and they were taken up in the SOM without the presence of the IWP. The IWP Chairman suggested that bilateral consultations might be better channels for the SOM to solicit industry opinion on the assessments, and the SOM gave effect to the IWP's wishes on these institutional and procedural matters.

In recent years industry advice on the oil market information system has reached the Agency for the most part in direct bilateral contacts between the Secretariat and industry officials, and in the increasing numbers of presentations by these officials at meetings of the SOM. The IEA has not found it necessary to convene the IWP since 1987, and the IWP has not met with the SOM since 1986. However, the IWP's co-operation with the IEA made immense contributions to the soundness of the oil market information system over the years, and the industry remains available under various forms of co-operation for further service to the Agency as the occasions arise.

2. Formal Consultations with Oil Companies

The founders of the IEA foresaw not only the oil industry's technical work on oil market information systems, carried out largely by the IWP, but also broader and more penetrating consultations with companies individually or

in small groups apart from the IWP. These consultations were intended to give Members the opportunity to

> consult with and request information from individual oil companies on all important aspects of the oil industry [I.E.P. Agreement, Article 37].

Members established within the Agency a "permanent framework" for such consultations and agreed to share among themselves on a co-operative basis the results of the consultations. Responding rapidly to a directive in the Agreement, the SOM submitted draft "Procedures for Consultation with Oil Companies" to the Governing Board following consultation with the IWP, which had played a major role in preparing the draft. The Board also acted promptly in adopting the proposal on 5 February 1975 [IEA/GB(75)8, Item 8]. These Procedures do not displace direct contacts or any other existing modality of consultation. They provide for the mechanics of convening the consultation meeting (which normally would be held in Paris), the possibility of a written procedure without a meeting if so agreed by the parties, or of a direct consultation open to all interested IEA Members. Direct consultations would be chaired by the SOM Chairman, and reports would be circulated to all Members. These Procedures were put into immediate effect, and the first consultation took place with Exxon a few months later. Over the years nearly fifty consultations or parallel presentations have taken place in the SOM, usually with up to three companies appearing together or successively. Reports on the early consultations were normally made by documents submitted to the Governing Board or by references contained in the SOM meeting records.

In 1976 the SOM's initial written report to the Governing Board covered the first five consultations. In that report the SOM concluded that the consultations produced valuable information, and it noted examples of general consultation subjects:

(a) terms of arrangements for access to major sources of crude oil, including acquisition costs paid by the oil companies to producer governments, their offtake arrangements, including volume availability etc.;
(b) a particular oil company's views of the worldwide supply and demand outlook (short, intermediate and longterm), including an evaluation of supply availability, transport capability, refinery capability, etc.;

(c) discussions centered on oil company profits, investment programmes, availability of investment capital and investment intentions [See IEA/GB(76)17, which also contains a list of the consultations and references].

In reporting on nine consultations which had taken place since its earlier report, in 1978 the Governing Board reaffirmed the value of these consultations in providing oil market information [IEA/GB(78)2].

The c*ompanies and other organizations* which have participated over the years on one or more occasions in these consultations (or in parallel and less formal consultation-type meetings), as shown in the order in which they appear in IEA records, include Exxon, BP, Mobil, Shell, Petrofina, ENI, Statoil, Gulf, Veba, Standard Oil of California, Pemex, BNOC, Texaco, Petrobas, Petroleum Association of Japan, New York Mercantile Exchange, London International Petroleum Exchange, Norsk Hydro, Petrol Canada, Shell International Trading, Petroleum Industry Research Associates, Petroleum Economics (London), Sun, Kuwait Petroleum, Shell International, CONCAWE (Oil Companies' European Organization for Environmental Health Protection), Phibro Energy, World Petroleum Congresses, Booz Allen and Hamilton, Total Exploration Production, Shell International Shipping, Pira, Europia, APPE, Caltex and FACTS.

In addition to these formal contacts, the Secretariat has held many bilateral and informal meetings with about forty oil companies, consultants, and other experts each year. Many substantial and direct contacts are made each month during the preparation of the *Oil Market Report*. The reduction in many companies of their manpower dedicated to short-term oil market information analysis has joined with the growing reputation of the IEA's *Oil Market Reports* to cause the IEA to function increasingly as an information clearinghouse for the global oil market.

The *subjects* of the consultations have varied widely over the Agency's twenty year history. In addition to the subjects mentioned above in the 1976 SOM annual report on consultations, later consultations covered such diverse subjects as the situation of the particular company in the consultation, the role of consumer country national oil companies, the relation of a state oil company to its government, changes in the organizational structure of the oil industry to meet changes in market conditions, international marine transportation and the tanker market, the OPEC two tier pricing system (in 1977), the situation of smaller companies in the international market, worldwide exploration prospects, the cessation of supplies from Iran, the economics of oil stock levels and policies, oil futures markets, the impact of

declining prices on cash flow, trading methods and market transparency, developing country oil demand trends, and synthetic gas fuels. The subjects have also included changing specifications of gasoline, diesel, and fuel oil and their impact on the refining industry, long-term derivative instruments, processes of deregulation and privatization in energy industries, the pipeline transportation industry, pipeline options for exports from the Caspian Sea, and the appropriate roles of governments, national oil companies, and private oil companies. While these consultations and parallel events have not been the subject of formal reports to the Governing Board since 1978, they have often been the subject of reports in SOM documents and in SOM meeting records.

The foregoing consultations, mostly held in an organized form carried out in the Agency's Paris meeting rooms, have made invaluable contributions to the Members' and the Secretariat's understanding of the current oil market situation, as have the individual bilateral consultations by the Secretariat. They have all combined with the information system generally to support the Secretariat's oil market analyses and assessments for internal use of the Agency, for Members, and for the public in the monthly *Oil Market Report* and other publications.

D. Dissemination of Oil Market Information

The dissemination as well as the production of oil market information was one of the principal objectives the founders sought to achieve in the IEA. They were particularly concerned about disseminating information to governments and to the Agency for use in developing oil market and other energy policies, but their interest clearly extended to information for the IEA's industry advisory bodies and for the public as well. To the extent that oil market information could be disseminated without impairing either sensitive Member government information or industrial competition, the Agency's policy has been to support wide dissemination and to implement progressively the measures required to help bring that about.

The IEA disseminates oil market information in a variety of ways, with the publication of this information receiving high priority in providing normally the broadest and most rapid coverage. Although publication meant mostly "hard copy" distribution in the early days of the IEA, publication now includes on-line transmissions, disks, magnetic tapes, and other advanced transmission systems. The IEA publications started with

the oil and gas and other energy publications taken over from the OECD shortly after the formation of the IEA (for example, the publications now known as the *Monthly Oil and Gas Statistics and Trade Data,* and the *Quarterly Oil Statistics and Energy Balances*). *Crude Oil Import Prices* covering the period back to 1973 was published in 1979 and again in 1981, and these statistics now appear quarterly in the publication entitled *Energy Prices and Taxes,* with IEA averages and other information. To these must be added the oil market elements contained in the IEA's annual publication series, as seen currently in the *Energy Statistics of OECD Countries 1991-1992, Energy Balances of OECD Countries 1991-1992, Energy Statistics and Balances of Non-OECD Countries 1991-1992,* and *Oil and Gas Information (1993),* together with such specialized statistical works as *Electricity Information 1993* and *Coal Information 1993.*

Moreover, the Agency's current oil market assessments, in quite general terms, were often made known and at least in part discussed by IEA spokesmen in their public appearances, by IEA Ministers in the Communiqué issued at the close of each of their meetings, and by officials of Member countries and the Secretariat in press conferences and other appearances following many Governing Board meetings when oil market interest was particularly high or important actions were taken. These practices continue to the present day, notwithstanding the publication of the IEA's monthly *Oil Market Report* since 1983 with more systematic and complete oil market information derived from all IEA information sources.

In 1975 the Governing Board began receiving regular Secretariat reports on the short-term outlook for the international oil market, and in 1977 the Board agreed to have a corresponding item on the agenda of each future Board meeting [IEA/GB(77)17, Item 5]; this is a continuing and consistent practice. Initially produced quarterly, this report evolved into the monthly Oil Market Assessment, containing the Secretariat's assessment of the general situation and major developments, oil supply and demand, prices for crude oil and products, and supporting statistical data. At times the assessments for the Governing Board also have contained sensitive Member government material on calculations forming part of the IEA's emergency response preparations (such as historic base period final consumption numbers for each Member, oil stock levels of Member countries as required under the I.E.P. Agreement, and quarterly oil forecasts).

Initially intended as a briefing document for the Governing Board, the government expert groups on the oil market (SOM) and emergency questions (SEQ), and the co-operating oil companies, the assessments did not receive wider distribution until after the Governing Board decided to publish the

greater part of the assessments on a commercial basis. Some officials perceived that the former practice of distributing the assessments to the co-operating companies gave these companies the advantages of the assessments, while other oil companies not represented in the groups co-operating with the IEA might not receive them. The publication of information on a commercial basis would not only resolve this problem, but would also inform a much wider audience on current oil market matters [See IEA/GB(82)77], and in fact this occurred rapidly once the publication began.

Following exploratory discussions in the Governing Board and consultations with the SOM, the SEQ, and their industry advisory groups (the IWP and IAB), the Governing Board decided in December 1982 to begin publication of the monthly oil market assessments, after removal of sensitive Member government material [IEA/GB(82)92, Item 2(c); see IEA/GB(82)83; and the joint document IEA/SOM(82)52, IEA/SEQ(82)47]. The first issue appeared in September 1983 as the *IEA Oil Market Report - A Monthly Oil Market and Stocks Assessment* (commonly abbreviated as the "OMR"). The Report contained information on current oil consumption (mainly in the OECD area), oil supply (OPEC and non-OPEC producers), oil stocks, supply/demand balance, average price levels with reports on significant price related events, spot market trends, and statistical detail. The IEA continued to supply Members through other channels with the sensitive Member government material not included in the publication. An *Annual Oil Market Report* has also been published by the Agency, beginning with the Annual Report for 1983, and continuing to 1990 inclusive. Thereafter the Annual Reports were replaced by annual addenda to the monthly Reports as the annual data became available [See for example, for 1994, the Report's *Annual Statistical Supplement* in the new format adopted for the annual material].

Over the years the scope and content of the Reports have been reviewed regularly by the Secretariat and IEA Members. The Secretariat has refined the Reports in the interest of greater precision and clarity. The data coverage has been revised in scope and depth, and the assessments have been enlarged accordingly. Since the April 1991 issue, the Reports on the oil supply/demand balance have been presented on a "truly global basis", as a result of the breakdown of barriers between Eastern and Western Europe and the availability of adequate data and estimates [See "Changes to Oil Supply/Demand Balance in Oil Market Report "Global Basis", SOM, Room Document No. 1, pp. 3-4, 13 May 1991; OMR, April 1991, pp. 2-3]. Much greater attention is now devoted to oil supply and demand in Latin America, Asia, and Africa. In the process of review and change, "apparent"

consumption has largely given way to "observed consumption" and then to "demand" with greater detail as to countries, regions, and products. Other notable developments include seasonally adjusted changes in demand, structural changes, and cyclical changes. There has been more material on OECD regional demand by product, and more on non-OECD regions and in selected countries. There are additional features of particular topical interest (for example, OECD oil demand for public electricity generation, October 1994). There is now much more data on *world oil production* with detail for the OECD and OPEC by country, the Former Soviet Union and other non-OPEC (and some individual) countries, and there is more analysis of significant oil supply movements. OECD oil *stocks* are also reported in more detail with data on regional changes, industry stocks, government controlled stocks, as well as product stocks. On the topic of *oil prices*, the Reports contain more developed information on CIF crude import prices, on spot crude oil prices over time and by market, on product prices, on differentials in various markets, and on end-user product prices. Refinery questions have been added to the price topic, with material on refining margins and refinery crude "throughputs" in OECD countries.

The monthly *Oil Market Report,* published under the responsibility of the Executive Director of the Agency, is prepared on the basis of a number of separate sources. Historical supply, demand, stock, and refinery activity data are derived from data that Members submit for the IEA's Monthly Oil Statistics system. The Secretariat supplements these data with information derived from numerous other sources, including industry contacts and consultancy services. Price data are derived from the monthly average CIF crude oil price data supplied by Members under the Crude Oil Import Register, discussed in Sections A and B above, as averaged and processed by the Secretariat. These price data are supplemented by material drawn from published sources, such as *Platt's,* and are also processed by the Secretariat. While the Secretariat believes its sources to be reliable, the data appearing in the Reports are meant to be indicative of *broad trends* rather than be a numerically accurate description of the world oil markets at any particular moment [See *Oil Market Report,* "Sources and Use of Data" etc., attached as the last page to each Report].

The Reports have enjoyed an extraordinary informational and commercial success, the number of subscribers having risen to nearly 800 in 1994, more than double the number of subscribers in its first year. For governments and industry, the Reports have become a standard and authoritative source of the best available oil market information. They are widely reported on wire service on the day of publication and by the press,

radio, and television. Because of the authority of the Reports, they have at times had discernable market effects, without carrying that intention, for they report facts and assessments without regard to political or other considerations. The Reports continue to serve as a principal instrument for achieving the IEA Members' goals of general oil market transparency and dissemination.

Co-operation with Non-Member Countries: The Global Perspective

This Chapter reviews the Agency's evolving policies and experience in the conduct of its relations with non-Member countries. The Agency's early policies, institutional arrangements, and information exchange practices in this sector are summarized in Section A below. From the outset the Agency's policy approach was outward-looking, particularly with respect to relations with the oil producing countries and with other consumers, as clearly contemplated in the I.E.P. Agreement and in other early policy declarations and actions. After the institutional arrangements to implement these policies were rapidly established in the mid-1970s, they evolved over the years to reflect changes in policy emphasis. High hopes for a constructive producer-consumer dialogue were seen in the early years of the Agency, leading up to the Conference on International Economic Co-operation (North-South Conference or CIEC) held in Paris in 1976-1977 [Section B]. As it became clear in this period that little could be expected from the proposed dialogue but that productive energy policy work could be carried out in co-operation principally with the developing countries, the IEA enlarged its emphasis on developing country questions [Section C]. By 1990 the Agency had turned more of its attention to the growing globalisation of energy developments and gave it significant energy policy interest [Section D], particularly with respect to Poland, the Czech Republic, Slovakia, Hungary, Romania, and the New Independent States that succeeded the Soviet Union. The Agency has since remained quite active in that area, while it has strengthened its global perspective also in Latin America, the Asia-Pacific region, and Africa. The Agency promoted a new approach to relations with the oil producer countries in the 1991-1994 Ministerial level conferences and in the IEA's Meetings of Experts from energy exporting and importing countries [Section E], and it conducted a general review of relations with non-Members in the period 1992-1994 [Section F]. Since the Agency's policy interests in each of the foregoing developments had been established from its beginning in 1974, the developments described in this Chapter reflect not so much entirely new

departures as changes in priority and emphasis in response to particular problems and opportunities as they presented themselves over the Agency's first twenty years.

A. Non-Member Policy Arrangements

The IEA's energy policy perspective has always extended beyond the Members' internal policies and the Agency's co-operative programme and administration to include external relations policies of both the Members and the Agency. From the earliest stages of the IEA, it was evident that the new Agency would have to become deeply involved in external relations across the entire spectrum of its functions. This is evident in one of "the lessons" of the 1973-1974 crisis:

> **Relations with Producers.** Consumer countries should establish arrangements for co-operative relations with the oil producer countries and with other consumer countries in order to achieve better mutual understanding and to benefit from developments in the energy field [See Volume I, p. 39].

In the IEA's energy policy outlook extending to all market participants, the objective of co-operation in energy was seen not only as co-operation *among* Agency countries themselves, but also as co-operation *between* them as organized in the IEA, on the one hand, and the rest of the energy world, on the other. This broad concept of co-operation was explicitly stated in the Communiqué of the Washington Energy Conference on 13 February 1974, in the early preparatory stages of the Agency [See Volume I, p. 45]. Participants "agreed that there was need to develop a co-operative multilateral relationship with producing countries, and other consuming countries that takes into account the long-term interests of all" [Paragraph 14]. In that context the Conference also mentioned the role of the international oil companies, initiatives in the United Nations, the consumer and producer country conference, and consultations with developing countries and other consumer and producer countries. All of these concerns indirectly found their way into the I.E.P. Agreement which contains the most authoritative statement of the founders' energy policy views at the time the Agency was established. The Agreement clearly states

the founders' objectives concerning co-operative international energy relations and provides the broad institutional framework for its co-operation with other countries and organizations.

The Agency's objective in co-operating with non-Member countries appears in several paragraphs of the Preamble to the I.E.P. Agreement [Paragraphs 3-4] where the Members state that they are

> DESIRING to promote co-operative relations with oil producing countries and with other oil consuming countries, including those of the developing world, through a purposeful dialogue, as well as through other forms of co-operation, to further the opportunities for a better understanding between consumer and producer countries,
>
> MINDFUL of the interests of other oil consuming countries, including those of the developing world . . .

A co-operative rather than an adversarial approach towards other countries is apparent in Article 11 of the Agreement, which makes it clear that IEA countries do not intend "to seek to increase, in an emergency, the share of world oil supply that the group had under normal market conditions". More specifically, "Historical oil trade patterns should be preserved as far as is reasonable, and due account should be taken of the position of individual non-participating countries". The Agency's approach would thus be one of fairness and constructive co-operation in its external relations, as the more operational texts of the Agreement confirm, and the actual external relations of the Agency have demonstrated over the years.

1. Institutional Arrangements

The founders of the Agency confirmed the foregoing views in the policy statements contained in a number of the Agreement's specific mandates and in a general grant of external relations powers. The principal specific mandate is contained in Chapter VIII entitled "Relations with Producer Countries and with other Consumer Countries". In this Chapter IEA Members restate their objectives concerning other countries [Article 44] and they take the commitments (1) to give full consideration to the needs of other consumer countries, particularly to those of the developing countries [Article 45], (2) to keep developments under review for that purpose [Article 44], (3) to exchange views on their relations with producer

countries [Article 46], (4) to seek opportunities and means of encouraging stable oil trade and secure supplies, (5) to consider other possible fields of co-operation, and (6) to "keep under review the prospects for co-operation with oil producing countries on energy questions of mutual interest, such as conservation of energy, the development of alternative sources, and research and development" [Article 47].

In addition to the relatively sharp focus of the foregoing external relations mandates concerning non-Members of the Agency, the IEA's non-Member co-operation policy is reflected in the all but complete grant of power to the Agency to enter into the corresponding external relations as required to realize its objectives. This was established in both the I.E.P. Agreement [Article 63] and in the Council Decision [Article 12]. Thus I.E.P. Article 63 contains the following:

> In order to achieve the objectives of the Program, the Agency may establish appropriate relations with non-participating countries, international organisations, whether governmental or non-governmental, other entities and individuals.

This grant of authority was intentionally designed to give the Agency the widest latitude and flexibility in determining the nature, scope, and form of its external relations and the categories of particular parties with which it should enter into relations. The Agency exercises these external relations powers, it should be added, in complete formal autonomy from the OECD. The quoted text of Article 63 and the specific I.E.P. Agreement mandates referred to above comprise the formal sources of competence for most Agency relations with others and convey a powerful policy statement. They provide the operational basis for the IEA's relations with the oil producing countries and with other oil consuming countries, and for its enhanced relations in recent years with the Central and Eastern European countries, the Former Soviet Union, Korea, Mexico, and other countries, as well as the United Nations, the World Bank, the Latin American Energy Organization (OLADE), the Asian Development Bank, other international organizations, and a multitude of other entities and individuals.

Initially the Agency's relations with non-Members were developed in the Standing Group on Relations with Producer and other Consumer Countries, one of the four plenary Standing Groups established by the Agreement, and its mandate is set forth in Articles 44-48 and 58 of the I.E.P. Agreement. Under Article 48, the Standing Group is to examine and

report to the Management Committee (in practice the Governing Board and the Management Committee meeting together) and to "carry out the functions assigned to it in Chapter VIII and any other function delegated to it by the Governing Board" [Article 58].

After the Standing Group had functioned several years under this mandate, the Agency found that it was emphasizing more its relations with developing countries, and this emphasis needed to be reflected in its institutional arrangements. The Governing Board also considered that it needed direct advice from Members' officials who were operationally responsible in their capitals for international energy relations. Since the Standing Group was not always best suited to meet these needs, in June 1977 the Board decided to establish an informal Ad Hoc Group on International Energy Relations, initially chaired by Mr. R. A. Burrows (United Kingdom) and often called the "Burrows Group". The broader mandate of the Ad Hoc Group was "to report to the Governing Board on international energy relations and to carry out such other functions as may be assigned to it by the Governing Board" [IEA/GB(77)33, Item 8]. Once the Ad Hoc Group began its work, the greater suitability of this Group as the general forum was apparent, and the functions of the Standing Group were thereafter fully taken over by the Ad Hoc Group. In 1990 with the end of the Cold War and the changing political and economic situation in Central and Eastern Europe, IEA Members could foresee that the emphasis of IEA work would broaden permanently on a more global basis, and they changed the Group's name to the "Committee on Non-Member Countries" (CNMC), the name it bears to the present day. Future references to the Ad Hoc Group will appear as "Ad Hoc Group/CNMC" to show that the two names refer to the same IEA body. Pertinent extracts from the mandate of the Committee are set forth in the OECD's document "List of Bodies of the Organisation - Mandates - Membership - Officers", updated annually [See also IEA/GB(89)36, Item 5]. The Committee mandate changes adopted by the Governing Board in the course of the 1992-1994 review of relations with non-Member countries are taken up in Section F below.

2. Information Exchange Among Members

The IEA bodies responsible for non-Member country relations (formerly the Standing Group and the Ad Hoc Group, now the Committee) have functioned principally as the IEA's focal point for exchange of information on this subject among the Members, as a convenient place for Members to share policy notions and to develop views to be expressed elsewhere, and as

a co-ordination point for the preparation of advice for the Governing Board, other IEA bodies, and the Secretariat. These functions began with the establishment of the IEA and have continued regularly since that time.

Internal information exchange has been one of the most vital and constant functions of the IEA's non-Member bodies. Article 46 of the I.E.P. Agreement contains the specific commitment of Members for this exchange:

> The Participating Countries will, in the context of the Program, exchange views on their relations with oil producing countries. To this end, the Participating Countries should inform each other of co-operative action on their part with producer countries which is relevant to the objectives of the Program.

Almost immediately after the Agency was established, the Governing Board "recognised that the Standing Group was the natural forum for the exchange of information on bilateral contacts with the oil producers for which provision was made in the Agreement; this item should be included in the agenda of the Standing Group as a matter of routine" [IEA/GB(74)11(1st Revision), Item 4(g)]. This is still done regularly in the Agency's Committee on Non-Member Countries. Accordingly, OPEC and individual producer country actions have been a regular subject of analysis and information exchange, during periods of both lesser as well as greater contacts between the Agency and OPEC. The Members report on bilateral contacts with non-Member countries generally and with universal, regional, and functional international organizations, and they also report regularly on their own national developments that concern areas of interest to the Committee. These functions were highly developed during the preparations for the Conference on International Economic Co-operation (CIEC) and during the Conference itself (sometimes called the "North-South Conference") in 1976-1977 [See Section B below]. The Agency played an important role in facilitating the Members' consultations on the Conference, assisting Members to co-ordinate their views for presentation to the Energy Commission of the Conference, and in conducting regular information briefings for all Members after each session.

IEA Members have been informed through this same process about energy-related discussions taking place in the United Nations and other multilateral organizations, particularly on developing country energy questions during and following the CIEC. The Agency carried out parallel functions for the preparation and participation of Members in many other meetings on energy in international relations, such as the 1981 Summit meeting in Ottawa, the United Nations Conference on New and Renewable

Sources of Energy held in Nairobi in 1981, and the International Meeting on Co-operation and Development held in Cancún. In each case the IEA provided an internal "platform" for the exchange of information and an exploration of avenues for possible action, and later it did the same for the exchange of views on appropriate follow-up actions. In the same year preparations for consideration of the East-West energy issues in the U.N. Economic Commission for Europe's Senior Advisors to ECE Governments on Energy were similarly co-ordinated in the IEA's Ad Hoc Group/CNMC.

Centered in the Agency's non-Member bodies, these activities continued on a regular basis over the years that followed. Preparatory discussions, information exchange, co-ordination of Members' views and follow-up took place on whatever the immediate questions of international energy relations were at the particular time. These internal exchanges have been conducted through periods of policy emphasis on the oil producer-consumer dialogue, on developing countries, and on East-West relations. Exchanges have continued as well with respect to the new series of IEA hosted Experts Meetings, the political level conferences of energy exporting and importing countries, and the recent general review of relations with non-Member countries within the IEA. The scope of these internal exchanges has expanded as the range of IEA contacts with non-Member countries has itself expanded with the periodic support and direction provided by IEA Ministers, as will be seen below in the Sections dealing more specifically with the major changes of emphasis in IEA work in this sector.

At its meeting in May 1992, the Governing Board carried out a general review of the Agency's relations with non-Member countries, based on proposals contained in the Secretariat's Note entitled "Participation by Non-Member Countries in the Activities of the IEA" [See IEA/GB(92)18/FINAL]. This review resulted in two decisions affecting internal information exchange, which at the same time confirmed and enlarged the Committee's mandate on this subject [IEA/GB(92)25, Item 5(d)]. The first of these provided that

(i) the Committee on Non-Member Countries shall, taking into account the views of the Standing Groups and the other committees of the Agency, advise the Secretariat and advise the Standing Groups and other committees of the Agency with regard to non-Member country activities;
(ii) overall policy guidance and decisions shall continue to be the responsibility of the Governing Board.

In the second decision, the Board requested the Committee to ensure that information on the Agency's activities in this sector be communicated to Members and that Members' views be communicated to the Secretariat. The Committee is also required to report regularly on this subject to the Board.

The Secretariat's review document [IEA/GB(92)18/FINAL] contained in Part IV an additional passage entitled "Expanded Role of the NMC Committee", in which it was recommended that the Committee's role be expanded and that it serve a consultation function entailing more frequent meetings and more functions. The Committee would also receive more direct reporting of deliberations and recommendations from the other Standing Groups and Committees and enjoy wider review and recommendation responsibilities. Although at its May 1992 meeting the Board did not reach final Conclusions on Part IV, it did note that the role of the Committee "needs to be further developed over time, bearing in mind that specific areas of co-operation with non-Member countries must be integrated into the work of other Standing Groups" [IEA/GB(92)25, Item 5(c)]. At that time the Board also adopted general policy guidance and specific guidelines for areas of co-operation with non-Member countries [See Item 5(b); IEA/GB(92)18/FINAL]. Following further review of these and other non-Member questions in 1994, the Governing Board adopted amended guidelines and approved procedures for accession to the I.E.P. Agreement without modification of the internal information exchange function of the Committee described above [See Section F below].

B. Early Producer-Consumer Dialogue

Diplomatic movement towards an oil producer and oil consumer "dialogue" began in the earliest stages of the creation of the IEA during and after the 1973-1974 oil crisis, in response to the disruption of supply and the increases in the price of oil which occurred in that crisis [See Volume I, Chapter II, Section A]. The potential stakes of both producers and consumers in the "dialogue" were enormous. On the one hand, the producers saw the dramatic increases in price as already fully "acquired". They viewed these elevated price levels as needing protection and a method for adjustment into still higher ranges, if possible, together with recognition of oil as a "wasting" and precious asset. The producers needed stable markets and assurances that their oil would find willing buyers. On the other hand, the industrialized countries sought to guard against actions which might have the effect of

damaging world economic growth, and they sought more reasonable prices and stabilized sources of supply without arrangements that might lock-in the then prevailing prices or lead to still higher prices.

The producers had been organized for some years in OPEC, the organization which had played a major role in bringing about the almost 400 per cent increase in crude oil prices during the 1973-1974 crisis and which it was thought might be mobilized to bring about further increases. The producers had demonstrated their newly acquired ability to *legislate* rather than to *negotiate* international oil prices. Moreover, in December 1974, a few weeks after the IEA was formed, the producers found support for their views in the United Nations General Assembly action on the "Charter of Economic Rights and Duties of States" [General Assembly Resolution 3281 (XXIX)], adopted during one of the high points of developing country influence in the General Assembly despite strong opposition from major industrial countries. This Charter contained provisions seen as favouring and protecting commodity cartels [See Article 5], which were not acceptable to all of the industrial countries. Although during the crisis the industrial countries were inadequately prepared from an institutional standpoint [See Volume I, Chapter II], in 1974 they were engaged in the process of organizing themselves into what would become the International Energy Agency. Among the purposes of this new organization described in detail in Volume I, Chapter II, Section C-4, the development of a "purposeful dialogue" with the oil producer countries received a high priority. Many participants in the preparations for the IEA believed that one of its main functions would be to establish a caucus point for the negotiation of oil price and supply issues with the producers (not excluding the possibility that the Agency itself might act directly in the market for consumer countries), and to do so in an institutional context in which the two groups would be better balanced than they had been in 1973-1974.

The corresponding policy threads found their way into IEA actions almost immediately after the Agency was founded, as the two groups moved gradually but deliberately towards establishing the "dialogue". While formal Agency contacts with OPEC did not take place before the CIEC preparations discussed below, the Secretariat enjoyed many informal contacts with OPEC officials not only during the build-up to the CIEC in the mid-1970s, but also throughout the entire history of the Agency to date. These contacts have occurred unofficially in connection with meetings in other organizations or during unofficial functions, and they have proved to be quite useful on a technical level.

In October 1974, while the IEA was still in the preparatory stage, President Giscard d'Estaing of France, whose country was not then participating in the IEA, took the initiative to launch officially the idea of the producer-consumer dialogue. Promptly upon its formation, the Agency took up the question of preparation for the dialogue. At its first meeting, held on the day the I.E.P. Agreement was signed, the Governing Board

> (h) agreed that an eventual meeting with the oil-producing countries should be carefully prepared and that in this connection a means of associating France with the Agency's work should be found . . .
> (i) agreed that an important objective should be mutual enlightenment between the Agency and OPEC . . .
> (k) agreed that the Agency's objectives should be presented to the oil-producing countries in the Participating Countries' bilateral contacts with those countries
> (l) . . . IEA Members should explain bilaterally to OPEC countries the wide scope of IEA showing that *IEA is not a counter-OPEC institution* [IEA/GB(74)9(1st Revision), Item 8; emphasis added].

In December 1974 the Governing Board [IEA/GB(74)11(1st Revision), Item 4] gave top priority to the definition of

> a common position on the crucial issues which would fall to be considered in a dialogue with producers; the topics which were mentioned and could be included are:
> (1) the general concept of the dialogue, strategy and the development of appropriate concrete topics of discussion;
> (2) the price of oil and security of supply . . . .

Other issues, including the producers' investment of funds and the matching of their investments to the investment needs of the consuming countries were mentioned as topics of discussion. The Board then proceeded with measures to gear up the new Agency to prepare for the dialogue, in "four interrelated sequential stages" that can be summarized in this way:

> (1) satisfactory progress in the establishment of concerted programmes among consumers in the fields of conservation,

the accelerated development of new energy supplies, and financial solidarity on an appropriate basis.

(2) the convening of a preparatory meeting with producers with a target date of March 1975 to develop the agenda and procedures for consumer-producer dialogue.

(3) the preparation of common consumer positions of the agenda items to be agreed under stage (2).

(4) the holding of a consumer-producer conference [IEA/GB(74)11(1st Revision), Item 4].

This began an intense period of dialogue meeting preparations which lasted almost one year. The IEA had to organize the work on both procedural and substantive matters over the long period before the Conference could complete the preparatory phase and begin its systematic work. During the preparatory phase, the Agency prepared position papers, co-ordinated the views of Members, participated as an active observer in the work of the Preparatory Meetings, and kept IEA Members informed.

The Agency continued to fulfil these functions during the period of the Conference itself in 1976-1977. The CIEC's early preoccupation with procedural issues provided participants with useful contacts and preliminary encounters with the *substantive* questions, which were necessarily imbedded in procedural questions and thus partially obscured [See IEA/SPC/M(75)5 (1st Revision); IEA/IER(81)5]. Preliminary questions about the possible participation of the IEA and the nature of its participation would influence the role that energy issues would play in relation to linkages with other issues (the IEA sought an invitation to the Conference as an observer and participated in that capacity on its own behalf, but not as the representative of Members). Even the place and name of the Conference had substantive implications for the participants. The Conference could not easily be held in either an OPEC or an IEA country, but France was suitable because it did not belong to either group (only in 1992 would France join the IEA). France had also taken the diplomatic initiative to hold the Conference, enjoyed constructive relations with countries in both groups, and could provide the necessary conference and communication facilities. While the IEA might have preferred a relatively narrow Conference title along the lines of "Energy Conference", the title as adopted revealed some of the impending issue links with developing countries. The title, "Conference on International Economic Co-operation", was a broad formulation indeed. The agenda of the Preparatory Meetings and the Conference itself also contained policy questions. The IEA initially sought to limit the agenda to oil questions, but

this did not prove possible in the face of the developing country issues which were also pressed on the Conference, which then became less of an energy conference and more of a North-South conference, with the industrial countries seen as the "North" and the developing countries as the "South".

Other procedural questions also attracted particular attention in view of their potential impact on policy. The question of whether the structure of the Conference should be plenary or broken up into topical Commissions was ostensibly procedural, but the creation of four Commissions (Energy, Raw Materials, Development, and Financial Affairs) actually facilitated the serious discussion of energy by separating it at that level from some of the issues assigned to the three other Commissions. The choice of participants had obvious substantive consequences in the sense that the principal issues were fairly represented, for the overall balance of the various issues considered, and for the general atmosphere of the Conference. In the end there were twenty-seven members of the Conference, with seven consumer countries represented directly (all were IEA Members) plus the European Economic Commission (EEC), and with the remaining nineteen being developing countries. Eleven observers also attended, including the IEA, OPEC, the OECD and a number of United Nations agencies. The question of Chairmanships also could not be excluded from consideration among the procedural questions with important substantive ramifications. Despite early suggestions that France as the host might chair the Conference in a "technical" sense, leaving its national interests to be represented by the EEC, the "Co-Chairmanship" concept carried the day, when Allan J. MacEachen of Canada and Dr. Manuel Pérez Guerrero of Venezuela were selected to co-chair the Conference. In the same spirit, the Energy Commission was co-chaired by Stephen Bosworth of the United States Department of State (also Chairman of the IEA's Standing Group on Long-Term Co-operation) and by Dr. H.E. Abdul-Hadi Taher, Director and President of Petromin, the Saudi Arabian state oil company.

Rather than a single conference, the IEA sought an early Conference meeting in 1975, to be followed by continuing meetings thereafter. Yet the *preparations* alone eventually took almost a full year, from 1 March 1975, when the invitation was made, to late February 1976 when the Energy Commission was organized and ready to begin substantive work. The *Conference* discussions then continued over fifteen additional months to early June 1977, when the Conference Report was completed at the end of the process. There was no provision for a Conference follow-on devoted specifically to oil producer-consumer dialogue-type issues.

While such procedural-substantive issues were under consideration in 1975, IEA Ministers met to consider the policy objectives of the Agency. In

May 1975, Ministers "reaffirmed their commitment to work for the development of a co-operative multilateral relationship among oil producing and oil consuming countries" [IEA document PRESS/A(75)20, paragraph 2]. Addressing the situation of developing countries, which would preoccupy the IEA's non-Member relations functions throughout the CIEC and for many years after, Ministers agreed that "For its part, the Agency will do all within its competence to work for the solution of the problems of the developing countries, so far as they are concerned with energy" [Paragraph 8]. Speaking more generally on their view of the then forthcoming Conference,

> Ministers declared themselves ready to pursue discussions at any time and in any manner found mutually convenient, and reaffirmed their common willingness to continue the dialogue and to encourage initiatives directed towards further progress.

This statement was made after the first CIEC Preparatory Meeting in April 1975 in which insufficient progress had been made to launch the Conference. Therefore the Ministers also adopted practical measures to expedite the dialogue, in agreeing to continue bilateral contacts and agreeing to instruct their representatives in the Governing Board to address the issues "as a matter of urgency" and to "co-ordinate their efforts" in order for "formal deliberations" to be held "as soon as possible". Four more preliminary meetings were to be held before the Conference Energy Commission entered the analytical or substantive phase of its work, only to find insurmountable difficulties lying in the road ahead. Altogether, eighteen CIEC formal meetings relevant to energy (mostly Energy Commission meetings, and most lasting several days or more) took place over the period from April 1975 to June 1977, when the Conference ended.

The composition of the Commissions foreshadowed the difficulties to come. Each of the four Commissions was composed of ten developing countries and five industrial countries. The Energy Commission was composed of Algeria, Brazil, Canada, Egypt, EEC, India, Iran, Iraq, Jamaica, Japan, Saudi Arabia, Switzerland, United States, Venezuela, and Zaire. As noted above this Commission was co-chaired by representatives of Saudi Arabia and the United States. Many major energy issues arose during the Conference, most of which ultimately proved to be intractable, as will be seen below in the summary of the agreements reached in the CIEC and the issues on which agreement could not be reached. The Commission's work programme and agenda presented difficulty not only in the preparation of the Conference, but also throughout the period of the Commission's substantive

work. The participants' views diverged sharply at various phases of the dialogue, "with regard to the extent to which, and the way in which, the energy problem should be addressed as well as [in] conceptual differences of the *linkage between energy and other international economic issues*" [See IEA/IER(81)5, page 4]. Other major energy issues on which participants disagreed included the supply of oil (responsibility for adequate and stable supply), the price of oil (including indexation and purchasing power), the continuation of consultation after the CIEC, the financial assets of oil exporting developing countries, and the needs of the energy deficient developing countries.

As the substantive work progressed in the Commission, the participants did not achieve notable success in narrowing the scope of disagreement on the key issues. Close co-ordination of views in both groups was maintained. For the industrial countries this was carried out on a regular basis in the IEA; and for the OPEC and the oil importing developing countries, views were co-ordinated in separate caucuses. Early in 1976 the IEA presented to the Commission a document entitled "Statistical Data and Projects, World Energy Consumption and Supply", and other participants submitted documents on a range of subjects. Both groups soon agreed that the "era of oil is transitional and a switch to other sources of energy will have to be made", but they could not agree on the timing of this switch or on the corresponding structural changes. Price issues, as expected, attracted special attention. Indexation was promoted by the developing countries, but within a broader framework of commodity prices, so the price issue was also examined in the Raw Materials Commission. Both the United States and the EEC acknowledged that protection of the producer countries' purchasing power was a legitimate concern, yet the industrial countries rejected the indexation of prices as a solution. While the industrial countries sought an uninterrupted supply of energy, the producer countries stated that they would talk about supply only in "commercial" terms. Early meetings did take up the United States' proposal for an International Energy Institute (IEI) to organize work on developing country problems and considered the special problems of the energy deficient developing countries as well. At the close of the first phase of the Conference in July 1976, the participants recognized that the analytical work had made a contribution to an understanding of the problems, but "some disappointment was expressed at the lack of concrete results" [IEA/IER(81)5, p. 10].

The second phase, beginning immediately thereafter, was to be "action oriented". The participants produced a number of clarifying proposal papers which dealt with the major issues, supported with additional technical

analysis. Subjects included supply, prices, co-operation, the International Energy Institute, research and development, and "action oriented consultations" to be conducted on a continuing basis after the close of the Conference. While some progress was made on issues which had been essentially agreed upon earlier, the main controversial issues remained unsettled. By November 1976 there were signs that arguments were simply being repeated and that the Commission was unable to make progress.

The concluding phase of the Conference occurred in April and May 1977, when intense discussions continued and proposals were formulated for agreements, decisions, commitments, and recommendations to be taken up in the Commissions and eventually by the closing Ministerial Conference. In the end, despite a few points of agreement, the areas of disagreement continued to predominate. After further intense discussions in the Final Ministerial Conference on 30 May - 2 June 1977, the CIEC Ministers adopted the Report of the Conference, in which they recognized that the issues in each of the areas examined by the Conference were closely interrelated, and they *agreed* on a number of points on energy, stated as follows:

1. Conclusion and recommendation on availability and supply in a commercial sense, except for purchasing power constraints.
2. Recognition of depletable nature of oil and gas. Transition from an oil based energy mix to more permanent and renewable sources of energy.
3. Conservation and increased efficiency of energy utilization.
4. Need to develop all forms of energy.
5. General conclusions and recommendations for national action and international co-operation in the energy field [See p. 22].

One of the recommendations referred to in item 5 above concerned energy R & D co-operation, on which the IEA had made suggestions in the course of the Conference on the Agency's openness to greater participation of the developing countries in IEA programmes and projects [See Chapter V, Section C-5 above].

Though the participants found some points of agreement, they *disagreed* on the other issues which were, of course, among the most important ones to them:

1. Price of energy and purchasing power of energy export earnings.

2. Accumulated revenues from oil exports.
3. Financial assistance to bridge external payments problems of oil importing countries or oil importing developing countries.
4. Recommendations on resources within the Law of the Sea Conference.
5. Continuing consultations on energy [See p. 23].

In addition, the participants were not able to agree on questions concerning the financial assets of oil exporting developing countries.

Overall the "participants considered that their intensive discussions have contributed to a broader understanding of the international economic situation and have been useful to all participants"[IEA/IER(81)5, p. 23]. They agreed to transmit the results of the Conference to the United Nations, where the dialogue would be continued between developed and developing countries. Finally, the participants agreed to carry out "in a timely and effective manner the measures for international co-operation agreed to" in the Conference and invited the countries which did not participate in the Conference to join in this co-operative effort. The CIEC closed on that note, with a greater sense of disappointment than achievement.

The second regular meeting of IEA Ministers convened a few months after the close of the Conference, providing them with an immediate opportunity to assess the CIEC [See IEA/GB(77)48(2nd Revision), paragraphs 13-17]. There was little occasion for rejoicing about the Conference, but taking a positive view of the outcome, Ministers

> . . . expressed their view that the Conference had helped oil producing and consuming countries to improve their understanding of the world energy supply and demand situation and of their respective responsibilities for managing the transition from oil to more plentiful and renewable energy resources.
>
> Ministers expressed their conviction that problems of energy supply and demand are among the important issues which will have to be resolved in order to assure an improving world economy, and that international co-operation has a considerable role to play in this.
>
> Ministers reaffirmed the objective of IEA Member countries to make a positive and constructive contribution to such

> international energy co-operation. They stressed their preparedness to intensify effective co-operation with developing countries in ways which are suitable to all countries concerned.

A hint of constructive disappointment may be seen in this Ministerial statement. The Conference failed on the essential points, an outcome not mentioned at all in the Communiqué. In the Conference process, the participants did deepen their understanding of the issues and the various positions and views, which was inevitable. Although IEA Members would continue their spirit of international co-operation with others on energy, notable promise could be seen clearly only with respect to the developing countries. Co-operation with the developing countries would have to take place, not in a specialized and efficacious energy forum, but in the United Nations where the industrial countries, as a minority, would find it difficult to achieve progress in dealing with their concerns, and where a main interest of the majority of U.N. Member States at that time was the establishment of the New International Economic Order promoted by the developing countries.

Throughout most of the 1980s, IEA Members continued to speak of a resumption of the dialogue with the oil producers, but without affirmative results. Successive IEA Ministerial meetings referred generally to the importance of a common approach of producing and consuming countries. These statements of continuing policy furthering dialogue were softened as the years passed; eventually they disappeared entirely from the IEA Ministerial Communiqués. The IEA's relations with oil producers on the major issues thus fell away from consideration in a *multilateral* forum, and all the parties returned to the process of essentially *bilateral* contacts between individual producer and consumer countries. IEA Executive Director Ulf Lantzke summarized this situation in 1984 at the time of his retirement, looking back over his years of IEA responsibilities: "The one area where the IEA has made little progress during the last 10 years is in its relations with OPEC" [AHGIER, Room Document No. 2, 26 March 1984].

That characterization did not, however, prove to be altogether accurate for the *second* ten years of the Agency's history. In 1991-1992, organized contacts between producers and consumers were resumed at both the political and technical levels, as discussed in Section E below. In the meantime the Agency's focus on non-Member relations shifted by necessity in the aftermath of the CIEC to the problems of the developing countries, which is the subject of the next Section.

C. Policies and Actions Concerning Developing Countries

The Agency has always been responsive to the particular energy needs of the developing countries, especially of those which have been characterized as "energy deficient developing countries", sometimes abbreviated as EDDCs in CIEC documents. If the industrial countries suffered economically in consequence of the 1973-1974 crisis oil supply disruptions, supply instability, and price increases, the developing countries suffered as much or more so, and their problems were not ignored when the founders of the Agency were developing the new energy policies and expectations of the industrial countries. Both the Washington Energy Conference and the I.E.P. Agreement which established the IEA referred specifically to the developing countries in the context of future multilateral relations with the oil producers and "other consumers" [See Section A above], and the Agency's preparations for the CIEC took these elements fully into account. In the CIEC's 1977 final Report, the Conference agreed that the ongoing dialogue between developed and developing countries should continue to be actively pursued in the United Nations system and in other appropriate bodies, thereby shifting the issues institutionally into a forum where the developing countries enjoyed significant advantages. In the U.N. General Assembly, developing countries held a substantial majority of the voting power and were in the process of attempting to establish a New International Economic Order (NIEO) based on the Charter of Economic Rights and Duties of States, which had been adopted in 1974 by the General Assembly with massive developing country support despite the opposition of major industrial countries. After their CIEC experiences, developing countries could expect to find in the U.N. greater opportunities to advance their interests in

- The financing of exploration and development of their indigenous energy resources.
- Access to and transfer of energy related technology on concessional terms.
- Financial aid to help them bridge their oil-induced balance of payments deficits.

However, there was a risk that in the U.N. system energy issues would be joined with the broader range of developing country demands and thus would fail to receive the attention desired by the developing countries and producer countries alike. For the consumer countries this outcome could

reduce the effectiveness of efforts to assist the developing countries. Yet at that stage there was no viable alternative to the United Nations forum, and developing country energy policy action became lodged in the U.N., while the IEA continued to act within its own institutional framework as opportunities were presented.

Despite the potential difficulties brought by these 1977 institutional changes, the IEA maintained its strong support for helping to meet developing country energy needs and concerns. Shortly after the close of the CIEC, IEA Ministers "stressed their preparedness to intensify effective co-operation with developing countries in ways which are suitable to all countries concerned" [IEA/GB(77)48(2nd Revision), paragraph 15]. Ministers made a searching inquiry into various areas of co-operation with developing countries, noting that better systems of regular exchange of information on world energy demand and supply, of co-operation in development of their various energy sources, and of co-operation in energy R & D might prove suitable for further examination [See paragraph 16]. On a broader basis,

> Ministers agreed that IEA Member countries would keep under review developments in the field of energy with a view to identifying opportunities for co-operation with developing countries, (both bilaterally and within the framework of the United Nations and other international organisations) [Paragraph 17].

An important practical step was to prepare an *inventory on aid* given by IEA countries to developing countries in the field of renewable energy, which the Agency's Ad Hoc Group/CNMC did in 1978. The Secretariat expanded its contacts with officials of developing countries to discuss energy problems and issues of common interest, and the Agency participated in a growing number of non-OECD intergovernmental meetings on energy in 1978 and later years. In December 1978 the IEA hosted in Paris a Workshop on Energy Data of Developing Countries to examine the collection, reporting, and analysis of energy data of the developing countries, and to improve energy forecasts and policy analysis. Over thirty energy experts from fifteen developing countries, international organizations, and OECD countries participated in the Workshop. The IEA published and widely distributed the proceedings of the Workshop together with comprehensive energy statistics and energy balances for sixteen developing countries. In 1980 the IEA joined with the Commission of the European Communities and

the U.N. Economic and Social Commission for Asia and the Pacific (ESCAP) to organize a second energy data workshop, this time on the subject of data on non-commercial energy sources.

In May 1977 IEA Ministers reaffirmed their objective of making "a positive and constructive contribution" to international energy co-operation, and in successive Ministerials they made similar statements of this policy priority for developing countries. They also agreed to continue their ongoing IEA activities involving developing countries, "including informal contacts with a variety of developing countries and international organisations, IEA workshops and R and D projects, and close attention to the United Nations Conference on New and Renewable Energy Sources" [See IEA/GB(79)35, paragraph 17]. In December 1979

> Ministers underlined their concern and recognition of the fact that development policies might be compromised if developing countries do not have sufficient energy resources at *reasonable prices* and stressed the need for energy specific action to help developing countries in meeting their energy requirements [IEA/GB(80)5, p. 2; emphasis added].

In the years that followed, the IEA participated in a number of U.N. sponsored conferences and other activities designed to assist the developing countries. Work on renewable energy sources was highlighted during 1978-1981 as part of the energy issues considered in the U.N. Global Negotiations. Recognizing the need for greater co-ordination of the industrial countries' efforts to assist developing countries with renewable energy sources, in 1978 the OECD Council established a Working Party on this subject. The Working Party's Report, known as the McPhail Report, reviewed the state of development of renewable technologies and opportunities for co-operation in this field, preparing in this way the work of the Nairobi Conference on New and Renewable Sources of Energy in 1981 which adopted many of the priorities identified in the McPhail Report [See IEA/IER(82)1].

In 1981 IEA Members continued to exchange views and explore possible lines of action concerning energy issues of interest to the developing countries, in particular in connection with the Nairobi Conference and related meetings in which the IEA participated. The Secretariat followed events in this broadening spectrum, including the work of the Brandt Commission and the Cancún Summit and reported on energy aspects of the conferences and other activities to the Ad Hoc Group/CNMC and the Governing Board as appropriate. The Agency submitted to the Nairobi Conference a document on

the R & D co-operation of IEA Members in the field of new and renewable sources of energy, as well as on the possibilities for co-operation with non-Member countries and in particular with developing countries. The Nairobi Conference situated new and renewable energy sources in the "global energy context" with emphasis on developing countries, but dealt with these energy sources separately from other global issues [See IEA/IER(82)1]. Restating the need for a transition away from hydrocarbon energy, the Conference adopted the "Nairobi Programme of Action" which dealt specifically with new and renewable energy sources at all levels, but recognized the importance of work at the national level. The Programme identified the following areas for priority action:

- Energy assessment and planning (calling for international co-operation to be directed to the assistance of national efforts to assess needs and technologies and to develop energy programs).
- Research, development, and demonstration (stating the need for focal points to develop and implement a systematic approach).
- Information flows, education and training.

In February 1982 the Secretariat noted in a circular letter to IEA Member Heads of Delegation that although the Nairobi Conference and Cancún Summit "were conducive to creating a better *political climate* for addressing issues pertaining to international energy co-operation",

> . . . it is still difficult to see that *practical results* are flowing from these conferences, or indeed from earlier international discussions of similar topics [IEA/DED/82.29; emphasis added].

The circular letter called for a comprehensive review of this subject in the Ad Hoc Group/CNMC and expressed the hope that progress might be made towards some degree of consensus on (1) agreement that the industrial countries should "help alleviate the energy problems of the developing countries", (2) the need for a "high degree of international co-ordination (at both multilateral and bilateral levels) in order to obtain practical and effective results", (3) the direction of the IEA's work in this area, and (4) ways for Members to contribute to "improved practical results in energy through other international organizations working in this area".

This comprehensive review took place as proposed, and the issues raised in the circular letter were addressed by IEA Ministers in their meeting of May 1982, in a major statement on developing country questions:

> Because of the *global nature of energy questions*, Ministers agreed on the importance of all countries recognising the nature of energy as a decisive element for progress in the world economy and, in particular, for the development of the poorer countries. They agreed that the Programme of Action adopted by the Nairobi Conference on New and Renewable Sources of Energy reflects a pragmatic approach to that end, and that the IEA and its Member countries will make a positive and constructive contribution to its sustained and effective implementation [IEA/GB(82)54(Final), paragraph 14].

The Ministers went on to emphasize the need for a co-ordinated effort to develop the indigenous resources of developing countries and recognized "that their expeditious development will require finance, expertise and technology". While external financial support had risen significantly, "continued weight will be given to energy in both multilateral and national aid programmes". The Ministers "agreed upon the need for better understanding of constraints affecting energy investment in developing countries, and for co-operative participation by *enterprises* with significant financial and technological resources as well as by *governments* and *international organisations*" [Emphasis added].

In the Nairobi Conference follow-up meeting held in Rome in June 1982, the IEA Secretariat offered stepped-up co-operation with developing countries in the fields of energy data, education, and training (workshops, seminars, and traineeships in the energy area), as well as collaboration in energy RD & D. These concrete contributions were made by IEA Members after the Ad Hoc Group/CNMC carried out the comprehensive review referred to in the Secretariat's circular letter of February 1982 on this subject.

In later years, IEA Ministers continued generally to support the energy objectives of the developing countries. In 1983 they emphasized that energy "is particularly important for developing countries" [IEA/GB(83)36(Final), p. 3] and referred again to indigenous energy resources, stating that

> Development of the indigenous energy resources, including new and renewable energy, of the developing countries could in its turn make an important contribution to improving the world energy situation [IEA/GB(83)36(Final), Annex I, p. 5].

Four years later the increased production of hydrocarbons in developing countries remained a major Ministerial concern. In their most specific statement on hydrocarbon investment, Ministers declared in their Communiqué that

> IEA countries will give increased attention to sound investments in exploration and development activities of developing countries with significant potential for future hydrocarbon supply. Ministers will support activities of international organisations to help improve investment regimes or to help finance investment in energy sectors of developing countries, as well as bilateral development aid projects directed towards energy [IEA/GB(87)33, Annex, paragraph 35].

In the fashion of earlier policy statements, this passage provides essential policy support in general terms without promising direct and tangible contributions from the IEA. The IEA was not intended to be, and has not evolved into, a development assistance distribution agency. The IEA does not dispose of the infrastructure or resources needed to dispense development assistance, which the Agency leaves to the United Nations institutions and to other organizations as well as to Members' bilateral programmes. What the IEA could envisage was to share experience, to lend *political* support in this sector, and to promote and develop such *practical* activities as energy analyses and assessments, energy data availability, energy policy advice, relevant education and training, and developing country participation in the IEA's energy R & D projects in appropriate cases.

These activities continued throughout this period and to the present day. In 1983 the IEA, together with the Latin American Energy Organization, the Government of Peru, and the European Communities, organized in Lima a Seminar on the "Rational Use of Energy in Industry", and the IEA expanded and up-dated its energy data base to include data on forty-five developing countries, thus ensuring the production of more accurate and useful energy statistics. In 1984 at St-Germain-en-Laye, near Paris, the Agency conducted a "Consultative Meeting on Hydrocarbon Investment in Developing Countries" which was attended by high-level participants from developing countries, financial institutions, and the oil industry, and the views expressed on this occasion were later integrated into IEA work in this field. In 1987 the IEA conducted a third developing country energy data Workshop (following the Paris Workshops in 1978 and in 1980). The IEA organized this third Workshop in Tokyo with the Government of Japan and the Asian

Development Bank. The participants consisted of a number of IEA Members and representatives from twelve developing countries. In 1991 the Governing Board took further action to welcome developing country (and other non-Member country) "Associate" participation in the Agency's energy R & D programmes and projects, and since then a number of developing countries have already joined these IEA activities [See Chapter V, Section C-5 above].

To the present day the Agency has also continued to co-operate with developing countries and to monitor and report on developments in these countries, particularly through bilateral contacts and the activities of multilateral and regional organizations, energy conferences, and workshops. As the IEA's non-Member country activities enlarged significantly during the late 1980s and early 1990s, increasing attention was devoted to Central and Eastern Europe, Latin America, the Asia-Pacific region, and Africa, and the Agency's global perspective was confirmed. In recent years, the Agency's policies and actions with respect to developing countries have evolved in that global context, which is taken up in the Sections to follow.

D. Globalisation of IEA Policies and Actions

The worldwide energy perspectives of the IEA from the outset in 1974 are apparent from the early IEA history discussion in Section A above, which shows that the broad international aspects of the IEA's energy policies and actions were not only anticipated, but also sanctioned and regularly acted upon. In the mid-1970s the IEA placed its main non-Member country emphasis on the dialogue with oil producing countries [See Section B above], and then from 1978 to the mid-1980s it concentrated more on the developing countries, as discussed in Section C above. Since that time, the Agency has broadened again its focus to *increase* its already established interest in the global dimensions of energy. Although this interest has extended to the oil producing countries and developing countries as before, the globalisation of IEA policy has brought greater attention to energy questions in Central and Eastern Europe, Latin America, the Asia-Pacific region, and Africa. The signs of this shift in emphasis began appearing as early as 1981 when the Ad Hoc Group/CNMC took up the question of East-West energy relations then under consideration in the United Nations Economic Commission for Europe, and in 1982 when IEA Ministers first spoke of "the *global* nature of energy questions" [IEA/GB(82)54(Final), paragraph 14; emphasis added]. More

systematic work in this area began with the dramatic political and economic changes in Central and Eastern Europe in the late 1980s, and this globalisation trend has continued to the present day.

IEA Ministers carried out a major assessment of IEA non-Member country policy in 1993, stating in their Communiqué some of the reasons for the global perspective:

> The IEA's pursuit of energy security has been enlarged, now encompassing more intensive contacts with non-Member countries to assist them in developing energy strategies and adopting energy policies that will contribute to their development and enhance global energy security. *There are several reasons for this:*
>
> - Non-Member countries are playing and will play an increasingly important role in *global energy demand,* as energy demand growth there continues to outpace that in IEA countries.
> - Consequently, non-Member regions will also be of greater significance in terms of global energy-related *environmental problems.*
> - In a number of key areas, *energy supplies* increasingly come from non-Member countries, and Member countries' energy logistical systems are more tied to them.
> - A growing number of non-Member countries are reaching a stage of transition or development that is drawing them closer to the OECD world and *prompting collaboration between them and the IEA* [IEA/GB(93)41, paragraph 26; emphasis added].

This overall assessment, addressing the recent past as well as the future, strongly reflects IEA policy statements and actions of the period from the mid-1980s on. In 1985 IEA Ministers spoke of energy developments being of "global" importance and referred to "sound energy policy actions both inside and outside IEA countries" [IEA/GB(85)46, page 9]; and they spoke again to like effect in 1987 [IEA/GB(87)33, Annex, paragraph 34]. IEA actions during the corresponding period reflected these policy broadening declarations. In 1984 the IEA kept under review the supply and demand situation of the Centrally Planned Economies, especially the Soviet Union, and gave specific attention to questions of East-West trade and to energy developments in the People's Republic of China. In the following year, the

IEA analyzed energy developments in the Asia-Pacific region, and on natural gas issues in Eastern Europe and the Soviet Union, while work continued on East-West trade, and an analysis of OPEC financial questions and future supply potential was carried out by experts in the Secretariat. The IEA enlarged this work in 1986 to include the future impact of lower oil prices on the energy needs of non-OECD countries, and energy developments in the Middle East, North Africa, and Latin America, and in 1987 this work was further broadened to include sub-Sahara Africa, China, the Soviet Union, and the Arabian Peninsula/Persian Gulf area. In 1988 the IEA continued these activities and extended them further to include South Asia.

When IEA Ministers met in 1989, the scope of IEA work had already become truly "global", but the nature of its global focus evolved as the post-World War II status quo in Central and Eastern Europe gave way to movement towards democratic institutions and to the transition to market oriented economies. Ministers noted the stronger impact of non-Member demand on the world energy situation and upon the ability of IEA countries to pursue effectively their energy policies, "especially those relating to greater energy efficiency and to energy and the environment". Ministers "welcomed the significant progress which the IEA has made in providing more information and better understanding about energy developments in non-Member countries (including a more comprehensive statistical data base)". Ministers agreed that the Agency's actions in this sector should be continued, that contacts with non-Members on energy data, energy demand and efficiency, and energy and the environment should be established and maintained, and that the IEA should "help keep non-Member countries informed as to the content and purposes of the IEA and its policies" [IEA/GB(89)36, Annex, paragraph 5].

The changing political situation in Poland sharpened the IEA's focus on Central and Eastern Europe, both for energy policy and for environmental considerations. In 1989 Poland was moving towards its first election with contesting parties since 1949, and the IEA took the first of many initiatives in response to movements in the region. Acting on an offer by Denmark to host a seminar on the energy sector of Poland, the Governing Board agreed that the IEA and Denmark should serve as its co-sponsors. The seminar, on the subject of "Energy in East and West: The Polish Case", took place in Copenhagen in April 1990. The IEA then carried out a detailed survey of the Polish energy sector, the first IEA energy survey of a non-Member country. The results of this work were published the following year under the title *Energy Policies - Poland 1990 Survey*. Demonstrating the growing collaboration of the Agency and the Polish authorities, the survey

assessed Poland's energy situation and its energy policies and industries, and looked carefully at energy efficiency, conservation, and environmental questions in Poland. This IEA initiative also offered policy recommendations and indications of areas where the IEA might be of assistance to Poland.

Studies of national and regional energy policies continued in other countries and regions. The IEA prepared a report on the energy sector in the USSR as part of the joint IMF, IBRD, OECD, and EBRD study on "The Economy of the USSR" initiated by the July 1990 Houston G-7 Summit. The IEA also analyzed the rapid rates of growth in energy demand occurring in non-OECD countries, particularly the Dynamic Asian Economies (DAEs): energy demand had already increased to the point where over 50 per cent of it was arising in *non-OECD countries*. In consequence, the IEA stepped up its worldwide energy monitoring and maintained close co-operation with regional international organizations.

In 1991 when IEA Ministers next met, IEA policy declarations on non-Member policy were further strengthened:

> *Non-Member Countries:* Ministers welcomed the growing *convergence* of the energy interests of OECD and non-OECD countries. With half of the world's energy consumption now occurring outside the OECD area, Ministers stressed the need for the IEA to develop expanded relations with these countries. Assisting non-OECD countries in the development, and where necessary, the restructuring of their energy systems would be mutually beneficial. Ministers recognised the importance of sound relations with oil producing countries and agreed that contacts should be further developed to promote communication and understanding among oil market participants [IEA/GB(91)42/REV2, paragraph 3; emphasis added].

IEA Ministers confirmed their 1989 policies as described above and underscored the active role the Agency should play in its relations with non-Member countries, including "the need for the IEA to provide advice to these countries on the development of sound energy policies and strategies, based upon a market-oriented approach" [IEA/GB(91)42/REV2, Section V; emphasis added]. More specifically,

> In the face of growing environmental difficulties and the challenge of global climate change, they noted that these countries could benefit from the *experience* of IEA countries in

integrating energy and environmental policies. Ministers also recognised the vulnerability of these countries to oil supply disruptions and price variations, and therefore urged the IEA to undertake work on how *market mechanisms* might be used to help them cope with such contingencies [Emphasis added].

IEA Ministers then declared more specific Agency policies (in addition to the general policies quoted above) on a broad range of non-Member countries, regions, and functions, which may be summarized as follows:

- *Central and Eastern Europe:* The Agency should have a comprehensive policy, including support for energy surveys and the countries' participation in appropriate IEA activities, for assisting in liberalization and reform.
- *USSR:* As the USSR progresses in its fundamental economic reforms, the IEA should extend a wider range of assistance, along the lines identified in the IEA's 1990 report on the energy sector in the USSR. The IEA should provide more detailed information, policy analysis, and recommendations on energy in the USSR. Special attention should be given to the oil and gas sectors and to the Soviet nuclear programme.
- *European Energy Charter:* Expressing interest in the objectives of the Charter (signed in December 1991; see Chapter IV, Section D-7 above), Ministers stated that the development of the Charter and protocols should be non-discriminatory. The European Community, the IEA, and other international organizations should co-operate closely on it.
- *Asia:* Ministers expressed confidence that the continued high rate of growth of the Dynamic Asian Economies would result in wider reliance on energy efficiency and fuel substitution technologies, and they requested the IEA to expand its contacts with the DAEs, "as they move closer to the OECD world", and with the large Asian producing and consuming countries likely to have an influence on the global economy and environment.
- *Latin America:* Ministers stressed that such major producers and emerging industrial consumers as Mexico, Venezuela, Brazil, and Argentina would be increasingly influential in world energy markets, and viewed the interplay of energy and environmental concerns in the region as "particularly significant".
- *Africa:* While energy changes in Africa are more moderate than those in Asia and Latin America, Ministers saw clear evidence of the potential for change through commercial energy inputs in the continent, and as

environmental constraints interact with the traditional use of biomass energy. Ministers also noted the supply-side implications of contributions by Nigeria and the Maghreb to energy markets.

- *Oil Producing Countries:* Ministers confirmed their recognition of the importance of sound relations with oil producing countries. They agreed that contacts among all market participants should be further developed "to promote communication and understanding" and that this would benefit market transparency, and efficiency. Since the market is the best allocator of resources, *"oil production volumes and price determination should be left to market forces"* [Emphasis added]. The post-Gulf War period provided an opportunity for constructive discussions which "should be informal and as broadly based as possible". (This initiative was an important element in the lead-up to the meetings of producer and consumer countries, which inaugurated a new and different phase of the *"dialogue"* beginning in 1991, discussed in Section E below).

During the period between the 1991 and the next Ministerial Governing Board meeting in mid-1993, the Agency was actively engaged in pursuing the foregoing policies and objectives in a wide spectrum and ever-growing number of specific activities which can be referred to here only briefly. The IEA responded rapidly to the serious energy problems inherited in the former Centrally Planned Economies. Calls for IEA assistance in these countries were made by the conference on "Co-ordination of Assistance for the New Independent States" held in Washington in January 1992 and by the G-7 Economic Summit countries' meeting in Munich in July 1992 to provide expert advice on potential alternatives to unsafe nuclear reactors of Soviet design.

The IEA expanded bilateral and multilateral contacts in all of the major regions of the world. Studies of national energy prospects in non-OECD regions were a major IEA function, particularly in Central and Eastern European countries. The 1990 survey of Poland was followed by detailed energy policy surveys of Hungary (1991) and the Czech and Slovak Federal Republic (1992). The IEA also conducted a survey of Korea which appeared in 1992, and a 1993 survey of Romania which was published in 1993. In addition, the IEA provided *ad hoc* advice on energy questions to non-Members, to the Czech and Slovak Republic, for example, on energy efficiency and emergency oil supply arrangements, and it developed an energy study of the three Baltic Republics. Jointly with the World Bank, the IEA carried out a study of the refineries of Central and Eastern Europe; the

Agency also continued to monitor and analyze the far-reaching changes occurring in the Former Soviet Union and it prepared a seminar on oil legislation. In 1991 the Secretariat organized a seminar in Berlin on "Power Generation Management and Structures in East and West" and one in Vienna on "East-West Energy Trade"; in 1992 seminars were organized in Prague on "Energy and the Environment in European Economies in Transition" and in Moscow on "Natural Resource Management: The Crude Oil Sector".

The IEA participated in the "Co-ordinating Conference on Assistance to the New Independent States", convened in Washington in January 1992. The Conference established an Energy Working Group chaired by Venezuela and The Netherlands with the following objectives: (a) to ascertain the current situation of the New Independent States and their problems, (b) to select humanitarian and short-term activities in support of market-oriented reforms in the energy sector in order to alleviate these problems, and (c) to ensure implementation of as many of these activities as possible [See IEA/GB(92)49; the Working Group's final report is contained in IEA/GB(92)28ADD]. The IEA hosted most of this Group's meetings in Paris, provided secretariat services, and organized missions to the New Independent States to explore their assistance requirements in the energy field [See IEA/GB(92)53].

During this period the IEA also provided energy expertise to the World Bank in the areas of electricity and statistics, and participated with the Bank in missions to Bulgaria and Romania. Since the IEA's own statistical and reporting work had to be enlarged to meet the growing demand for energy information in the non-Member areas, the IEA's monthly *Oil Market Report* was expanded in 1991 to include more specific information on the former Centrally Planned Economies [See Chapter VI, Section D above], and the Agency stepped up its publication programme on non-Member country subjects.

Throughout the 1991-1994 period, the IEA continued its active participation in negotiations on the European Energy Charter, which was signed in December 1991, and on the Energy Charter Treaty and its Protocol on Energy Efficiency and Related Environmental Aspects, which were opened for signature on 17 December 1994 in Lisbon. The Charter Treaty establishes legal commitments among the signatories (a number of IEA Member countries, Central and Eastern European countries and New Independent States) on such issues as energy trade, investment, and dispute settlement [See Chapter IV, Section D-7 above]. The Treaty also establishes an organizational process for extending the range of commitments, and for deepening existing commitments in areas such as nuclear safety and hydrocarbons, and for other purposes.

IEA activities in Asia and other regions continued as in earlier years but with greater breadth and depth. The Agency's relations with Korea were advanced by the IEA's first energy survey of Korea, mentioned above, which was carried out at the request of the government of that country. The survey was conducted by a Secretariat team, which included a member from the OECD Nuclear Energy Agency to assist on nuclear matters. The team visited Korea to examine that country's energy situation and policies, in what constituted the first IEA review of an Asian non-Member country. Like other energy surveys by the IEA, the Korean survey developed policy recommendations adapted to the particular situation of the country. In this case, the recommendations concerned measures to enable Korea to reach its objectives in the energy security and environment sectors, and to reduce its high level of market intervention. This survey represented a significant step forward for Korea towards realizing its announced intention of joining the OECD and the IEA [See Section F below on recent membership questions]. In the early 1990s the IEA was also active in enlarging its contacts with other countries in the Asia-Pacific region and in Latin America. The Secretariat's visits to these regions contributed to expanding relations concerning statistical exchange, energy economic modelling, and technology information. In 1992 the IEA extended its bilateral contacts and multilateral relations by participating in meetings of regional organizations such as OLADE, and participating in major regional conferences, including the 3rd Jakarta International Energy Conference, the 6th Symposium on Pacific Energy Co-operation, and the APEC Energy Project Group. This extended participation of the IEA in bilateral and multilateral meetings has continued to the present day.

With the Ministerial policy decisions of 1989-1991 and the Agency's vastly increased implementing activities described above, the outlook of the IEA had become well globalised by 1993, when IEA Ministers gave still more policy guidance for the Agency in this sector, in effect confirming their earlier declarations and leading the IEA in the direction of further globalisation. This Ministerial meeting adopted the statement on the reasons for globalisation, quoted above. In addition, Ministers stated broadly that

> In its relations with non-Member countries, the IEA will continue to take a *balanced approach*, tailoring relations with individual non-Member countries to the prevailing circumstances and ensuring that such contacts further IEA energy security objectives [IEA/GB(93)41, paragraph 27; emphasis added].

This "balanced approach" meant that while the IEA would not become a universal international organization attempting to carrying out all of its functions worldwide, the Agency would seek to differentiate between groups of countries on a pragmatic basis to make the most effective use of its resources. Moreover, Ministers also mentioned the "multiplier effect" to be obtained by closer relations with such international organizations as the World Bank, EBRD, OLADE, and APEC, with which the Agency already had relations and operating experience in working together. Ministers asked the IEA to continue its analytical work in this sector and emphasized the importance of developing further bilateral contacts with non-Member countries.

In Central and Eastern Europe and the New Independent States, Ministers noted with concern the decline in Russian energy production, and they remarked that "Russia's oil and gas reserves are huge and could provide significant amounts of foreign exchange needed for critical imports and to finance the economic reform programme". Welcoming the considerable work already accomplished in the IEA, Ministers agreed on the need for close co-operation with countries in this region "to improve the operation of their nuclear facilities to the highest available standards of safety, and to contribute to the development of sustainable long-term energy solutions". The IEA was instructed to continue its co-operative activities "with a view to helping those countries successfully reform their energy sectors". The IEA is to increase its efforts to work with them on "developing safe and clean energy systems and . . . realising the enormous potential for energy savings and efficiency gains". Particular emphasis was placed on the need for Russia to establish "as quickly as possible the legal framework necessary to attract investment in its energy sector, particularly to reverse the decline in oil production". On a related subject, Ministers confirmed their earlier support for the European Energy Charter, welcomed the "IEA's substantial assistance to the Treaty negotiations", and supported "the IEA's active involvement in the ensuing Charter implementation". Confirming earlier statements with respect to the Asia-Pacific region, Ministers supported the co-operative relations developed with Korea and asked the IEA to devise practical ways to expand further its contacts with this region, including co-operative contacts with APEC. Ministers also welcomed increased IEA contacts in other regions and again asked the IEA to *intensify* its efforts in this sector. They spoke favourably on the subject of broader contacts, including the Energy Experts meetings which had brought together market participants from oil producers as well as consumers and others.

The year 1993 also witnessed the adoption of the "IEA Shared Goals" as a more permanent declaration of IEA Ministers' energy policies and objectives [On the adoption of this measure, see generally Chapter II, Section J above]. In the introduction to the IEA Shared Goals, Ministers stated the globalisation policy quite broadly:

> IEA countries recognise the significance of increasing global interdependence in energy. They therefore seek to promote the effective operation of international energy markets and encourage *dialogue* with all participants [See IEA/GB(93)41, Annex I; emphasis added].

In Goal 9, Ministers spoke more specifically:

> Co-operation among all energy market participants helps to improve information and understanding, and encourage the development of efficient, environmentally acceptable and flexible energy systems and markets worldwide. These are needed to help promote the investment, trade and confidence necessary to achieve global energy security and environmental objectives.

In 1993 and 1994 IEA activities with non-Member countries continued to expand to reflect the Ministerial declarations described above. Central and Eastern Europe again took the spotlight. In 1993 the IEA published the proceedings of the "International Conference on Natural Resource Management: Crude Oil Sector" (Moscow, 1992). The survey of Romania was published in 1993, following IEA "reconnaissance missions" and close consultations between Romanian officials and representatives of IEA Member countries in Paris. In Poland and the Czech Republic, IEA Secretariat members worked with energy officials on the follow-up to the energy surveys on these countries published respectively in 1991 and 1992, and on the development of national energy legislation. The second IEA survey of the Czech Republic's energy policies was published in 1994, and the second energy policy surveys of Poland and Hungary are being published in early 1995. As an outgrowth of the Washington Conference of 1992 mentioned above, the Agency participated in technical assistance arrangements, and provided back-up support to help co-ordinate energy assistance to the New Independent States. Co-ordinated country group meetings under the auspices of the World Bank were held for the purpose of matching offers with requests for technical assistance, and the IEA

participated in the discussions of assistance in the energy sector. Moreover, the IEA established the energy part of the OECD/IEA online Register of matched and unmatched technical assistance projects, as a service to recipients and to donors in the implementation of its policy of assistance to countries in this region.

By 1994 a number of these countries, which had not yet become Members of the OECD, sought membership in the IEA, and the Governing Board asked the Executive Director to begin discussions with them in parallel with their respective applications for membership in the OECD [See IEA/GB(94)25, Item 8]. This was an acceptable and workable procedure in view of the IEA rules limiting access to IEA membership to countries which are Members of the OECD [See Volume I, Chapter IV, Section A-2]. The non-Members of the OECD making this request to the IEA were Korea, the Czech Republic, Poland, Hungary, and the Slovak Republic.

The IEA commenced in 1994 a major survey of the Russian Federation which is expected to be completed and published in 1995. The preparations for the survey included an "IEA Workshop on the New Energy Strategy of Russia", hosted in Tokyo by the Government of Japan in October 1994. The Secretariat also carried out a number of research and analysis projects, including the Central and Eastern European and NIS Chapters of the IEA study on worldwide natural gas transportation, published in 1994 under the title *Natural Gas Transportation: Organisation and Regulation.* In the same year the IEA also published works on *Russian Energy Prices, Taxes and Costs,* and on *Electricity in European Economies in Transition.*

A major event in IEA co-operation with Russia occurred in Moscow on 6 July 1994, when representatives of the Russian Federation and the Agency signed the Joint Declaration of Co-operation in the Field of Energy, a unique framework declaration on the areas, forms, and modalities of their co-operation in the energy field [See IEA/GB(94)31; IEA/NMC(94)20]. In entering into the Declaration, the parties recognized the key role of the energy sector, the experience of the IEA, and

> the desire of the Russian side to create conditions for the development of the energy sector in the Russian Federation on a *market economy basis* . . . [and] to co-operate toward achieving both that goal and the objectives of the *European Energy Charter* [Emphasis added].

Energy conservation and efficiency topped the list of the areas of co-operation, followed by "rational and efficient production, extraction and

processing, transport, distribution and use of oil, gas, coal, electricity and other sources of energy". This list also contained information and statistics, energy R & D, and other energy areas to which the parties would agree. The *forms* of co-operation included the review and analysis of policies and issues, programmes and projects, joint seminars and conferences, information and data exchange, and others to which they would agree. The stated *modalities* of the parties' co-operation are agreements on proposals for concrete activities, reviews of the IEA's active and proposed energy R & D Implementing Agreements in order to facilitate Russian participation, periodic progress reviews, and participation of each in the activities of the other. Moreover, IEA Standing Groups and Committees would consider inviting Russian attendance at relevant meetings. The Declaration recognized that "in the increasingly globalised energy market, co-operation with other energy market participants can strengthen their bilateral co-operation, and that their bilateral contribution can benefit the functioning of the market". There was also reference to each party bearing its own costs of the co-operation, and to the extension by the Russian side of satisfactory privileges and immunities. It was agreed that these arrangements would continue for an initial period of one year and would be automatically renewed thereafter on a yearly basis until terminated on notice by either party to the other.

In the Asia-Pacific region, the IEA also further expanded its contacts and activities during this period. After some years of contact between the Agency and Korea, in May 1993 the Government of Korea expressed its intention to seek IEA membership in parallel with proceedings for membership in the OECD [See Section F below]. Though formal IEA membership proceedings were not to be commenced immediately, the Agency and Korea consulted on interim ways in which co-operation could be augmented between them while Korea was still a non-Member. One event was the IEA/Korea Conference on Demand-Side Management held in Seoul in November 1993; another was the direct participation by Korea as an Associate in a number of IEA energy R & D Implementing Agreements [See Chapter V, Section C-5]. The IEA carried out a second energy survey of Korea in 1994, taking up key issues of energy pricing, emergency preparedness and oil stocks, energy efficiency and conservation, and energy and the environment. The IEA also examined the structure, ownership, and regulation of the electricity and gas sectors in Korea. The IEA published this work in 1994 under the title *Energy Policies of the Republic of Korea - 1994 Survey*. Meanwhile, the Agency maintained bilateral contacts in the Asian area, initiated preliminary contacts with the Government of China,

and maintained relations with the Asia-Pacific Economic Co-operation (APEC), with a view to possible joint activities in the future, particularly with APEC.

The IEA also enlarged its energy co-operation and contacts in the Latin America region. In 1994, shortly before Mexico became a Member of the OECD, it formally sought membership in the IEA. In April 1994 the Secretary of Energy, Mines, and State Owned Industry of Mexico wrote to the Executive Director expressing the wish to enter into discussions with the Agency on this subject, and the Governing Board asked the Executive Director to examine the terms and conditions of membership with representatives of Mexico [IEA/GB(94)25, Item 8(b)]. These discussions began in mid-1994 and they were not yet been completed at the time of writing.

As part of its development of broader relations with Latin America, early in 1994 the IEA organized jointly with Mexico a "Conference on Energy Efficiency in Latin America" held in Cancún. The Agency was also represented at a growing number of conferences in Latin America, including the 28th Ministerial meeting of OLADE and the Energy Conference of Latin America and the Caribbean (ENERLAC 93) in 1993, and this IEA conference activity is expected to continue not only in Latin America, but also worldwide.

E. Producer and Consumer Relations: New Ministerial Conferences and IEA Meetings of Experts (Beginning in 1991)

As noted above in the description of IEA Ministerial actions in 1991, in the aftermath of the 1990-1991 Gulf crisis the IEA sensed an opportunity to resume constructive discussions with oil producers. Ministers expressed an early view that the discussions should be as informal and as broadly based as possible. This led to the establishment of a pattern of Ministerial or political level meetings of producers and consumers, convened by governments (and attended by the IEA) on the one hand, and expert meetings of the two groups convened by the IEA on the other hand. This pattern of meetings, begun in 1991, has continued through the time of writing at the close of 1994, and will doubtless continue in the near future pursuant to plans already being developed.

The first of these new meetings of oil producers and consumers was the French/Venezuelan "Seminar for Oil Producing and Consuming Countries" conducted at Ministerial level in Paris on 1-2 July 1991. This Seminar brought producers and consumers together for the first time since the disappointing CIEC dialogue meetings held in Paris in 1976-1977. Reflecting the attitudinal changes favouring the French initiative in 1991, the oil producer and consumer participants agreed in advance of the meeting that price management and production questions were to be avoided. "Indeed, participants agreed that the market itself was the best allocator of resources" [IEA/NMC(91)9, paragraphs 8 and 9; see IEA/GB(91)56, paragraph 23]. This Seminar was thus conducted in an atmosphere and under guidelines altogether different from those of the earlier CIEC meetings [See Section B on the early producer-consumer dialogue]. Following diplomatic considerations at the time, the IEA Secretariat was represented at the Paris Seminar by Ambassador G. Quincey Lumsden, Director of the IEA Office of Oil Market Developments and Non-Member Countries. The main topics of discussion included Oil Markets and Energy Policies, Industrial Co-operation, Futures Markets, and Energy and the Environment. In his statement to the Seminar, Ambassador Lumsden noted the "co-operative, relaxed and non-polemic atmosphere of this Conference arranged by our French and Venezuelan hosts which signals an end to those several confrontational aspects that have marked gatherings such as these in the past" [Intervention of Ambassador Lumsden, 2 July 1991, IEA archives]. He spoke specifically on the subject of "industrial co-operation", in outlining some of the specific elements this co-operation would necessarily involve, particularly in relation to conditions of competition.

The IEA also put forward at this time an initiative for a meeting of experts from energy importing and exporting countries on "energy developments and policies" under IEA auspices as soon as arrangements could be made. This meeting would cover, in addition to petroleum and the central role it plays, "the related roles of gas, coal, nuclear, hydro and unconventional energy sources, and their inter-relationship with our environmental objectives" [IEA/NMC(91)9, paragraph 9]. It would become the IEA's first *technical Experts Meeting* in the series of new dialogue meetings, and Norway also at this time expressed its willingness to host a workshop at *political level* between producers and consumers, thus continuing the work at that level. Each of these initiatives found favour among the Seminar participants, which led to the convening of two more meetings in a new and strengthened atmosphere of producer-consumer co-operation.

The IEA hosted the next meeting in this series. After the Governing Board approved the format and proposed agenda [IEA/GB(91)65, Item 4(d)], this meeting took place in Paris on 24-26 February 1992. This was the first of two meetings so far, under IEA auspices, of high-level technical experts from oil exporting and importing countries (the second took place in 1993, and a third is planned for 1995). The 1992 meeting was convened for expert technical exchanges on substantive issues *other than price and production targeting*, the two major issues on which agreement could not be reached - or even approached - at the CIEC. Over 200 technical experts from forty-four countries, eight international organizations, and eighteen energy and other companies attended, and IEA Executive Director Helga Steeg opened and closed the meeting. The organization of the meeting was sharply focused on business-like questions of energy, without being encumbered with the broader economic and political issues that had complicated and troubled the earlier CIEC.

The 1992 IEA meeting was organized in four sections: Energy Information Exchange, Energy Efficiency and Environment, Industrial Co-operation, and Market Mechanisms. On the subject of *information*, the following proposals and ideas emerged from the meeting: the IEA could act as an "information clearing house" for energy statistics; various groups could develop a statistical gathering system for the Republics of the Former Soviet Union; a new independent body, charged with worldwide data collection, could be created; and the IEA could make available the Agency's regular statistics to countries and institutions prepared in return to share their statistics. On *Industrial Co-operation*, there were proposals and ideas to reinforce efforts to bring non-Members into the IEA's energy R & D Implementing Agreements on projects, information sharing, and dissemination, and to develop a comparative survey and analysis of investment requirements in the energy sector over the next 10-15 years. For *Energy Efficiency and Environment*, the IEA was prepared to consider co-operation on specific data and analysis with interested parties; and the introduction of the IEA GREENTIE information system should be accelerated to assist non-Member countries. Finally, on *Market Mechanisms*, there were proposals and ideas to carry out a study of structural changes on oil demand, to examine "price volatility" elements, and to monitor key oil markets to determine whether they were subject to "any form of manipulation".

The informal structure of the meeting, without communiqué or other formal record, helped foster an atmosphere in which all participants could speak fully and freely. The meeting engendered many new and worthwhile personal contacts among the representatives of producer and consumer

countries and other participants. The widely appreciated utility of such meetings made a convincing case for continuing them [See "Report on the Energy Experts Meeting — 24th-26th February 1992", contained in IEA Committee on Non-Member Countries Room Document No. 1, 10 May 1993], and indeed a second IEA-hosted meeting of the experts took place in 1993, following the second political level meeting held in July 1992 at Bergen, Norway.

At the Bergen Ministerial Workshop of oil producers and consumers, the participants took up the subject of energy co-operation under a broad foreign policy and economic perspective. Like the Paris Seminar, the Bergen Workshop did not seek to bring about agreements or the establishment of new institutions. There was no official communiqué. In the keynote address, Prime Minister Gro Harlem Brundtland called for "a global energy policy inter-relationship". In addition to energy co-operation among producers and consumers, the workshop considered links among energy, the environment and economic development, energy supply, investment, and the "common energy future". Questions of a possible "carbon tax" attracted a great deal of attention. The IEA was represented by Executive Director Helga Steeg who confirmed her view that in this period following the end of the Gulf crisis, opportunities for greater co-operation are in part dependent on workshops of this kind to sort out the interests of producers and consumers, and to develop the requisite understanding between them. Mrs. Steeg also suggested the possibility of a second technical workshop on producer-consumer relations as a follow-up to the February 1992 meeting hosted by the IEA in Paris. Following the 1991 precedent in the French/Venezuelan Seminar, the Spanish authorities also offered to hold the next political level meeting.

In the meantime, on 29-30 November 1993 the IEA hosted in Paris the second Meeting of Experts from producer and consumer countries, under the Chairmanship of Executive Director Helga Steeg. The participants in this meeting included all twenty-three IEA Member countries, the European Union, twenty-two non-Member countries, eight international institutions, and twenty-five private companies and other organizations. Principal agenda sessions were devoted to Long-Term Energy Outlooks; Efficiency, Technology and Environment; and Investment Requirements; throughout, the emphasis was placed on analysis and understanding rather than the production of proposals and ideas identified as such. In her summary at the close of this meeting, Mrs. Steeg cited energy's twin responsibilities to support economic growth and to enhance the environment. If the two days of discussion showed that a matrix of *solutions* has not yet been found, she observed that

nevertheless "it is through exchanges of experts' views at technical sessions such as these that different mixes of policy measures can be considered as *potential elements* in advising governments and companies". The interests of buyers and sellers are obviously different in many respects. However, she noted the advantages of *the absence of a politicized dialogue*, and the usefulness of examining "framework conditions" through which producers and consumers could better "assure companies and financial institutions that reliable and predictable ground rules will govern investment decisions". She highlighted the need for investments to be deployed to open energy resource reserves and the general desirability of international co-operation. Although the IEA is not a "technical transfer agency", it does *facilitate* technology transfer by means of its energy R & D Implementing Agreements [See Chapter V, Section C above]. She concluded that the Agency was prepared to continue these technical meetings of experts from oil exporting and consuming countries, and that "the timing and substance of a future meeting would be worked out in consensus with the parties concerned" [See IEA/NMC(94)3, pp. 1-2].

The most recent meeting in this series was the third Ministerial level meeting conducted in Cartagena, Spain on 19-20 September 1994 under the auspices of the Government of Spain in collaboration with the Governments of Algeria and Mexico. This conference was attended by more than thirty countries and a number of international organizations, including the IEA, OPEC, the European Union, and the United Nations. The IEA delegation was again led by Executive Director Helga Steeg. The Conference devoted one session each to the following topics: Energy and the Environment, the Outlook for Oil and Other Energy Markets, and Natural Gas in the Present and Future Energy Context. Mrs. Steeg made statements on energy and the environment and on the IEA's energy R & D programmes and projects. Like its predecessor, this Conference did not adopt a communiqué or other formal meeting record. However, the Conference did note the willingness of the Governments to continue this forum of producing and consuming countries, and it was proposed that the fourth political level conference take place in Venezuela. Planning is now proceeding for the conference to take place in that country in September 1995. Moreover, at Cartagena Mrs. Steeg announced plans for the next *IEA Meeting of Experts*, the third technical level meeting, which took place in Paris, on 12-13 April 1995. On 18 November 1994 Mr. Robert Priddle, appointed as IEA Executive Director on the previous day, stated that he "would continue the 'technical dialogue' initiated by the IEA under Mrs. Steeg, among producing and consuming countries". He also

differentiated "between a 'technical dialogue' among experts and a 'political dialogue with Ministers'" [See Platt's Global Alert, 18 November 1994, Item 59]. At the close of 1994, the stage was thus being set for this series of meetings to be continued essentially according to the pattern which had been developed in the period 1991-1994.

F. The IEA Review of Relations with Non-Members 1992-1994

By early 1992 the international relations of the IEA had evolved to the point where Members and the Secretariat concluded that a comprehensive review of the Agency's non-Member policies would be a timely and worthwhile development. The policy evolution towards globalisation and concerns about the environment, taken up in Sections D and E above, had resulted from the underlying changes which were taking place throughout the energy world. These were summarized by Executive Director Helga Steeg to the Governing Board on 11 May 1992:

> Clearly, the world has changed since the establishment of the IEA in 1974, in almost every aspect of the energy sector. I mention only a few changes: the globalisation of energy markets, the evolving position of oil producers, the increasing role of [developing countries] in energy demand, the political and economic changes in Central and Eastern Europe and the CIS, and, last but not least, the growing focus on the relationship between energy and environmental policies [IEA/GB(92)25, Annex].

These developments had been leading to increased contacts between the Agency and those non-Member countries that wished to draw closer to the Agency, in order to participate in IEA activities (conferences, workshops, information exchange, and energy R & D projects), attend IEA meetings, or eventually establish permanent relations with the Agency or indeed full membership in it. The IEA had already enlarged the scope of its activities with non-Member countries as described above, and in 1990 it changed the name of the responsible Ad Hoc Group in this sector to the "Committee on Non-Member Countries", which better describes the widening scope and permanence of its activities.

Responding further to these developments, the IEA conducted an informal "IEA Brainstorming Session" in Rueil-Malmaison outside of Paris in March 1992 on the subject of non-Member questions of current interest. One of the outcomes of that session was the recognition that the IEA needed to refocus energy *security* concerns to reflect the growing importance of non-Member countries (NMCs), and this led to the Board's adoption, in May 1992 on an interim basis, of a new and elaborate "IEA General Policy Guidance" and of new "Guidelines for Areas of NMC Co-operation" [IEA/GB(92)25, Item 5]. At that time the Board broadened the Committee's formal mandates to reflect the evolving policies. In reaching these decisions, the Board acted on the basis of a Secretariat document entitled "Participation by Non-Member Countries in the Activities of the IEA" [See IEA/GB(92)18/FINAL] and of the Executive Director's Introduction to this subject, quoted above [Annex to IEA/GB(92)25]. The Board's actions overall called for greater *flexibility* and the capacity for *quick decisions* on international energy relations questions, without revising the I.E.P. Agreement (which already contained the essential mandates) and without reducing the Agency's priorities in the area of energy security (which was expanding in this process).

The May 1992 Governing Board meeting adopted not only its "Guidelines for Non-Member Country Relations" which are set forth below as amended in 1994, but also two further decisions on the mandate of the CNMC:

(i) the Committee on Non-Member Countries shall, taking into account the views of the Standing Groups and other committees of the Agency, advise the Secretariat and advise the Standing Groups and other committees of the Agency with regard to non-Member country activities;
(ii) overall policy guidance and decisions shall continue to be the responsibility of the Governing Board [IEA/GB(92)25, Item 5(d)].

In paragraph (e) of these Conclusions the Board requested the Committee to ensure that information on the Agency's activities in this sector be communicated to Members and that Members' views be communicated to the Secretariat. The Committee reports regularly on this subject to the Board.

Moreover, the operative Secretariat document entitled "Participation by Non-Member Countries in the Activities of the IEA" contained a Part IV on "Expanded Role of the NMC Committee", which proposed a recommendation that the Committee's role be expanded to enable it to serve better as a consultation point, entailing more frequent Committee meetings and more

far-reaching functions [IEA/GB(92)18/FINAL]. The Committee would also receive more direct reporting of deliberations and recommendations from the other Standing Groups and Committees; the Delegates meeting in the Committee would need the authority of their governments to make decisions in order for this role of the Committee to be effective. The Committee would enjoy wider review and recommendation responsibilities, and report to the Board as appropriate. Although at its May 1992 meeting the Governing Board did not reach final Conclusions on Part IV, the Board did note that the role of the CNMC "needs to be further developed over time, bearing in mind that specific areas of co-operation with non-Member countries must be integrated into the work of other Standing Groups" [IEA/GB(92)25, Item 5(c)]. Finally, in paragraph (f) of those Conclusions the Board noted that the 1992 Decision was an "interim Decision, which the Governing Board will review in a future meeting". [See "Policy Review: The IEA in a Changing World" IEA/GB(92)27; "Assessment of IEA Activities on Non-Member Countries" IEA/NMC(93)10].

In enlarging the IEA's policy of openness to non-Member countries, the "General Policy Guidance" called for increasing "energy security by initiating or enhancing relations with significant energy consumers and/or producers", and it asked the IEA to develop a case-by-case approach to non-Member countries that would not limit co-operation solely to those countries which were likely to become OECD Members (and thus draw still closer to the IEA). It recommended that non-Member country activities be funded within the IEA's annual budget allocations and that special contributions for specific, unforeseen activities should continue pursuant to IEA rules; and it stated that the Executive Director would report to the Board as these non-Member country activities were undertaken.

As adopted in 1992, the comprehensive Guidelines contain mixed elements of policy and mandate. IEA Ministers recognized in 1993 that the Agency's energy security efforts encompass "more intensive contacts with non-Member countries to assist them in developing energy strategies and adopting energy policies that will contribute to their development and enhance global energy security" [IEA/GB(93)41, paragraph 26], and Ministers promoted "a balanced approach" for the IEA in its growing relations with those countries. Following these Ministerial declarations, the IEA continued to assess the nature and scope of these relations with non-Member countries, as the Agency received formal requests for the membership of six new countries (Mexico, Korea, the Czech Republic, Poland, Hungary, and the Slovak Republic), and there were signs that the number of new membership requests could grow in the future. In 1994 the Guidelines were

reviewed on the basis of the Agency's experience in applying them during the intervening two year period. The amended Guidelines as adopted by the Governing Board on 14 December 1994 [IEA/GB(95)1] are set forth below together with the text of a 1994 "Comment" on it as endorsed by the Governing Board or with a brief summary of the "Comment":

A. Participation in IEA Meetings:

> *For an experimental period, the Standing Groups should decide on the level, frequency, and subjects for NMC participation, subject to the right of any Member country to refer such a decision to the Governing Board. However, participation by a new non-Member country would be a matter for Governing Board consideration. The NMC Committee should be regularly informed. Participation by NMCs in IEA meetings should be ad hoc and informal. NMCs do not participate in Governing Board or Budget Committee meetings, unless the Governing Board were to decide otherwise. To the extent possible, the number of NMCs invited to an IEA meeting should be kept to the minimum necessary to accomplish the purpose of the meeting.*

The Comment on this Guideline confirms that it "should remain as it is . . .".

B. Participation in IEA Conferences, Workshops, etc.:

> *Participation of NMC representatives as both participants and speakers should continue to be on an ad hoc basis, in the context of the subject to be discussed. Periodically, speakers from NMCs may be invited to participate or make presentations at an IEA Conference, subject to the existing rule requiring approval by the Executive Director and the Governing Board Chairman.*

The operative part of the Comment on this Guideline provides that

> . . . the standing rule . . . should be relaxed, so that the Governing Board Chairman's prior consent will, in principle, not be sought, unless it concerns a country with which the Agency has not previously had any contact. The Executive Director will, however, report to the Governing Board on such participation.

C. Review of Energy Policies:

Energy reviews of NMCs are an important element in assisting them to adopt sound energy policies. Such reviews would be conducted only if they were included in the Programme of Work, or the Governing Board had otherwise expressly authorised them. The scope of NMC reviews will be adjusted, as necessary, to reflect changed circumstances or resource constraints.

The Comment confirms that the above Guideline shall continue to apply and indicates some priorities.

D. Co-operation in the Area of Emergency Preparedness:

NMCs will not participate in emergency response systems. However, briefing and advising NMCs, as was done with selected Asian, Central and Eastern European countries during the Gulf crisis, should be considered, as appropriate. In addition, the impact of the change of relative weight of NMCs in energy markets in the long run should be examined by the relevant Standing Groups. The NMC Committee and the SEQ will be regularly informed and consulted.

The Comment states that:

> The standing guideline provides that NMCs will not participate directly in the IEA's emergency response systems. However, the Agency will make available its expertise in emergency response strategies to selected NMCs and/or regional organisations and where appropriate explore ways to co-operate with them on related activities. Given the successful experience with a number of NMCs participating in an IEA Workshop on Emergency Oil Stockdraw, such participation will continue to be explored on a selective basis . . . .

E. Participation in Implementing Agreements:

NMCs may participate in Implementing Agreements as Associate Contracting Parties, subject to Governing Board approval.

The Comment confirms the continuation of this Guideline and states that participation by non-Member regional organizations may also be considered. The CNMC, in consultation with the CERT, will be requested to advise on participation by non-Members not previously participating in any Implementing Agreement. The following Guidelines are also continued:

F. Statistical Exchange and Co-operation:

> *IEA statistical services will be intensified. Exchange of statistics with NMCs should take place as appropriate, if possible on a quid pro quo basis. In addition, the IEA will continue to co-operate with NMCs in the adaptation of their statistical methodology to Western models for collection and presentation.*

The Comment states that for the purpose of comprehensive global coverage, the Agency's efforts will continue to extend beyond the groups of countries identified in the document.

G. Training:

> *As a general rule, the IEA should not take any NMC trainees into the Secretariat. However, two specific trainees were approved by the Board as one-time actions, not to be seen as precedents for future training requests.*

The Comment states that any future cases should be judged by the Governing Board on their specific merits.

In 1994 the Agency's receipt of formal requests for membership from a number of non-Member countries focused the Agency's attention on membership procedures, criteria for membership and relations with applicants in the context of the wider review of membership questions, discussed above. This led to the inclusion in the Governing Board's December 1994 Conclusions of the two following elements on membership. The Board:

> (iv) approved the procedures for accession to the Agreement on an International Energy Program, [and] the criteria for membership in the Agency . . .

(v) noted that the ability of an applicant for membership in the Agency to meet the emergency response requirements under the IEP Agreement should be reviewed in the Standing Group on Emergency Questions [IEA/GB(95)1, Item 6(a)].

The procedures for accession to the I.E.P. Agreement and for membership are described generally in Volume I, Chapter IV, Section A. In addition to the criteria for membership set forth in Article 71 of the I.E.P. Agreement, the following are the specific criteria adopted by the Governing Board: acceptance of the IEA Goals and Objectives, including such Governing Board decisions as the Long-Term Co-operation Programme and the IEA Shared Goals as well as participation in the Emergency Sharing System, and willingness of the prospective Member to leave "organizations whose objectives are opposed to those of the Agency". For countries which have formally requested that the membership process begin and for which the Governing Board has authorized the Executive Director to begin negotiations, the documentation, information and discussion stage would begin. IEA policy on relations with applicants during this stage and until completion of the procedures for accession is under consideration in the Agency at the time of writing.

This Chapter has outlined the history of the IEA's non-Member policies and actions on non-Member country relations through the early period when the dominant activity was the exchange of information, the North-South early dialogue period which could not be as productive as Members envisaged, later work with developing countries, and the more recent processes of globalisation and of organized discussions between energy producers and energy consumers. Perhaps the key to the Agency's future may be seen in this globalisation process, for the economic and political basis of globalisation is continuing to expand, as energy needs grow and increasing environmental impacts are produced by the developing countries as well as by the industrial world and others. More energy producers and consumers worldwide are expected to join the process of international energy management. The IEA experience over its first twenty years has prepared the way for further co-operation in managing the resulting policy issues with non-Members as well as Members, as the discussion in Chapter VII clearly demonstrates.

The IEA's major policies and actions outlined throughout this *History* show how productive the co-operative process may be, and this confirms the value of the Agency as the institutional base for future co-operation on

energy policy questions. While the first twenty years of the IEA have produced a remarkable panorama of accomplishments as seen in Volume I of this work as well as in the present Volume, perhaps the most telling conclusion to be drawn is that the past twenty years are but prologue. If the Agency has performed its tasks well over this period, the best measure of accomplishment will be its readiness to manage the energy policy and institutional questions which it is bound to confront in the years ahead.

End of Volume II.

Officers of the Governing Board at Ministerial and Official Level, Standing Groups and Committees, and Senior Members of the IEA Secretariat

(Updates Volume I, Appendix II to April 1995)

Name	Country	Dates of Service
GOVERNING BOARD AT OFFICIAL LEVEL		
Chairmen		
Mr. E. Becker	Germany	Feb. 1995 - present
Mr. Y. Sato	Japan	Feb. 1994 - Feb. 1995
Mr. C. W. M. Dessens	The Netherlands	Dec. 1992 - Feb. 1994
Vice-Chairmen		
Mr. A. Puri Purini	Italy	Oct. 1994 - present
Mr. C. Henderson	United Kingdom	Jun. 1994 - present
Ms. S. Fallows Tierney	United States	Oct. 1993 - present
Mr. C. Mandil	France	Feb. 1994 - Jun. 1994
Mr. A. Walther	Norway	Jan. 1992 - Oct. 1994
Mr. Y. Sato	Japan	Dec. 1992 - Feb. 1994
STANDING GROUP ON EMERGENCY QUESTIONS (SEQ)		
Chairmen		
Mr. L. Knegt	The Netherlands	Apr. 1995 - present
Mr. H. E. Leyser	Germany	Jan. 1992 - Apr. 1995
Vice-Chairmen		
Mr. J. Hart	United States	Feb. 1994 - present
Mr. F. Nielsen	United States	Mar. 1989 - Feb. 1994

Name	Country	Dates of Service
STANDING GROUP ON LONG-TERM CO-OPERATION (SLT)		
Chairmen		
Mr. S. Donnelly	United States	Oct. 1994 - present
Mr. R. E. Hecklinger	United States	Oct. 1993 - Oct. 1994
Vice-Chairmen		
Mr. H. Saeki	Japan	Oct. 1993 - present
Mr. P. Gerresch	Belgium	Mar. 1989 - present
STANDING GROUP ON THE OIL MARKET (SOM)		
Chairmen		
Mr. M. Cleland	Canada	Mar. 1993 - present
Vice-Chairmen		
Mr. D. Pumphrey	United States	Oct. 1994 - present
Mr. N. Nikai	Japan	Apr. 1994 - present
Mr. S. Endo	Japan	Mar. 1993 - Apr. 1994
Mr. J. Brodman	United States	Jan. 1983 - Jun. 1994
COMMITTEE ON ENERGY RESEARCH AND TECHNOLOGY (CERT)		
Chairmen		
Mr. C. Mandil	France	Jun. 1994 - present
Mr. H. Koch	Denmark	Mar. 1991 - Mar. 1994
Vice-Chairmen		
Mr. J. Brodman	United States	Jun. 1994 - present
Mr. T. Murayama	Japan	May 1993 - present
Mr. R. Bradley	United States	Apr. 1993 - Jun. 1994
COMMITTEE ON BUDGET AND EXPENDITURE (BC)		
Chairmen		
Mr. R. Knorreck	Austria	Jun. 1994 - present
Mr. A. H. F. van Aggelen	The Netherlands	Oct. 1992 - Jun. 1994

Name	Country	Dates of Service
COMMITTEE ON NON-MEMBER COUNTRIES (CNMC)		
Chairmen		
Mr. R. Jeker	Switzerland	Apr. 1995 - present
Mr. A. Walther	Norway	May 1992 - Apr. 1995
Vice-Chairmen		
Mr. G. Boyce	United Kingdom	Jun. 1994 - present
Mr. E. Denekamp	The Netherlands	Jun. 1994 - present
Mr. M. Atkinson	United Kingdom	Mar. 1993 - Jun. 1994

Senior Members of the IEA Secretariat

Name	Country	Dates of Service
EXECUTIVE DIRECTOR		
Robert Priddle	United Kingdom	1994 - present
Helga Steeg	Germany	1984 - 1994
Ulf Lantzke	Germany	1975 - 1984
ACTING EXECUTIVE DIRECTOR		
John P. Ferriter	United States	Oct. - Nov. 1994
J. Wallace Hopkins	United States	Apr. - Jun. 1984
DEPUTY EXECUTIVE DIRECTOR		
John P. Ferriter	United States	1989 - present
J. Wallace Hopkins	United States	1975 - 1989
LEGAL COUNSEL		
Craig S. Bamberger	United States	1992 - present
Richard F. Scott	United States	1975 - 1991
SPECIAL ADVISOR FOR PUBLIC INFORMATION		
Joyce Heard	United States	1991 - present
Lionel Walsh	United Kingdom	1983 - 1990
Peter Daniel	Canada	1980 - 1983
John Mowinckle	United States	1977 - 1980

Name	Country	Dates of Service
OFFICE OF LONG-TERM CO-OPERATION AND POLICY ANALYSIS		
Robert Skinner	Canada	1988 - present
David le B. Jones	United Kingdom	1982 - 1988
Fred Gorbet	Canada	1979 - 1982
Peter Kelly	United Kingdom	1975 - 1979
OFFICE OF OIL MARKETS AND EMERGENCY PREPAREDNESS		
Tomihiro Taniguchi	Japan	1993 - present
Nobuyoshi Yokoe	Japan	1992 - 1993
OFFICE OF NON-MEMBER COUNTRIES		
Guy Caruso	United States	1993 - present
OFFICE OF OIL MARKET DEVELOPMENTS *		
Quincey Lumsden	United States	1986 - 1992
Bjørn Barth	Norway	1983 - 1985
Vittorio Ristagno	Italy	1975 - 1979
OFFICE OF INFORMATION AND EMERGENCY SYSTEMS OPERATIONS *		
Nobuyoshi Yokoe	Japan	1990 - 1992
Toshikazu Nasu	Japan	1989 - 1990
Keiichi Yokobori	Japan	1985 - 1989
Tatsu Sunami	Japan	1982 - 1985
Kazuo Mishima	Japan	1979 - 1982
OFFICE OF ENERGY TECHNOLOGY AND RESEARCH AND DEVELOPMENT This Office was called “Energy Research, Development and Technology Application” from 1977 to 1989. Before 1977, it was simply known as “Energy R & D”.		
Hans Jørgen Koch	Denmark	1994 - present

Name	Country	Dates of Service
Sergio Garribba	Italy	1987 - 1994
Pietro Capriolgio	Italy	1985 - 1987
Eric Willis	United States	1980 - 1985
Milton Klein	United States	1976 - 1980
OFFICE OF ECONOMICS, STATISTICS AND INFORMATION SYSTEMS		
Sean O'Dell	Canada	1993 - present
ENERGY ECONOMIC ANALYSIS DIVISION *		
Sean O'Dell	Canada	1991 - 1992
George Kowolski	Canada	1985 - 1991
Herman Franssen	United States	1980 - 1985
James Reddington	United States	1975 - 1980

* In January 1993, these three areas were re-organized. The Emergency Planning and Preparation Division was combined with the Oil Industry Division (of Oil Market Developments) to form the Office of Oil Markets and Emergency Preparedness. The Office of Non-Member Countries was created at that time. The Energy Statistics and Information Systems Divisions, formerly part of the Office of Information and Emergency Systems Operations, were amalgated with the Energy Economic Analysis Division to form the Office of Economics, Statistics and Information Systems.

Oil Import Dependence of OECD Countries 1950-1973

Mtoe (million tonnes of oil equivalent)

	North America			Pacific			OECD Europe			OECD Total		
Year	**Oil Supply**	**Net Oil Imports**	**Import Depend. (%)**	**Oil Supply**	**Net Oil Imports**	**Import Depend. (%)**	**Oil Supply**	**Net Oil Imports**	**Import Depend. (%)**	**Oil Supply**	**Net Oil Imports**	**Import Depend. (%)**
1950	320.31	44.91	**14.0**	3.81	3.50	**91.9**	61.48	57.50	**93.5**	385.60	105.91	**27.5**
1960	510.57	98.45	**19.3**	46.07	45.56	**98.9**	211.74	196.84	**93.0**	768.38	340.84	**44.4**
1965	611.44	136.07	**22.3**	109.77	108.71	**99.0**	394.68	374.19	**94.8**	1115.89	618.97	**55.5**
1966	647.12	140.28	**21.7**	124.04	122.78	**99.0**	437.89	417.54	**95.4**	1209.04	680.59	**56.3**
1967	667.06	126.79	**19.0**	146.85	145.01	**98.7**	472.69	451.91	**95.6**	1286.60	723.71	**56.2**
1968	709.67	146.50	**20.6**	169.78	167.07	**98.4**	524.86	503.95	**96.0**	1404.31	817.52	**58.2**
1969	736.75	159.94	**21.7**	197.28	194.31	**98.5**	576.45	555.30	**96.3**	1510.47	909.55	**60.2**
1970	777.24	165.51	**21.3**	233.05	223.30	**95.8**	649.80	628.78	**96.8**	1660.09	1018.04	**61.3**
1971	801.19	190.00	**23.7**	250.98	235.30	**93.8**	677.33	657.24	**97.0**	1729.50	1082.55	**62.6**
1972	844.73	223.36	**26.4**	267.47	250.76	**93.8**	709.81	689.10	**97.1**	1822.00	1163.13	**63.8**
1973	907.19	286.63	**31.6**	308.53	287.72	**93.3**	764.02	743.25	**97.3**	1979.74	1317.60	**66.6**

Import dependence is calculated as net oil imports / oil supply.

Oil Supply in this table is defined as Production + Imports - Exports.

For comparability purposes, this table includes for each year data for all countries which were OECD Members in 1973.

Data for the new Federal states of Germany are not included.

1977 IEA Principles for Energy Policy

Adopted by the Governing Board at Ministerial Level on 5 October 1977, IEA/GB(77)52 (1st Revision) Annex

1. Further development by each Participating Country of national energy programmes and/or policies which include the objective, formulated as specifically as possible, of reducing in absolute terms or limiting future oil imports through conservation of energy, expansion of indigenous energy sources and oil substitution.

2. Constant and careful attention to important environmental, safety, regional and security concerns to which the production, transportation and use of energy give rise, and improvement of the speed and consistency of public procedures for resolving conflicts which may exist between these concerns and energy requirements.

3. Allowing domestic energy prices to reach a level which encourages energy conservation and development of alternative sources of energy.

4. Strong reinforcement of energy conservation, on a high priority basis with increased resources, for the purpose of limiting growth in energy demand relative to economic growth, eliminating inefficient energy use, especially of rapidly depleting fuels, and encouraging substitution for fuels in shortest supply, by implementing vigorous conservation measures in various sectors along lines which include the following elements:

- pricing policies (including fiscal measures) which give incentives to conservation;
- minimum energy efficiency standards;
- encouragement and increase of investment in energy saving equipment and techniques.

5. Progressive replacement of oil in electricity generation, district heating, industries and other sectors by:

- discouraging the construction of new exclusively oil-fired power stations;
- encouraging the conversion of existing oil-fired capacity to more plentiful fuels in electricity, industrial and other sectors;
- encouraging the necessary structural adjustments in the refinery sector in order to avoid an excess of heavy fuel oil;
- directing efforts to the reduction of the use of heavy fuel oil as a primary energy source in those sectors where efficiency is low.

6. Application of a strong steam coal utilization strategy and active promotion of an expanded and reliable international trade in steam coal, composed of the following elements:

- rapid phasing-in of steam coal as a major fuel for electrical power generation and in industrial sectors;
- further development of steam coal policies within producing, exporting and consuming IEA countries to support increased utilization by enhancing market stability through reliable and increased export and import market flows under reasonable commercial terms;
- development of policies to remedy anticipated infrastructure bottlenecks.

7. Concentration of the use of natural gas on premium users' requirements, and development of the infrastructure necessary to expand the availability of natural gas.

8. Steady expansion of nuclear generating capacity as a main and indispensable element in attaining the group objectives, consistent with safety, environmental and security standards satisfactory to the countries concerned and with the need to prevent the proliferation of nuclear weapons. In order to provide for this expansion, it will be necessary through co-operation to assure reliable availability of:

- adequate supplies of nuclear fuel (uranium and enrichment capacity) at equitable prices;

– adequate facilities and techniques for development of nuclear electricity generation, for dealing with spent fuel, for waste management, and for overall handling of the back end of the nuclear fuel cycle.

9. Stronger emphasis on energy research, development and demonstration, including collaborative programmes, more intensive national efforts and greater co-ordination of national efforts, in order to make energy use more efficient and to meet future energy requirements. Each Participating Country should contribute to energy technology development, with emphasis on (a) technologies which can have relatively near-term impact, (b) policies which facilitate the transition of new energy technologies from the research and development phase to the point of utilization, (c) technologies for broadly applicable renewable energy sources, and (d) investigation of whether there are technological possibilities for significant contributions from other renewable resources, through:

– providing the fullest possible financial support for energy research, development and demonstration;

– increasing participation in international collaborative projects to extend the effectiveness of funds available;

– encouraging investment in energy technology development by appropriate incentives;

– ensuring that R & D policies remain consistent with and supportive of the objectives of ongoing energy policy.

10. Establishment of a favourable investment climate which encourages the flow of public and private capital to develop energy resources by appropriate pricing policies, by minimizing uncertainties about the general directions of energy and other policies such as mentioned in Principle 2, and by providing government incentives where necessary, in order to:

– give priority to exploration activities including those in offshore and frontier areas;

– encourage rates of exploration and development of available capacities which are consistent with the optimum economic development of resources.

11. Providing in energy policy planning for alternative means, other than increased oil consumption, for meeting any development of supply shortfall or failure to attain conservation objectives, taking into account the appropriate requirements of economic development and social progress.

12. Appropriate co-operation in the field of energy, including evaluation of the world energy situation, energy research and development and technical and financial requirements, with developed or developing countries or international organizations.

1993 IEA Shared Goals

Adopted by the Governing Board at Ministerial Level on 4 June 1993, IEA/GB(93)41, Annex I

Member countries of the IEA seek to create the conditions in which the energy sectors of their economies can make the fullest possible contribution to sustainable economic development and the well-being of their people and of the environment. In formulating energy policies, the establishment of free and open markets is a fundamental point of departure, though energy security and environmental protection need to be given particular emphasis by governments. IEA countries recognise the significance of increasing global interdependence in energy. They therefore seek to promote the effective operation of international energy markets and encourage dialogue with all participants.

In order to secure their objectives they therefore aim to create a policy framework consistent with the following goals:

1. Diversity, efficiency and flexibility within the energy sector are basic conditions for longer-term energy security: the fuels used within and across sectors and the sources of those fuels should be as diverse as practicable. Non-fossil fuels, particularly nuclear and hydro power, make a substantial contribution to the energy supply diversity of IEA countries as a group.

2. Energy systems should have the ability to respond promptly and flexibly to energy emergencies. In some cases this requires collective mechanisms and action — IEA countries co-operate through the Agency in responding jointly to oil supply emergencies.

3. The environmentally sustainable provision and use of energy is central to the achievement of these shared goals. Decision-makers should seek to minimise the adverse environmental impacts of energy activities,

just as environmental decisions should take account of the energy consequences. Government interventions should where practicable have regard to the Polluter Pays Principle.

4. More environmentally acceptable energy sources need to be encouraged and developed. Clean and efficient use of fossil fuels is essential. The development of economic non-fossil sources is also a priority. A number of IEA members wish to retain and improve the nuclear option for the future, at the highest available safety standards, because nuclear energy does not emit carbon dioxide. Renewable sources will also have an increasingly important contribution to make.

5. Improved energy efficiency can promote both environmental protection and energy security in a cost-effective manner. There are significant opportunities for greater energy efficiency at all stages of the energy cycle from production to consumption. Strong efforts by Governments and all energy users are needed to realise these opportunities.

6. Continued research, development and market deployment of new and improved energy technologies make a critical contribution to achieving the objectives outlined above. Energy technology policies should complement broader energy policies. International co-operation in the development and dissemination of energy technologies, including industry participation and co-operation with non-Member countries, should be encouraged.

7. Undistorted energy prices enable markets to work efficiently. Energy prices should not be held artificially below the costs of supply to promote social or industrial goals. To the extent necessary and practicable, the environmental costs of energy production and use should be reflected in prices.

8. Free and open trade and a secure framework for investment contribute to efficient energy markets and energy security. Distortions to energy trade and investment should be avoided.

9. Co-operation among all energy market participants helps to improve information and understanding, and encourage the development of efficient, environmentally acceptable and flexible energy systems and markets worldwide. These are needed to help promote the investment, trade and confidence necessary to achieve global energy security and environmental objectives.

IEA Energy RD & D Implementing Agreements and Other Instruments 1975 - 1994

ENERGY TECHNOLOGY INFORMATION CENTRES

Centre for the Analysis and Dissemination of Demonstrated Energy Technologies (CADDET)	active
Energy Technology Data Exchange (ETDE)	active
Energy Technology Systems Analysis Programme (ETSAP)	active
Greenhouse Gas Technology Information Exchange (GREENTIE)	active
IEA Coal Research	active
International Centre for Gas Technology Information (ICGTI)	active

FOSSIL FUELS TECHNOLOGIES

Coal Combustion Sciences	active
Coal Hydrogenation Technology	completed
Coal-Liquid Mixtures	active
Coal Pyrolysis	completed
Coal Technology	completed
Enhanced Oil Recovery	active
Feeding of Dry Solid Fuels into Pressure Reactors for Coal Processing	completed
Fluidised Bed Conversion (formerly Fluidised Bed Combustion)	active
Fluidised Combustion of Coal (Grimethorpe)	completed
Fossil Fuel Multiphase-Flow Sciences	active
Greenhouse Gases from Fossil Fuel Use	active
Low Nitrogen Oxides Coal Burner (LONOX)	completed
Testing of High-Temperature High-Pressure Filters	completed
Coal Gasifier Effluent Liquors	completed

RENEWABLE ENERGY TECHNOLOGIES

Bioenergy (formerly Forestry Energy)	active
Biomass Conversion Technical Information Service (now in ETDE)	completed
Geothermal Equipment	completed
Hot Dry Rock Technology	completed
Hydropower Technologies	active
Man-Made Geothermal Energy Systems (MAGES)	completed
Peat Production and Utilisation	completed
Photovoltaic Power Systems	active
Production and Utilisation of Hydrogen (formerly Hydrogen from Water)	active
Solar Heating and Cooling	active
Solar Power and Chemical Energy Systems (SolarPACES)(formerly Small Solar Power Systems)	active
Wave Power	completed
Wind Turbine Systems (merger of former Large Scale Wind Energy Conversion Systems and Wind Energy Conversion Systems)	active

EFFICIENT ENERGY END-USE TECHNOLOGIES

Advanced Fuel Cells (formerly Alcohol and Alcohol Blends)	active
Alternative Motor Fuels	active
Buildings and Community Systems	active
Cement Manufacture	completed
Demand-Side Management	active
District Heating and Cooling	active
Electric Vehicles	active
Energy Cascading	completed
Energy Conservation Applications to Building Complexes	completed
Energy Conservation and Emissions Reduction in Combustion (formerly Energy Conservation in Combustion)	active
Energy Storage	active
Heat Pump Systems	completed
Heat Pumping Technologies	active
Heat Transfer and Heat Exchangers	active

High Temperature Materials for Automotive Engines	active
High-Temperature Superconductivity	active
Iron and Steel	completed
Process Integration Technologies	in preparation
Pulp and Paper	active

NUCLEAR FUSION AND FISSION TECHNOLOGY

Environmental, Safety and Economic Aspects of Fusion Power	active
Fusion Materials (formerly Radiation Damage in Fusion Materials)	active
Intense Neutron Source (INS)	completed
Reactor Safety	completed
Nuclear Technology of Fusion Reactors	active
Plasma Wall Interaction in TEXTOR	active
Reversed Field Pinches	active
Stellarator	active
Superconducting Magnets	active
Three Large Tokamaks	active
Toroidal Physics and Plasma Technologies (ASDEX-Upgrade)	active

Highlights of Recent IEA Developments 1994

The following Highlights provide a brief overview of the main IEA events of 1994 and update the 1974-1993 Highlights described in Appendix VI of Volume I. The information for 1994 has been compiled largely from the IEA Annual Activities Report for 1994 [See IEA/GB(95)10]. All items do not carry the same status and many are likely to develop further in 1995 and beyond. More complete information relating to the topics mentioned below can be found in Volume II and in the 1994 Annual Activities Report.

The year 1994 marks the 20th anniversary of the founding of the IEA. This is commemorated in April with a Governing Board meeting in Kyoto, followed by a Seminar on "The IEA in the 21st Century: Challenges and Prospects" which attracts a number of the world's leading energy officials and personalities. The IEA publishes the 1994 *World Energy Outlook* and Volume I of the IEA *History*, on Origins and Structure.

After ten years of service to the IEA as its Executive Director, Mrs. Helga Steeg of Germany resigns on 30 September. Mr. John P. Ferriter, the Deputy Executive Director, assumes those functions on an Acting Basis, until Mr. Robert Priddle of the United Kingdom takes up his duties as Executive Director on 1 December.

This year's version of *Energy Policies of IEA Countries* reports on the first round of reviews undertaken on the basis of the IEA Shared Goals, adopted by Ministers in 1993. The Review also contains an overview of significant market trends covering the past two decades.

An unprecedented Ministerial Level "brainstorming" meeting held at Interlaken, Switzerland considers the options available to respond to climate change concerns.

The IEA inaugurates a new series of publications, "Energy and Environment Policy Analyses", which consists of analytical papers on topics of current environment interest. *Biofuels* is the first title in this series.

The IEA publishes important sectoral studies including *Natural Gas Transportation - Organisation and Regulation* and *Electricity Supply Industry - Structure, Ownership and Regulation* which reports on developments in IEA countries and implications for policy objectives.

Due to the growing importance of energy consumption in non-Member countries, the IEA broadens its work on energy efficiency policies, and participates in the preparatory discussions on the Energy Efficiency Protocol under the Energy Charter Treaty.

A workshop on Stockdraw and Emergency Response Management held in Kagoshima, Japan assembles government and industry experts to exchange views and experiences on strategic oil stock storage and drawdown.

A major revision of the Emergency Management Manual updates the principles and procedures for I.E.P. emergency measures.

The IEA reviews the emergency response potential of Member countries and publishes the results for the first time, under the title *Oil Supply Security: The Emergency Response Potential of IEA Countries.*

In the R & D sector, four new projects on Photovoltaics, Electric Vehicles, Hydropower and the International Centre for Gas Technology Information are launched, while a project in the field of Process Integration Technologies receives Governing Board approval.

Participation of non-Members in R & D activities continues to expand through IEA Conferences and Workshops and Implementing Agreements. The Governing Board approves twelve more proposals for the participation in energy R & D Implementing Agreements of Brazil, Israel, Korea, Poland, the Russian Federation, Ukraine, and Venezuela.

A Transportation Forum was held in Valbonne, France to help Member governments and industry work together to update priorities and solve transport-related problems.

Following the completion of the *IEA/OECD Scoping Study on Energy and Environmental Technologies to Respond to Global Climate Change Concerns,* the IEA/OECD hold a High-Level meeting to discuss the Scoping Study, and the Study is published.

In response to restraints on R & D budgets, the IEA establishes an Experts' Group on Energy Technology Assessment and Methodologies for R & D Priority Setting and Evaluation to enable Member countries to share experiences and enhance their national programmes.

The IEA publishes an energy survey of the Czech Republic and conducts follow-up surveys of Poland, Hungary and Korea.

The IEA and the Russian Federation sign a Joint Declaration of Co-operation which expands their mutual relations and identifies priorities such as the survey of Russian Energy Policies which is undertaken by the IEA.

The IEA publishes studies on *Russian Energy Prices, Taxes and Costs,* and on *Electricity in European Economies in Transition.*

Throughout the year the IEA continues to participate in the preparation of the Energy Charter Treaty and the Energy Efficiency Protocol, which were signed on 17 December in Lisbon.

In response to the request of Mexico to begin membership discussions with the IEA, the Governing Board authorizes the Executive Director to examine with Mexico the terms and conditions of membership.

Following receipt of formal expressions of interest in IEA membership by Korea, the Czech Republic, Poland, Hungary, and the Slovak Republic, the Governing Board authorizes the Executive Director to begin discussions with these countries in parallel with their membership discussions with the OECD.

Relations strengthen with Asia-Pacific and Latin American countries through regular contacts and participation in regional and international conferences. The IEA publishes *Energy in Developing Countries: A Sectoral Analysis.*

The IEA reviews its guidelines for relations with non-Member countries, enlarges the possibilities for participation of these countries in IEA events, and approves criteria and procedures for membership.

Table of Ministerial Communiqué Document References

Date of Meeting	Press Reference	Governing Board Reference
27 May 1975	PRESS/A(75)20	————————
5 - 6 October 1977	IEA/PRESS(77)10	IEA/GB(77)48(2nd Revision)
21- 22 May 1979	IEA/PRESS(79)14	IEA/GB(79)35
10 December 1979	IEA/PRESS(79)28	IEA/GB(80)5
21 - 22 May 1980	IEA/PRESS(80)8	IEA/GB(80)58
8 - 9 December 1980	IEA/PRESS(80)20	IEA/GB(80)85(FINAL)
15 June 1981	IEA/PRESS(81)10	IEA/GB(81)34(Final)
24 May 1982	IEA/PRESS(82)8	IEA/GB(82)54(Final)
8 May 1983	IEA/PRESS(83)6	IEA/GB(83)36(Final)
9 July 1985	IEA/PRESS(85)6	IEA/GB(85)46
11 May 1987	IEA/PRESS(87)4	IEA/GB(87)33 Annex
30 May 1989	IEA/PRESS(89)4	IEA/GB(89)36 Annex
3 June 1991	IEA/PRESS(91)7	IEA/GB(91)42/REV2
4 June 1993	IEA/PRESS(93)8	IEA/GB(93)41

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