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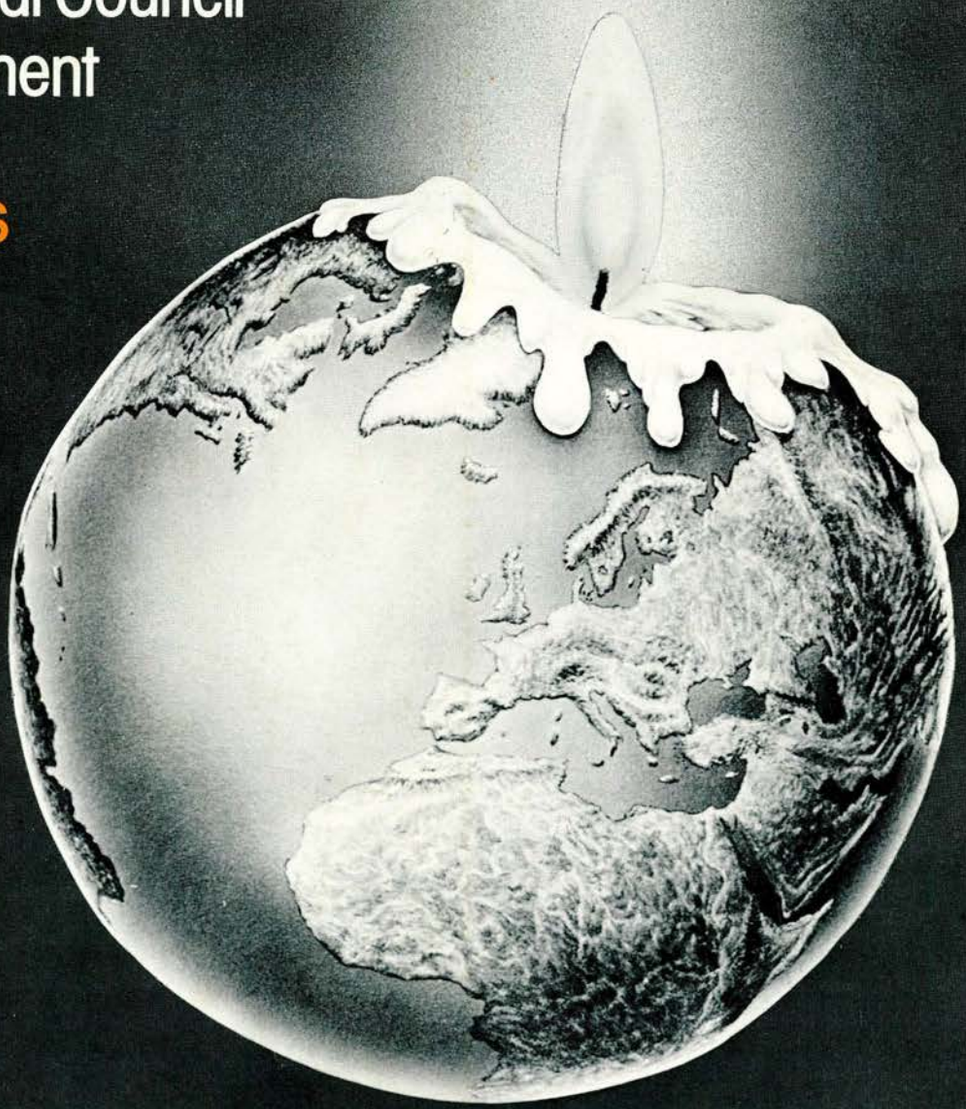

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Cover: A poster put out by the Netherlands Economics Ministry urging inhabitants to "be intelligent about energy". Progress by members of the International Energy Agency (IEA) in conserving energy as well as developing alternative sources is described in detail on pages 27-42.

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OECD ECONOMIC STRATEGY: A REASSESSMENT

by Emile van Lennep, OECD Secretary General

Where do we stand today? The Secretariat's latest forecasts are for a growth rate of around 3½ per cent up to the middle of next year, about the same as last year, and below the rate needed to reduce unemployment. Perhaps of more concern has been the unevenness of growth and inflation performance as between Member countries.

- The United States has made good progress in reducing unemployment but has developed a large trade deficit and after a good start, there has been a worrying pick-up in the rate of inflation.
- Outside the United States, unemployment has risen in many countries and would in many cases be higher were it not for various special measures to support employment. Inflation has been reduced, but remains much too high in many of these countries.

This uneven performance has been reflected in payments positions and exchange rates. While some important imbalances have been corrected, others have persisted or been aggravated. Within the OECD area this year, the United States is still running a large current account deficit, while a group of persistent surplus countries have a combined current account surplus substantially larger than that of the OPEC countries.

It is against this background that work has been under way since last autumn, in this Organisation and elsewhere, to reassess the diagnosis and prescription on which the 1976 strategy rests. A great deal of progress has been made.

As regards diagnosis, there are two key points on which a wide degree of consensus has emerged. First of all, there have, until now, been two rather different schools of economic thought. According to one, most of our difficulties would be solved by creating more aggregate demand. According to the other, once certain basic conditions for higher growth have been achieved — in particular low rates of inflation and a more appropriate relationship between costs and prices — demand will pick up spontaneously. I believe there is now a widespread measure of agreement that the right answer is both more complex and more difficult: that what is needed is *both* action to ensure a sufficient rise in aggregate demand and reinforced efforts to create and maintain the basic conditions needed for sustained growth and the proper functioning of the market system.

The second point is that it is now much more clearly recognised that many of the difficulties over the last two years have arisen because the actions taken by individual countries to combat inflation, increase demand, and implement energy policies have not been sufficiently consistent with one another, or with the requirements for achieving better balanced growth in the OECD area as a whole.

Agreement on these two points of diagnosis has paved the way for agreement that what is needed is a broad programme of internationally concerted action:

- which is differentiated between countries according to their circumstances
- which is addressed not only to the immediate problem of inadequate demand, but covers all the interrelated areas in which action is needed over a period of years to achieve sustained growth: inflation, payments disequilibrium and exchange rates, energy, and the maintenance of an open market-oriented system, both nationally and internationally.

In some way, the hardest task still lies ahead: to create the political momentum and mutual confidence needed for the successful implementation of this programme. There are political difficulties to be overcome domestically. These arise because inflation has become deeply embedded in the economic and social fabric of our societies, and because adjustment to high energy prices and the changing structure of world production and trade is painful and raises difficult questions of equity and burden-sharing. And these difficulties are compounded at the international level when there is a need for action in the collective interest, the rationale of which is not always apparent to national electorates.

It is these political difficulties which will have to be overcome if the programme of internationally concerted action that has been put before you is to be successful. The challenge to international co-operation is to ensure that the action taken by different countries is sufficiently coherent and substantial to enable Member countries to break out of the vicious circle whereby slow growth leads to loss of confidence in future growth, to low investment, and to a progressive move away from a market-oriented economic system, which, in turn, make it that much more difficult to achieve the higher growth we are seeking. I believe that the most recent meeting of the Council at ministerial level, representing as it does all the industrialised countries, has resulted in a major step forward in creating the political momentum which will be required to achieve this.

Left to right: *Nobuhiko Ushiba, Japanese Minister for External Economic Affairs, co-Chairman; Tsuyoshi Hirahara, Ambassador, Permanent Representative; Gerard Eldin, OECD Deputy Secretary-General; Kiichi Miyazawa, Japanese Minister of Economic Planning, co-Chairman; Emile van Lennep, OECD Secretary-General.*

OECD MINISTERS AGREE ON CONCERTED ACTION FOR GROWTH AND INTENSIFIED DEVELOPMENT COOPERATION

The Council of the Organisation for Economic Co-operation and Development met at Ministerial level on 14th-15th June, 1978, under the co-Chairmanship of Kiichi Miyazawa, Minister of Economic Planning of Japan, and Nobuhiko Ushiba, Minister for External Economic Affairs of Japan.

Agreement was reached on the major components of a broad programme of internationally concerted action by Member countries to achieve more sustained economic growth, and on the respective responsibilities of individual Member countries in contributing to faster growth, greater price stability, better payments equilibrium and strengthened energy policies. Recognising that the maintenance of an open market-oriented economic system is an essential part of this programme, Ministers renewed the Declaration of 30th May, 1974 (the *Trade Pledge*) and agreed on the general orientations for policies to facilitate the structural adjustments needed to sustain faster economic growth (see pages 6 and 10).

Ministers considered the implications of the growing economic interdependence between developed and developing countries for trade and investment. They confirmed their commitment to constructive policies for development co-operation to help developing countries to strengthen and diversify their economies and to improve the welfare of their people. They emphasized that the capacity of developing countries to participate more fully in world economic growth would be strengthened by an increase in the flow of resources, including increased aid, and an improvement in the conditions of world trade.

The Economic Background

Ministers noted that despite the difficult circumstances there has been some improvement in world economic conditions: recession has been replaced by positive economic growth; inflation has been significantly reduced; unemployment has been substantially reduced in the United States and has been mitigated in a number of Member countries, inter alia by special manpower and employment policies; an open trading system has been maintained; some important payments imbalances have been corrected; and international financial markets have helped to alleviate the problems posed by large trade imbalances inside and outside the OECD. Nonetheless, the record of recent years is in many ways disappointing: unsatisfactory growth rates; inflation and unemployment rates that are still too high; periods of disorderly exchange-market

conditions; increasing pressures for forms of government intervention which inhibit market forces in general and world trade in particular; and insufficient preparation against future needs in respect of energy. While these developments are harmful to the welfare of all countries, the adverse consequences for the development prospects of the poorer countries are of particular concern.

Ministers recognised the costs and dangers inherent in the continuation of present trends:

- There are increasing economic and social costs of continuing high levels of unemployment, particularly among youth and disadvantaged groups.
- There are growing pressures for protection against foreign competition and for export subsidies, and a growing risk that unilateral trade and other current account measures could touch off chain reactions.
- There has been a tendency for sectoral, regional and manpower policies to shift from action to foster adjustment to structural change to measures of a defensive character that tend to preserve the *status quo,* which thus in important respects have the same effects as protectionist trade measures. Under conditions of high unemployment, some domestic measures to maintain existing employment in sectors or companies in financial difficulty may in certain circumstances be justified in the short run. But their continuation on a large scale would over time undermine the dynamic process which underlies rising productivity and would inhibit sustained non-inflationary growth.
- The task of creating sufficient jobs in some less-industrialised Member countries has been made much more difficult by restrictions on immigration (see article page 23), by the return of migrants due to the recession, and by serious payments difficulties, and their development risks being gravely impeded if it takes place in a climate of depressed world trade and growing protectionism.

Ministers discussed the constraints on economic growth. Many of these are internal to the countries in question: high rates of inflation, low profits, heavy dependence on exports and difficulties in financing large budget deficits without adverse effects on inflationary expectations and concern about the rapid increase in governments' indebtedness. There is also an external constraint on countries with a weak balance of payments. Together, the persistence of high rates of inflation, low levels of profits and capacity utilisation, large international payments disequilibria and periods of disorderly exchange-market conditions have depressed business confidence. A further significant factor has been uncertainties about the future supply and price of energy, resulting in part from delays in the implementation of effective energy policies. Under these conditions, private investment has not responded as expected to the action taken to stimulate aggregate demand.

> *"The only way there will be losers is if we fail to agree on a strategy for concerted growth which marries the needs of the South to the requirements of the North: and, if we still have not learnt that lesson, the losers will be the men, women and children of North and South alike."*
>
> Andrew Peacock, Minister for Foreign Affairs, Australia

While recognising these constraints, Ministers reaffirmed the decision they took in 1976 to aim for a moderate but sustained rate of expansion, sufficient to achieve a progressive return to full employment over a number of years, but not so fast as to risk the re-emergence of bottlenecks and an upsurge of inflationary expectations. In line with this strategy, Ministers agreed that there is a clear need to step up economic growth in the OECD area as a whole above the rate experienced over the last 18 months so as to reduce unemployment. While expansionary demand management policies have a role to play, this cannot be achieved simply by injections of additional purchasing power. The difficulties now facing the world economy are inseparable and cannot be looked at in isolation: growth, jobs, price stability, energy, adjustment to structural change, are only individual facets of the overall predicament facing Member countries today. What is needed now, and over the medium term, is a combination of policies to ensure adequate domestic demand and to create the right environment for sustainable growth, which requires less inflation, the maintenance of an open market-oriented economic system, and a recovery in productive investment and profits.

A key feature of the programme of concerted action set out below is that differentiated action on various fronts by each Member country can, taken together, ease the constraints facing each of them individually:

- the continuation and, in some cases, strengthening of anti-

Left: *France — René Monory, Minister for the Economy.* Centre (left to right): *Ireland — Martin O'Donoghue, Minister for Economic Planning and Development; David Andrews, Minister of State at the Department of Foreign Affairs; Hugh McCann, Ambassador, Permanent Representative.* Right: *Italy — Arnaldo Forlani, Minister for Foreign Affairs.*

inflationary policies in countries with a poor price performance will lessen the risk that faster growth in the OECD area as a whole sets off a renewed burst of inflation;

- action by an important group of countries to achieve faster growth will ease the balance-of-payments constraints on countries in a weak external position;
- by acting together countries will individually need to take less expansionary action, and incur smaller budget deficits, than if they acted in isolation;
- policies to facilitate adjustment to structural changes will help to ensure that rising demand is matched by increased supply potential; and
- stronger policies to encourage conservation and increase production of energy in countries best placed to do so will improve confidence in all Member countries.

Ministers underlined the fact that successful implementation of this programme depends not only on government policy, but also on the extent to which all concerned pursue responsible attitudes towards the determination of prices and incomes. They stressed their conviction that, with the necessary co-operation from both sides of industry, more sustained and better balanced economic growth can be secured with a further progressive reduction of inflation.

A Programme of Concerted Action

Against this background, Ministers have agreed on the following major components of a programme of concerted action.

Demand Management and Stabilization

Ministers agreed on the respective responsibilities of individual Member countries in contributing to faster growth, greater price stability and better payments equilibrium over the next 18 months:

- *Belgium, Canada, France, Germany, Italy, Japan, Switzerland* and the *United Kingdom* should ensure, by appropriate measures as necessary, that the expansion of their domestic demand is significantly greater than in 1977 or, where capacity is already fully utilised, should ensure that total demand increases in line with productive capacity. The *Netherlands* should consolidate the effects of the boost in domestic demand which was achieved last year. The scale and timing of expansionary action by countries in this group should be determined in the light of their internal and external circumstances; in this respect a particular responsibility

DECLARATION (Trade Pledge)

Revised text of the Declaration of 30th May, 1974, adopted by Governments of OECD Member countries on 15th June, 1978

GOVERNMENTS OF OECD MEMBER COUNTRIES (*)

Considering that though the economic situation is in several respects different from that which prevailed at the time of the adoption of the Declaration in 1974, it is still characterised by the problem of adjustment to higher energy prices and by a number of other serious difficulties such as slow economic growth, high levels of unemployment, under-utilisation of productive capacity in a number of sectors, continuing inflation, serious imbalances in international payments and monetary problems.

Considering that difficulties experienced by certain sectors, often simultaneously in many countries, reflect the continued weakness of demand together with structural changes such as shifts in relative prices, in competitive positions, and in production and trade patterns.

Considering that these difficulties constitute an important source of tension in the trade field and that therefore the risk remains that unilateral trade and other current account measures could touch off chain reactions of protectionism.

Considering that all Member countries are affected by these developments, though in varying degrees.

AGREE:

that the nature and size of these difficulties continue to call for wide co-operative action in the fields of economic, trade, financial, monetary, investment, energy, employment and development policies, designed notably to achieve more satisfactory, sustained and balanced economic growth;

that the financing of international payments deficits remains a difficult problem of certain Member countries and that, accordingly, Member countries will co-operate fully to facilitate such financing and are ready to consider appropriate arrangements which may prove necessary in this respect;

that unilateral trade or other current account measures by one or more Member countries to deal with the current situation would aggravate the problems of other countries without solving the underlying difficulties in a longer term perspective and, if generalised, would be self-defeating and have a depressing effect on the world economy;

that countries have responsibilities both as importers and exporters to avoid disruption of regular trade flows;

that, in the case of sectoral problems, every effort should be made to identify them before they assume critical proportions and that action in this field should bring about adaptations through measures which do not transfer the burden of adjustment to trading partners and which avoid or minimize distortions to trade;

that there is therefore a continuing need for a joint undertaking, having as its objective to prevent unilateral action which may have a detrimental impact on international economic relations;

that the successful outcome in the near future of the Multilateral Trade Negotiations in both industrial and agricultural areas and its implementation will improve and strengthen the open, multilateral trading system;

that, with a view to stimulating mutually beneficial growth of world trade, there is a need to improve the trade relations between industrialised and developing countries.

REAFFIRM THEIR DETERMINATION, in the light of the foregoing and for a period of one year:

- *to avoid having recourse to unilateral measures, of either a general or a specific nature, to restrict imports or having recourse to similar measures on the other current account transactions, which would be contrary to the objectives of the present Declaration;*
- *to avoid measures to stimulate exports or other current account transactions artificially; and, inter alia, abstain from destructive competition in official support of export credit and aim at continuing progress in co-operative action to this effect;*
- *to avoid export restrictions which would be contrary to the objectives of the present Declaration;*
- *to consult with each other, making full use of the general procedures of consultation within OECD, in order to assure that the present Declaration is properly implemented;*
- *to implement the present Declaration in accordance with their international obligations and with due regard to the special needs of developing countries.*

(*) Including the European Communities.

lies with countries in a strong balance-of-payments position. Such action should not undermine anti-inflationary policies.

• *All other Member countries,* who are not currently in a position to take explicit action to expand domestic demand beyond what is now in prospect, should concentrate primarily on reducing inflation and improving their balance-of-payments position. Most countries in this group can accept the faster growth which concerted action will impart through a stronger rise in their exports. But in a few of them, where activity has been increasing briskly and demand pressures are quite strong, increased exports resulting from concerted action should be accompanied by reinforced stabilization policies which prevent any net addition to total demand. It is particularly important that the recent acceleration of inflation in the *United States* should be reversed.

Maintenance of an Open Market-Oriented Economic System

Ministers agreed that firm commitments to maintain an open market-oriented economic system are essential to the success of this programme. To this end, Ministers:

• Reiterated their commitment to an open multilateral trading system and decided to renew the Declaration to this effect of 30th May, 1974, with a new preamble which takes into account developments since then and reflects the spirit in which they intend to pursue its implementation (see box to left).

• Reaffirmed their determination to bring the Multilateral Trade Negotiations to a successful outcome in the near future.

• Expressed satisfaction that the negotiations for an Arrangement on guidelines for officially supported export credits had been successfully concluded in February. The United States and Canada

> *"Economic growth is the most efficient way to fight against protectionism and to ensure that the Trade Pledge is promptly adhered to. The Pledge also has to be viewed as an element directly linked to the strategy for concerted action. It is an instrument devised to reduce the obstacles to structural adjustment and to secure expansion of world trade."*
>
> Paavo Väyrynen, Minister for Foreign Affairs of Finland

Roy Jenkins (left), *President of the EEC and Cyrus Vance, Secretary of State, United States.*

Ransley V. Garland (left), *Minister for Special Trade Representations, Australia; Brian Talboys, Deputy Prime Minister, Minister of Foreign Affairs, New Zealand.*

Denmark — Otto Moeller (left), Under-Secretary, Ministry of Foreign Affairs and Lise Östergaard, Minister of State, Ministry of Foreign Affairs.

Left to right — *François-Xavier Ortoli, Vice-President of the EEC; Michael Blumenthal, Secretary of the Treasury, United States; Denis Healey, Chancellor of the Exchequer, United Kingdom.*

requested other Participants in it to enter into negotiations for the substantive improvement of the existing Arrangement. Other participants were not in a position to react definitively to this request on this occasion. However, in recalling that the Arrangement had only come into force in April, they noted the provision in it for reviews at regular intervals, starting this autumn, of its operation in practice and that these reviews would provide the opportunity to consider any further suggestions for reinforcing administration of the guidelines.

• Agreed on the general orientations for policies to facilitate the structural adjustments needed to sustain faster economic growth (see page 10).

Energy

Ministers took note of the decision as adopted by the Governing Board of the International Energy Agency at Ministerial level on 6th October, 1977. They stressed that strengthened energy policies form an essential part of the concerted action programme. While recognising that considerable progress has been made, Ministers underlined the following orientations for energy policies and agreed that they need to be pursued vigorously:

• Countries where energy pricing is still below world levels should pay particular attention to this element in energy policies since the price mechanism is one of the most important instruments for promoting increased efficiency of energy use and for expanding energy supplies.

• More should be done to achieve greater energy conservation, to replace oil by other forms of energy (particularly by expanding coal use, assuring adequate nuclear programmes as appropriate and developing stable and reliable conditions for trade in coal and nuclear fuels and technologies) and to encourage expanded oil and gas exploration and development and intensified research and development for new energy technologies. A key requirement is the need to resolve as soon as possible conflicts which may exist between energy requirements and important environmental, regional, safety and security concerns.

Given its predominant weight as both a consumer and producer of energy and the cost of oil imports to its balance of payments, it is of decisive importance that the United States should complete the adoption of a comprehensive energy policy along these lines as soon as possible. At the same time, other Member countries have, in the aggregate, an equally important contribution to make, and Ministers agreed that in these countries energy policies need to be strengthened further (see page 27).

Monetary Cooperation

Implementation of policies along the lines described above, particularly if adopted in the framework of a concerted programme, will not only improve the prospects for economic growth, but will also help to reduce existing payments imbalances and thereby contribute to greater stability in foreign exchange markets. Ministers agreed that monetary policy has an important role to play in the achievement of these objectives. While recognising that exchange rates need to reflect underlying economic conditions, Ministers agreed that their countries will continue to co-operate closely and to intervene in exchange markets to counter disorderly conditions. Greater stability in foreign exchange markets will, in turn, improve confidence and help to achieve sustained economic growth.

Ministers agreed that the prompt implementation of the various components of this programme of concerted action should be followed up in the appropriate bodies of the Organisation.

Ministers noted the work undertaken with respect to the Communiqué issued after their last meeting concerning the particular problems of the less-industrialised Member countries, and agreed that the outcome of this work should be reported to the next meeting of the Council at Ministerial level (see article page 23).

Global Interdependence and Relations with Developing Countries

Ministers reviewed relations with developing countries in the perspective of development co-operation and the management of global interdependence. Recognising that the prosperity of the OECD countries cannot be pursued in isolation, they emphasized the importance of strengthened co-operation with the developing countries to advance common interests in efficient global economic management and mutually beneficial changes in the structure and balance of the world economy. They also stressed the need for positive policies for increased and more effective support of accelerated economic and social development of the developing countries. They noted with satisfaction the recent establishment of the United Nations General Assembly Committee of the Whole as a new form of dialogue on global economic issues with the developing countries. They expressed the hope that its work would be developed constructively and affirmed the determination of their governments to work to this end.

"We should welcome the development of the advanced developing countries which are succeeding in achieving industrialisation because it will contribute to the expansion of the world economy... With the aim of achieving both expansion and equilibrium in world trade, we must adopt the following basic position: that we will accept an expanded inflow of manufactured goods from these countries, and that, in accordance with their stage of development, will request them to liberalize their markets... In order to adjust our economies to the situation brought about by the development of these countries, we must work for increased rationalisation and sophistication in our own industries."

Nobuhiko Ushiba, Minister for External Economic Affairs of Japan

"We must adjust our economies to the very rapid surge of production of manufactured goods in the more advanced developing nations. We have for years encouraged the cry for "trade, not aid". Quite a number of nations are ready to take us up. We must keep our markets open to these nations and adjust our own production to supply the goods these nations seek. At the same time these countries must come to a better understanding of their responsibilities in opening their markets and reducing and eliminating their export subsidies."

W. Michael Blumenthal, Secretary of the Treasury, United States

"It would seem to be common sense to mobilise the under-utilised savings existing in the world and to transfer them, in larger measure, from industrialised and OPEC countries to the developing world."

Per Kleppe, Minister of Finance, Norway

"Our task is extremely difficult because we are aware that there are at one and the same time two imperatives, which are liable to appear contradictory unless we can overcome the apparent dilemma with which they present us. One of them would require us, in order to restore the major equilibria that have been upset and re-establish harmonious processes of adjustment, to manage the world economy cautiously, steering our ship skilfully and accurately. What the other tells us to do, in order to give the Third World its rightful place and bring it into the upward spiral of expansion for its own benefit and for our own, is to be somewhat bold in making the changes that are needed. Can these two imperatives be reconciled?"

Louis de Guiringaud, Minister of Foreign Affairs, France

Interdependence, Trade and Adjustment

Ministers discussed recent changes in the pattern of world production and trade, with particular reference to the industrial advances made by some developing countries. While, especially under conditions of slower growth, these advances have been a factor in adjustment problems in a limited number of industrial sectors, Ministers agreed that trade with developing countries has brought positive benefits to both parties, and that there is a mutual interest in continued expansion of such trade. Ministers reiterated their commitment to an open multilateral trading system on a worldwide basis and re-affirmed their readiness to adjust to changes in the pattern of world production and trade. Renewal of the Trade Pledge, a successful outcome to the Multilateral Trade Negotiations and endorsement of the need for more positive adjustment policies will contribute to this end.

At the same time Ministers noted the advantages which would follow to the world economy in general, including to other developing countries, if developing countries with stronger economies would progressively adapt their trade and other policies in line with their level of development and overall financial strength.

Interdependence and International Public and Private Investment

Ministers noted that increased investment in developing countries would contribute to sustained and more balanced world

economic growth as well as enhancing development in the countries concerned. Both developed and developing countries therefore should have a mutual interest in measures to stimulate investment in developing countries on an economic basis. Among the sectors mentioned were energy, food production, raw materials and processing and related infrastructure. In this connection, Ministers noted the importance of current and prospective negotiations to expand the lending capacity of the international and regional development finance institutions. They agreed to examine within the Organisation the utility and feasibility of other measures designed to increase investment flows to developing countries, building on existing institutions and mechanisms. Such measures clearly need to be compatible with the development objectives of the countries concerned and would naturally have to be worked out in close co-operation with the developing countries. These measures, which should also be of a kind to stimulate investment in least developed countries, should be explored in the framework of positive development co-operation including increased aid.

Energy Co-operation

Ministers also emphasized that the energy problems of the future would affect all countries and would need to be tackled by all countries working in co-operation. They reaffirmed their willingness to engage in such co-operation, especially with the developing countries.

Development Co-operation

Ministers agreed on the need for an evolving approach to development co-operation to help developing countries in their efforts to strengthen and diversify their economies, to secure decent conditions of life for their people, and to participate increasingly as more equal partners within the world economy. In particular, stepped-up collaborative efforts are required to help ensure that the basic needs of the world's poor are met and to encourage constructive structural change in international economic relations, leading to a more equitable and stable international economic system. Ministers noted the disappointing overall recent level of aid flows. (See page 19.) However, they welcomed the performance of some donors and the statements by a number of other donors on plans for expanding their aid allocations and taking other measures to make their official assistance more effective. Ministers of OECD countries, donors of aid, reaffirmed the intention as expressed by their countries in different fora to increase effectively and substantially their official development assistance and to achieve an improved balance of their efforts in this regard. They agreed to examine further how best to ensure that larger aid allocations are effectively spent.

"The OECD countries' growth rates continue to be a decisive factor in securing a dynamic development of the Third World. What is new, however, is that the developing countries themselves more and more influence the growth rates of the OECD countries. One thing has become clear: more rapid growth in the developing countries can be a stimulus to expansion which could help the OECD countries to return to sustained growth rates. Growth and development have thus become a common objective and a common responsibility. It has become apparent that responsible co-operation requires us to do more than just remit development aid checks, however important that may be."

Hans-Dietrich Genscher, Federal Foreign Minister, Germany

Other Matters

Illicit payments

Ministers expressed their satisfaction with the substantial progress made this year by the special working party of the United

POLICIES FOR Some General

Certain industries, regions and groups in the labour force have been particularly hard hit by the sequence of events since the early 1970s — the synchronous boom, inflation and the oil crisis — which have changed relative prices, cost structures and patterns of demand. Adjustment to these changes has been rendered more difficult and painful by slow growth, high unemployment and longer-run trends which have increased fixed costs.

Given the persistence of abnormally high unemployment there has been a short-term case to cushion the impact of these changes by selective measures designed to maintain existing employment and preserve existing productive capacity. Over time, however, there is likely to be a deterioration in the trade-off between the short-term economic and social benefits from such measures and their longer-run costs. Action to provide help at the specific point at which labour is about to be laid off, or producers to go out of business, will, if rolled forward, often turn out to be action to support employment where labour is being used least efficiently or to pro-

"Adjustment can never be painless, but we have to work positively together to bring about change. There is a need for safeguards: every government has a duty to ensure that the pace of adjustment is carefully modulated to reduce hardship to a minimum. Otherwise social and political pressures can lead to the adoption of far cruder policies. But there must be 'safeguards against safeguards' to ensure that the legitimate interests of exporters are also protected. The purpose of safeguard action is to smooth out the effects of adjustment, not to arrest the process."

Frank Judd, Minister of State for Foreign and Commonwealth Affairs, United Kingdom

"Policies to assist industries in difficulty should not become prolonged protection. OECD has taken the initiative to develop specific criteria for distinguishing the important dividing line between adjustment policies and protection. If each of us ensures that actions to support specific sectors or companies in trouble are reduced progressively; if we link such support with policies to encourage the phasing out of obsolete capacity and the promotion of viable enterprises; if we resist raising prices to protect inefficient producers—in short, if we follow the OECD criteria—we can avoid the danger that adjustment policy will become a disguised form of protection for inefficiency."

Cyrus Vance, Secretary of State United States

Nations Economic and Social Council in the preparation of a treaty to prevent illicit payments in connection with international commercial transactions. They expressed the wish that subsequent progress would permit that a conference of plenipotentiaries could be convened at the earliest possible date.

ADJUSTMENT: Orientations

duce products for which there is no longer a market. The economy will gradually become both less productive and more inflation prone. Moreover, such domestic measures may have much the same effect as protection at the frontier in enabling inefficient producers to compete with foreign suppliers and in delaying necessary structural adjustments. They may both create a vested interest in protection in the country concerned, and provoke protectionist reactions in other countries.

A more constructive approach is to further adjustment to new conditions, relying as much as possible on market forces to encourage mobility of labour and capital to their most productive uses. At the same time, governments are pursuing other social and political objectives concerning the social and physical environments, the distribution of income, and the fair sharing of the burden of adjustment to structural change. It is essential, however, that these goals should be sought through policies which minimise any resulting costs in terms of reduced economic efficiency.

It is difficult for countries to shift away from defensive action to prop up weak sectors unless overall demand is rising fast enough to provide alternative employment elsewhere. Equally, however, a progressive shift away from defensive policies is necessary, along with appropriate macro-economic policies, to ensure sustained growth. Otherwise, with labour and capital locked into declining activities, bottlenecks will emerge and renewed inflation will constrain expansionary policies and undermine the recovery. A progressive shift to more positive adjustment policies must, therefore, be an integral part of the programme of concerted action for more sustained and better balanced growth in the world economy.

While there is a close interrelationship between growth and adjustment policies, it should not be interpreted rigidly. In some cases, action can and should be taken in advance of achieving faster growth. This applies generally to measures designed to avoid introducing further rigidities into the economic system or to alleviate existing ones. It may also apply where the budgetary costs have become too high, or where labour and capital need to be shifted in the interest of improving the competitive strength of countries with a weak balance of payments, or of shifting resources away from the export sector in countries with an excessively strong external position. On the other hand, there may be cases where the phasing out of temporary measures with a high short-term social return and relatively low short-term economic cost can be left until appreciable progress has been made in reducing unemployment.

In sum, a reasonably strong rise in aggregate demand and the prospect of sustained growth are required if governments are to shift to more positive adjustment policies, but the rise in demand will not be sustainable unless such a shift is started at the earliest possible opportunity.

Industrial Policy

In responding to requests for help from enterprises in the industrial sector in financial difficulty, it should be recognised that under normal conditions there is usually a presumption against selective action to assist loss-making activities, in favour of more general measures. Where the difficulties being encountered are mainly cyclical, they will normally be best handled by measures to facilitate access to external sources of finance and to raise demand and improve profitability in the economy as a whole. Even where the difficulties are more deep-seated, reflecting unanticipated adverse trends in demand or competition from other sources of supply, special intervention will normally only be justified if the economic or social costs of the necessary adjustments are likely to be unacceptably high in the short run, and cannot be adequately handled through existing policies to ease the burdens of adjustment. Thus, cases where specific action to protect or support individual sectors or companies in financial difficulty can be justified, and are likely to be successful, should be relatively rare.

Where, nevertheless, governments find it necessary to intervene, experience has shown the importance of the following criteria:

- Action should be temporary and should, wherever possible, be reduced progressively according to a pre-arranged timetable.
- Such action should be integrally linked to the implementation of plans to phase out obsolete capacity and re-establish financially viable entities, without, however, seeking to raise prices above levels providing an adequate return to efficient producers.
- The cost should be made as evident as possible to decision-makers and the public at large. Careful attention should be paid to the cost to consumers of action which raises prices, to the cost to taxpayers, and to the effects of subsidised competition on employment elsewhere.
- Where public funds are being injected into the private sector, it is desirable that private risk capital should be involved.
- Assistance given on a company-by-company basis should be framed so as to provide an incentive for improved management practices, notably by ensuring sufficient domestic and international competition.
- Where the primary objective is to support employment in particular regions or towns, consideration should be given to action that can benefit any eligible company in the area concerned, rather than only those in financial difficulty.
- While recognising that governments must pay due regard to the interests of national security, care should be taken to see that arguments based on considerations of self-sufficiency should not be misused to justify measures for protection and support.

To varying degrees, OECD governments have tried to follow industrial policies aimed at "picking the winners". Experience shows, however, that this is far from easy, particularly for industrial countries at the frontiers of technological progress and changing patterns of consumption, and possessing roughly similar factor endowments and management skills.

There are, however, directions in which according to country circumstances, policies based on rational economic criteria may seek to supplement market forces in promoting desirable developments. For example:

- There are certain areas where markets are unlikely adequately to reflect and anticipate future economic and social needs. This applies, for example, to research and development and investment in producing and saving energy; to improvements in environmental quality, health care, urban infrastructure, etc.
- Recent difficulties have caused many companies to reduce long-term research in advanced technologies involving large investments, in favour of research to meet more immediate requirements. Governments should, therefore, ensure that adequate incentives for long-term research and development exist.
- Since much technological progress and response to changed demands has come from small and medium-sized companies, there is a good case for strengthening policies designed to ensure

that they have adequate access to venture capital and incentives and opportunities to innovate, specialise and modernise.

Employment and Manpower Policies

The longer slow growth continues, the more important it becomes to ensure that measures to protect employment do not preserve unviable industrial structures, impede technological change and distort trade flows. The very success of such policies in alleviating unemployment can lead to strong pressures to carry them forward into the medium term.

There is a particularly strong link here between the conditions for sustained economic growth and a shift to more positive adjustment policies. To meet longer-run economic and social objectives:

- There should be renewed emphasis on supply measures such as training, mobility and placement to facilitate adjustment to shifting demands, technological progress and changing patterns of trade.
- Job creation programmes should be targeted more directly to benefit clearly-defined disadvantaged groups encountering structural employment problems (youth, women, minorities and other target groups).

As the general expansion of output gathers sufficient momentum to bring about sustained reduction in unemployment:

- General incentives to prevent redundancies should be phased out, or replaced by schemes which encourage taking on additional workers in other activities.
- Temporary job creation schemes in the public sector which merely serve to maintain employment in place of income support should be scaled down, while continuing to develop programmes to meet legitimate needs for increased public services.

Action is also necessary to reduce the rigidities and distortions in the labour market which have become increasingly apparent under conditions of slow growth:

- Improved job security cushions the impact of change on individuals, gives them more time to adjust and provides compensation for the economic and social costs involved. At the same time, however, it may slow down necessary shifts in employment and may inhibit the investments called for by technological change; under conditions of slow growth, it also discriminates against those without jobs. In countries where this is a serious problem, there is a good case for shifting more of the costs of changing jobs (redundancy payments, retraining, etc.) from employers to society as a whole, either by taking them over directly or by providing compensation through the tax or transfer system.
- Companies' ability to compete can be hampered and distorted by arrangements for financing social security which have the effect of levying a heavy tax on employment, particularly on the lowest paid workers. This introduces an unnecessary bias in favour of labour-saving investment and against labour-intensive activities — which, paradoxically, the government may find itself having to protect or subsidise to enable them to compete with competition from "low wage" countries. The situation in this respect varies greatly between countries, but in some countries there appear to be good grounds for shifting from what are, in effect, taxes on the use of labour, to taxes on income or expenditure.
- Better functioning of the labour market calls for efforts by governments, unions and employers to ensure that the structure of wages does not inhibit the adjustment of labour supply to changing needs and adversely affect the employment prospects of certain types of labour.

The capacity and willingness of labour to adjust to changing employment patterns is also influenced by the arrangements for providing income support to the unemployed. While such arrangements are essential to alleviate social hardship, and to give workers time to find new jobs suited to their needs and abilities, they should be carefully designed to ensure that, over time, they do not unduly affect attitudes to work and willingness to accept necessary change. Under conditions of persistent slow growth, there is also an increasing need for special employment programmes directed to the long-term unemployed.

Agricultural Policy

Policies towards agriculture have traditionally been influenced by broad social and political objectives, taking into account different national conditions. As part of these policies considerable emphasis has been put on increasing agricultural productivity in OECD Member countries. Under conditions of slow growth, these policies have helped to support agricultural incomes and employment at a time when there have been fewer employment opportunities for surplus agricultural labour in the rest of the economy. Although, in this respect, these policies have a stabilizing effect, they involve risks and costs as set out above. Under present difficult conditions with continuing inflationary dangers, it is particularly important to ensure that agricultural policies, no less than the other policies discussed above, are designed to achieve their social, economic and political objectives at minimum cost to the consumer and taxpayer without neglecting the legitimate interests of the agricultural producers and while ensuring the necessary overall food security. More generally, it is advisable to seek improvement in the functioning of agricultural markets as well as in their stabilization.

Regional Policy

A recent OECD review of regional policies noted that there had been a shift towards assistance which was not regionally differentiated but went to sectors or enterprises facing severe structural problems or other difficulties. But since such support will not help to develop viable new industries in the weak regions, there will be a strong case for shifting the emphasis progressively back to measures more likely to be beneficial over the longer term, such as the provision of infrastructure and regionally differentiated fiscal arrangements.

Regulatory Policy

In order to increase the ability of the economy to adjust to new conditions, governments could do more to reduce the uncertainties and the additional costs caused by their own policy actions. This implies efforts to avoid unnecessary regulation and reporting requirements, and to maintain better co-ordination, clarity and continuity in government regulations, including those regarding safety, health and the environment.

International Co-operation

Continuation of defensive measures and lack of longer-run restructuring programmes in some countries will make it politically difficult for others to pursue their own adjustment policies. Collective agreement on the need to shift from defensive to more positive adjustment policies in the areas of industrial, employment and manpower, agricultural, regional and regulatory policies, as part of a concerted programme for more sustained and better balanced growth, will make it easier for each Member country to follow appropriate domestic policies, and to honour its commitments under the OECD Trade Pledge. It is also an affirmation of Member countries' willingness to adjust to changes in their trade in manufactures and other products with developing countries. Continued efforts for co-operation and co-ordination of adjustment policies in the appropriate fora, whereby current and perspective developments are reviewed, analysed and discussed, should help governments to formulate policies which take into account possible impacts on other countries and involve a fair sharing of the costs of adjustment.

A research project designed to help governments place their day-to-day actions in a context that is both long-term and world-wide, OECD's

INTERFUTURES

(more formally entitled a study of "the future development of advanced industrial societies in harmony with that of developing countries") was launched two years ago (1).

Intended to relate short and medium-term concerns to the long-term outlook, the Interfutures research project explores the problems which will face OECD countries between now and the year 2000. This means examining not only the likely course of events within these countries and in the developing world but also the interactions between the two, the aim being to assess the importance of structural changes which will affect the economy of the world as a whole.

Based on the premise that many exercises in exploring the future fail to analyse sufficiently the existing data, Interfutures has begun its work with a systematic review of a large number of world problems (see below), examining what has already been done in all parts of the world, highlighting the main trends, asking the key questions and only then moving on to examine likely future trends.

After this preliminary phase, the team was organised into three working groups. The first is making macro-economic projections to serve as a framework for the study and, more specifically, examining the outlook for international trade. The second group is concerned with changes in values and the resulting new demands which may make themselves felt in advanced societies and is also analysing the structural and sectoral changes likely to affect economic activity, both in these societies and in the developing world. The third group is focussing on the long-term outlook for the developing countries and is also responsible for integrating the separate strands of study and constructing scenarios of world development. Thus the conclusions of the Interfutures research project, which will be presented in a final report at the end of 1978, will be based on both macro-economic analyses and models and micro-economic or structural analyses of the main industrial sectors. The scenarios obtained are designed to facilitate understanding of the interaction between economic, social and political factors and to explore consequences of various possible strategies that might be adopted by OECD Governments.

(1) Eighteen countries are taking part in this project, which was initiated by Japan ; Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the United Kingdom and the United States. In addition the project is given financial support by the European Communities.

PRELIMINARY PHASE OF INTERFUTURES

Interfutures' exploration of the future is based on twenty-one studies (2): an anlysis of long-term problems as seen today; a comparative assessment of world models; the likely trend of international relations in the last quarter of the 20th century; the impact of Eastern Socialist countries on North-South problems; armaments and long-term development; population; energy; food and agriculture; raw materials; the international division of industrial labour; the future of technology in advanced industrial societies; problems of technology transfer between advanced and developing societies; the physical environment; trade; long-term aspects of the monetary system; debt, aid and finance issues; the dynamics of advanced industrial societies; evolution of the developing countries; institutional problems; towards partial and global scenarios; and long-term issues for the advanced industrial societies.

In order to evaluate the outlook for the Third World countries, 15 experts from these countries were asked for reports. Then five seminars were held with these experts and members of the Interfutures team. They dealt with the evolution of the five major regions of the developing world: Southern Asia, South-East Asia and the Far East, the Arab countries, Latin America and Black Africa.

(2) In their present form these studies are for internal use.

INDUSTRIAL RAW MATERIALS

Physical vs Political, Economic and Social Scarcity of Minerals

by Wolfgang Michalski, Deputy Director, Interfutures

The outer crust of the earth consists of 92 natural elements. Only nine of them including aluminium, iron, magnesium and titanium constitute 99.06 per cent of it. There would be almost no economically viable concentration of minerals if the remaining 83 elements, which make up less than one per cent of the earth's crust, were spread randomly. Thus scarcity with respect to minerals has a twofold dimension — physical availability, which also covers the fact that minerals are non-renewable, and economic availability, which includes possible political and social constraints as well. *Interfutures* has examined both aspects, and some of the results are presented here.

Resources and Reserves

With regard to geological proof of existing concentration and the degree of viability of mineral extraction, the starting points for consideration are hypothetical and identified resources on the one hand and reserves on the other. Reserves are that portion of the iden-

21 INDUSTRIAL RAW MATERIALS — *Resources, Demand, Geographical Distribution*

	Raw Material	Share of 3 countries 1974	Share of 5 countries 1974	Regional Distribution of Measured and Indicated Reserves-1974 Country and Percentage Share	Resources 1975/76 metal content in million metric tons	Reserves 1975/76 metal content in million metric tons
BASIC METALS	**Iron**	59.4	76.0	USSR (31.1) Brazil (16.6) Canada (11.7) Australia (10.2) India (6.4)	195,000	90,500
	Copper	44.7	58.0	USA (18.4) Chile (18.4) USSR (7.9) Canada (6.8) Peru (6.5) Zambia (6.3) Zaire (5.6)	1,500	408.2
	Lead	58.0	71.9	USA (35.6) Canada (11.5) USSR (10.9) Australia (10.9) Mexico (3.0)	300	150.0
	Tin	50.8	69.0	China (23.6) Thailand (15.0) Malaysia (12.2) Bolivia (9.9) Indonesia (8.3) Brazil (6.0)	37.0	10.2
	Zinc	55.0	68.5	Canada (22.8) USA (20.1) Australia (12.1) USSR (8.1) Ireland (5.4)	245	135.0
LIGHT METALS	**Aluminium**	67.6	78.1	Australia (26.0) Guinea (26.0) Brazil (15.6) Jamaica (6.1) Greece (4.4) Cameroon (3.9) Surinam (3.4)	5,700	3,483
	Titanium	93.0	98.2	Brazil (65.9) India (21.7) Australia (5.4) USA (3.5) Sierra Leone (1.7) Canada (1.6)	1,234	340.1
ALLOYING METALS	**Chromium**	96.5	98.2	S. Africa (73.9) Rhodesia (19.7) USSR (2.9) Finland (1.2) India (0.5) Madagascar (0.4) Philippines (0.4) Turkey (0.4) Brazil (0.3)	1,049	523.2
	Cobalt	69.0	91.1	Zaire (27.7) New Caledonia (27.1) Zambia (14.2) Cuba (13.8) USSR (8.3)	4.3	2.4
	Columbium	89.7	96.4	Brazil (75.8) Canada (7.6) USSR (6.3) Zaire (3.8) Uganda (2.9) Nigeria (2.7)	14.6	10.0
	Manganese	90.5	97.7	S. Africa (45.0) USSR (37.5) Australia (8.0) Gabon (5.0) Brazil (2.2)	3,265	1,814
	Molybden	79.1	96.5	USA (49.5) USSR (15.2) Canada (14.4) Chile (13.6) China (3.8)	28.6	6.0
	Nickel	69.4	87.0	New Caledonia (43.7) Canada (16.1) USSR (9.6) Australia (9.2) Indonesia (8.4) Cuba (5.7)	129.7	55.3
	Tantalum	72.7	84.8	Zaire (55.0) Nigeria (11.0) USSR (6.7) Thailand (6.7) Malaysia (5.4) Canada (4.8) Brazil (4.4)	0.26	0.07
	Tungsten	74.6	87.1	China (53.6) Canada (12.1) USSR (8.9) N. Korea (6.4) USA (6.1)	5.2	1.8
	Vanadium	94.8	97.3	USSR (74.7) S. Africa (18.7) Australia (1.4) Chile (1.4) USA (1.1)	56.2	9.7
ACCESSORY METALS	**Bismuth**	58.4	69.7	Japan (25.6) Australia (19.5) USA (13.3) Mexico (6.2) Peru (5.1)	0.13	0.06
	Mercury	60.8	80.0	Spain (40.6) USSR (10.1) Yugoslavia (10.1) China (10.1) USA (9.1) Italy (8.1)	17,510	4,930
PRECIOUS METALS	**Silver**	65.0	86.7	USSR (26.7) USA (25.0) Mexico (13.3) Canada (11.7) Peru (10.0) Australia (3.3)	0.70	0.19
	Platinum	99.8	100.2	S. Africa (71.3) USSR (26.7) Canada (1.8) USA (0.2) Colombia (0.2)	0.026	0.009
OTHER	**Asbestos**	76.9	83.5	Canada (45.2) USSR (24.8) S. Africa (6.9) Australia (3.6) USA (3.0)	249.4	145.1

and Lifespan of Reserves (1)

Ratio of Reserves to 1975 Demand in Years	*Ratio of Reserves to Cumulative Demand 1974-2000*
177	4.5
62	1.3
49	1.2
44	1.3
41	1.1
> 200	4.0
> 300	4.4
> 200	5.7
78	2.1
> 800	> 10
197	4.9
65	1.4
77	2.1
49	1.1
46	1.2
> 300	7.5
22	0.5
21	0.7
16	0.4
110	3.1
35	0.9

tified (non-speculative) resources from which a useable mineral can be economically and legally extracted at the time of determination. Resources and reserves are "floating figures" not only because of increasing knowledge about the composition and structure of the earth's crust but also because of the economic dimension of what is to be regarded as resources and reserves. If they are defined as the absolute quantities available (in metric tons of metal content, for instance), their amount is dependent also on the developement of metal prices, on extraction, processing and transportation costs with given technologies and on relevant technological changes. If, on the other hand, they are defined in relative terms (such as foreseeable lifespans), the development of demand at given prices, the direct price elasticity, the development of relative prices and the elasticities of substitution have also to be taken into account.

Bearing in mind these relationships, there is no doubt that the statistical data in the table have to be looked at and interpreted very carefully.

Although these data are relatively reliable in the light of present knowledge, some of them need additional comments regarding the bandwidth of existing estimates. Most important in this context is the fact that not all the resource data presented at left include seabed deposits. If these are also taken into account, the resource figures for cobalt have to be increased by another 583 million tons; manganese in ocean floor nodules is reported to be more than 36,425 million tons; the resources of nickel in the seabed are estimated to be 1,305 million tons, those of molybdenum 78 million tons and those of vanadium 107 million tons. In all these cases the increase in resources is far more than 150 per cent or even virtually unlimited as is the case for instance, with cobalt. Other minerals for which resource estimates are considerably increased if ocean floor nodules are taken into consideration are titanium, aluminium, lead, copper and to a smaller extent zinc, iron and chromium.

In the case of lead and zinc, one might add that "subeconomic" and undiscovered resources are not included in the above figures. If already identified but extremely subeconomic deposits such as the Kupferschiefer in Germany and Poland are taken into account as well as some speculative, undiscovered deposits in areas of the world where no deposits have yet been found, total resources of lead may be as high as 1.5 billion tons. And if one does the same for zinc, the corresponding total would exceed 5,000 million tons which is more than 20 times the resource estimate normally used so far.

Not only the resource figures but also the reserve figures are based on average or even conservative assumptions. The data available for copper reserves range from 390 to almost 460 million tons. The reserve figures for lead are between 130 and 173 million tons. Data for zinc indicate the reserves at 159, 185 or even 274 million tons: The estimates for aluminium, chromium and manganese also seem to be comparatively low. The figures for titanium, tantalum and asbestos are to be regarded as less conservative than other estimates.

In any case, the conclusion to be drawn from the table and additional figures is that, including ocean nodules, there are only a very few materials for which the ratio between resources and reserves is less than 300 per cent; in many cases it is far higher. For most of them, the amount of potential reserves already identified indicates that current reserves will rise greatly if there is a certain increase in metal prices and/or a stepping up of technological progress. But even for those materials with a comparatively small margin between resources and reserves, the future development of the latter is not necessarily critical. On the one hand there might be successful prospection in the future, and on the other hand economic factors — of which the development of demand is not the least — are of great importance. One of the best examples of this is aluminium. Here the ratio between reserves and consumption is so great that there is no strong incentive to intensify prospection today.

Even if one admits that there was a boom in prospection and exploration in the Sixties, which may not be represen-

(1) Reserves are defined as being that portion of the identified resources from which the usable material can be economically and legally extracted at the time of determination.

Sources: *US Bureau of Mines and Interfutures calculations;* Regionale Verteilung der Weltbergbauproduktion; *Bundesanstalt für Geowissenschaften und Rohstoffe, Deutsches Institut für Wirtschaftforschung; Malenbaum Wilfred:* Materials Requirements in the United States and Abroad in the Year 2000, *Wharton School of Finance and Commerce, 1973.*

tative for the future, it is interesting to look at the development of reserves over the last 10 to 25 years. In nearly all cases where data are available (such as copper, lead, tin, zinc, bauxite, chromium and molybden, but not tungsten), there have been considerable increases in recent years. And it should be particularly emphasised that these were the years of the highest raw material consumption in history.

It would be interesting to know what part of the increase in reserves can be attributed to the discovery of new reserves, to price increases and to the development of new technologies in the field of mining, extraction, processing and transportation. But the available data do not answer this question. It is practically impossible even to estimate the price/tonnage elasticity of ore reserves with accepted econometric techniques. The time lag between the decision to develop and the bringing of new capacity into operation differs greatly from project to project. Moreover, the investment decision is normally based on a projected return and thus has only an indirect relationship to the price prevailing at the time of the decision or to the actual price in effect when the new capacity comes on stream.

Reserves and Consumption

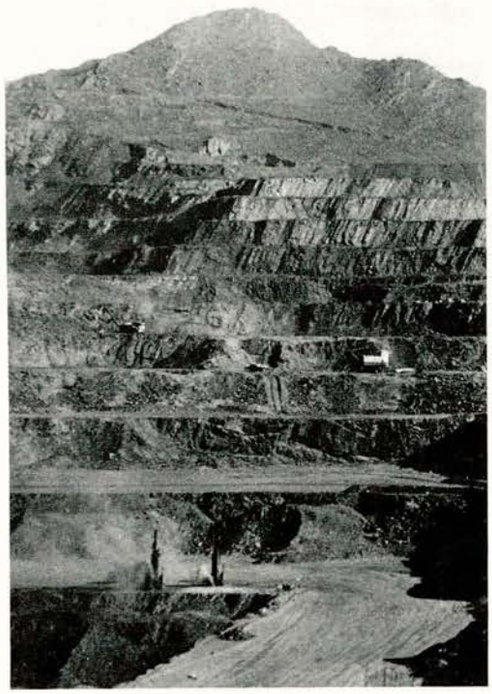
Resources and reserves, however, are only one side of the coin, and it may be argued that information about reserves without reference to consumption is somewhat irrelevant. If, therefore, current reserves are divided by actual consumption, it is possible to get an idea of the lifespan of the reserves; this is a static concept which would indicate when the reserves of raw materials would run out if the level of consumption at the time of calculation were to remain constant. Using projections of future economic development, it is also possible to derive estimates of future mineral consumption. These consumption figures give a dynamic impression of the lifespan of the different materials. A comparison between the given reserves and the expected cumulative demand up to the year 2000 (see last column of table) is highly interesting in this context.

Even if one takes into consideration the uncertainty of these "floating" figures on resources, reserves, lifespans and future demand, one can hardly conclude that there is a general problem of physical scarcity of minerals for the future. According to current knowledge, the situation is more critical for silver, bismuth, mercury and asbestos than for copper, lead, tin, zinc, molybden, tantalum or tungsten. And it may be added that for iron, aluminium, titanium, chromium, columbium, manganese, vanadium and platinum, as to physical availability in a world-wide context, there are really no foreseeable problems at all.

Even in the case of those materials for which given reserves seem less likely to meet requirements up to the year 2000, the situation is less dramatic than statistical data would suggest. Instead of silver, for instance aluminium may be used in mirrors and other reflecting surfaces and tantalum for surgical instruments; stainless steel can replace silver in the manufacture of tableware. As far as bismuth is concerned, iron may be used as a substitute in the production of acrylonitrile for example. Magnesium and aluminium compounds can be used in place of bismuth in pharmaceuticals, and plastics may replace bismuth alloys in holding devices for certain applications. Moreover, if one relates cumulative consumption from 1974 to 2000 not to reserves but to resources, which are potential reserves, the resulting ratio for silver is 1.7 compared with 0.4, and that for bismuth is 1.1 instead of 0.5.

Mercury and asbestos present more difficult problems. Because of mercury's unusual combination of physical and chemical properties, there are only a few satisfactory substitutes for it. This is true in particular for the principal uses — electrical apparatus, industrial and control instruments. However, in paints, agriculture, pharmaceuticals and in the chlor-alkali industry, it is not inconceivable that environmental considerations will tend to reduce the consumption of mercury even more than supply shortages or high prices. For asbestos, there are no substitutes available so far in many applications, particularly for friction materials used in automobiles, trucks and other transportation equipment. Technological advances in production of competitive synthetic asbestos would therefore be most important and this before the end of the century.

Even if asbestos, bismuth or another comparatively scarce non-energy mineral such as barium, fluorine, germanium, graphite, gypsum, indium and mica, not dealt with explicitly here, were to disappear completely — which is rather unlikely — this would pose some problems in specific applications, but it would certainly be possible from a technological point of view, to do without them. If a supply shortage does not occur from one day to the next — and it normally does not as far as natural depletion is concerned — there will be a transition process in which the relative price of that specific raw material will increase and substitutes will be sought where possible. Thus its use for non-essential purposes will cease first and this will stretch the material over a longer period for the essential uses.



It may be misplaced optimism to say that, in general, something will turn up when the crunch comes. But as to the physical availability of minerals for uses other than energy it can be said that there really is no universal or absolute scarcity. If the economic and technical transition process is not disturbed by sudden, unforeseeable breaks, there may be some specific difficulties but no insurmountable or traumatic problems. Thus, the serious concern so often expressed about the exhaustion of resources, which is based on the undeniable but too general and far-reaching assumption that our world is limited, is not relevant to policy decision-making within reasonable time-horizons.

The Regional Distribution of Reserves

Much more important than the question of worldwide scarcity of resources is the regional distribution of the reserves. In most cases the countries in which there are reserves are not those which are the centres of consumption, and in some cases there is also a very high regional concentration of reserves. Therefore the question of access to the raw materials could be of much more importance than the overall physical availability. This is true for most minerals for the EEC and Japan and, in some cases, for the United States.

As a rough description of the regional distribution of the reserves of the raw materials covered in this article, it can be said that 40 per cent of them are held by the industrialised countries (OECD plus South Africa), 30 per cent by the Eastern countries and another 30 per cent by developing countries. More than 80 per cent of the reserves to be found in the industrialised countries are in the U.S., Canada, Australia and South Africa. The USSR possesses more than 80 per cent of the reserves of the socialist countries. In the developing countries too the predominant share of the reserves is held by a very limited number of countries. Consequently, not only Western Europe and Japan, but also most of the East European countries and about 70 per cent of all developing countries have only very limited reserves of minerals.

An analysis of the regional concentration of the reserves of specific metals is even more informative. For eight of the commodities (titanium, chromium columbium, manganese, molybden, vanadium, platinum and asbestos) more than three-quarters of the measured and indicated reserves are found in only three countries. There are sixteen minerals of which more than 75 per cent is held by five countries. And, except for copper, there are no minerals among the twenty-one covered in the Interfutures study for which the five-countries' share is less than 65 per cent.

An interesting exercise in this context is the identification of those minerals for which there is both a high regional concentration of reserves and an extremely high dependence of OECD countries on supplies either from Eastern countries, from developing countries or from South Africa. The most striking examples seem to be platinum, chromium, manganese and vanadium in which South Africa and the USSR predominate and columbium and titanium in which Brazil has a strong position.

As far as the platinum-group metals are concerned, 98 per cent of the world reserves are found in only two countries — South Africa and the USSR. Moreover, each of these two countries specialises in one of the two major metals of the group. South Africa produces more than two-thirds of all platinum and the USSR two-thirds of all palladium. In most present uses — the automotive, chemical, electrical and petroleum refining industries — substitution of other materials for platinum metals is theoretically possible. However, because of the high unit prices of the platinum metals, they are employed even now only when fully justified for technical and economic reasons. Thus, at least in the short-term, politically caused interruptions to supply would be a problem for all OECD countries except Canada.

More than 90 per cent of the reserves of chromium are situated in only two countries — South Africa and Rhodesia. Chromium is mainly used for metallurgical, chemical and refractory purposes. As there is no known substitute for chromium in most metallurgical applications nor in certain chemical uses, chromium is a rather critical material for almost all OECD countries. As long as South Africa's exports continue, an interruption of supplies from Rhodesia could cause only short-term problems. If, however, supplies from both countries, and in particular from South Africa, are disrupted, the supply situation of the Western industrialised countries would become rather uncertain.

Until the exploitation of seabed nodules is started on a large scale, manganese may also be regarded as a crucial material. Again South Africa and the USSR dominate the reserve position. But as present production of manganese is more widely distributed than platinum metals or chromium, it might be easier to adjust over a period of several years in the event of the interruption of supplies from the present producers. Nevertheless, the short-term effects of such an interruption could be quite severe, for manganese is essential for the production of virtually all steels and in its main applications has no substitute.

In many respects the situation for vanadium is different. Although the present reserve situation indicates a strong position for the USSR and South Africa, the actual dependence of the OECD countries is considerably less. On the one hand, other materials such as columbium, molybden, manganese, titanium and tungsten can more easily substitute for vanadium. On the other hand, allowing for a lead time of two or three years to start production, the United States could produce ample supplies — or even be self-sufficient — from domestic reserves while Europe and Japan could buy elsewhere.

Apart from these materials, in which there is a strong South Africa/USSR reserve position, there are a number of other minerals such as columbium, titanium and tantalum, of which three-quarters or more of the reserves are in developing countries, while for tin and tungsten, around 70 per cent of the reserves are in developing countries and China. Of course, the position of each of these materials must be evaluated rather differently. But it is a fact that in most cases, the position of Europe and Japan is far more vulnerable to supply disruption than that of the United States.

Environmental and Social Constraints

Since reserves are defined as that portion of the identified resources from which the useable mineral can be economically and legally extracted at the time of determination, environmental considerations and new and more hostile public attitudes towards resource development also have a great impact on world-wide and on regional availability of raw materials. The great variety of environmental problems in the field of mineral extraction and processing can roughly be divided into four categories: the impact on land, on water, on the atmosphere and on the social environment.

In terms of volume, only six materials — iron, phosphorous, bauxite, manganese, copper and chromite — constitute more than 95 per cent of world mining production. If one assumes that the average growth rate in consumption between now and the year 2000 will be 2.8 per cent for iron and manganese, 3.9 per cent for copper and some 5 per cent for phosphate and bauxite, world mining production will be around 2.5 times the size it is today. Since most of the mining operations for these minerals are carried out at the surface, the question of land use and land rehabilitation is becoming increasingly important.

The same is true in the context of the increased utilisation of lower grade ores. This means, on the one hand that more and more amounts of material have to be moved and extracted for a given unit of metal and, on the other hand, there is a growing problem of waste disposal. Thus, not only will more land be disturbed by the mining activities themselves, but increasingly large amounts of residuals have to be disposed of, much of them in the form of solid wastes.

The case of copper gives an idea of the order of magnitude of the problem. In 1973 for a U.S. mine production of 320 million tons of copper ore, about 758 million tons of waste material were moved and discarded. The 273 million tons of copper ore milled the same year produced approximately 6 million tons of concentrates, leaving some 267 million tons of tailings. And the production of 1.8 million tons of blister copper at the smelting stage was accompanied by an estimated 3 million tons of solid waste in the form of slag. There is virtually no

doubt that the ratio of ore to waste, as well as the ratio of metal to ore, will worsen.

Apart from the waste disposal problem and the increasing area needed for mining as the rate of recoverable mineral per unit of ore and/or material to be moved declines, there is another problem which cannot be neglected: the quality of the land used. If surface mining is extended more and more to areas with fragile ecosystems such as the Arctic or permafrost regions where balances, once altered, are difficult to restore, the rehabilitation of land after mining becomes a particularly severe problem. Progress in rehabilitation will be expensive and slow, especially in areas where the soil cover is thin, micro-organisms are delicately balanced, the overburden in acidity or salinity is high and rainfall is sparse.

As to the impact of mining and raw material processing on water and the atmosphere, the range of problems is vast. Apart from the usual pollution problems such as mine drainage, sulphur discharge and dust and noise emission, one problem deserves special attention because it is, more than most, related to future mining operations. Once the institutional and international agreements are worked out, it is likely that mining on the outer continental shelf and in the deep ocean, still in its early stages, will be a rapidly growing world-wide industry. Unless the technologies developed and used to extract, transport and process the deepsea minerals are completely compatible with environmental objectives, there is a potential danger of serious environmental degradation.

Although the already great and still growing awareness of environmental implications in most developed countries may ensure that these activities, as far as nationally controlled waters are concerned, will start only after satisfactory environmental impact statements have been prepared, this is less certain for international waters or for the rest of the world. Recommendations such as that of the U.S. National Academy of Science that "industry must be willing to disclose data on the technology of mining pertaining to those elements of mining systems that directly intersect with the environment" may sound rather revolutionary. But if a system could be devised whereby proprietary information of the private sector and the marine environment could be simultaneously protected, this would be just as useful as any acceptable international agreement on deep sea mining rights and the distribution of royalties.

The problems negotiated at the Law of the Sea Conference are well known, but the new societal hostility towards resource development is equally important as a social constraint on the increase of reserves. Since many communities do not wish to have minerals developed within or near their boundaries because of adverse environmental and social side-effects, it is no longer axiomatic that, if new mineral deposits can be economically mined they can actually be exploited. On the contrary, in a certain number of advanced countries, the prevailing attitude is more and more one of letting such developments occur elsewhere. Such "not here"attitudes, integrated over a whole country, can quickly be transformed from a local to a national issue.

The United States provides the best example of such a process. By 1968, 17 per cent of all Federal lands had been effectively withdrawn from mining and exploration activities. Withdrawals of land started to accelerate in 1968 and, by 1975, 67 per cent of all Federal land — representing some 500 million acres and as large as any state east of the Mississippi except Maine — had been declared off-limits to miners. The momentum is growing, and if the rate established in 1974 should continue, all public land in the United States — representing one-third of its total land area and containing some of the best mineralised regions — will be closed to mining by 1980.

Even if environmental and social constraints on mineral development prove to be somewhat flexible the importance of the current anti-mining movement should not be underestimated, particularly if there are severe bottlenecks which affect the quality of life by the impact of shortages. The disadvantages of shortages compared with the negative environmental and social side-effects of mining will certainly be evaluated differently from one community to another, thus leaving enough room for effective local opposition. On the other hand, in mining the lead-time between the investment decision and the start of production is so long that the social pressure to reverse the trend may be too late to improve the situation. Finally, because of the increasing amount of energy needed either to mine deeper and deeper or to use progressively lower grade ores, certain aspects of energy policy may also prove to be a social constraint on appropriate long-term mineral supplies. This is of indirect but nevertheless more than marginal relevance. It is not impossible that mining and processing of many materials may become not only resource-limited, but also — and even earlier in some countries — energy-limited.

The tension between materials availability on the one hand and, on the other, environmental quality and even broader societal concerns, may further increase. As far as today's externalities can be internalised in the form of pollution abatement costs or rehabilitation expenditure the market can certainly play its regulatory role. However, materials availability will not only be influenced by rising relative prices which reflect increasing demand and higher costs due to more difficult mining conditions, declining quality of ores and rising expenditure for environmental protection. There are strong indications that availability will be affected by other factors as well, for example by the growing array of assessment procedures to open up the decision process on new investments to the public and long time-lags in reaching acceptable agreements. In many cases such decisions will not be based on the economics of trade-offs or marginalism; they will be absolute and mainly political decisions made on an all-or-nothing basis. As to the flexibility of environmental and social constraints, political will can change rather quickly when severe shortages arise, but to bring new mines into production, improve the energy situation or reactivate mining or processing after it has been closed down may take many years.

* * *

Interfutures' conclusions are that as long as the economic and technical transition process is not disturbed by sudden unforeseeable breaks in development, the "natural" depletion of resources and reserves is not a policy issue; nor is the overall physical scarcity of industrial raw materials. The critical problem is *access* to raw materials because the countries which possess the reserves and which produce them are not necessarily the main consumers. This is true on the whole for both the EEC and Japan and in the case of certain raw materials for the United States as well.

However great the political uncertainty and, more specifically, the likelihood of direct or indirect export restrictions, the tensions between materials availability on the one hand and political and social constraints related to environmental quality and even broader social concerns on the other may increase. Political will can change rather quickly when there are severe shortages but to bring new mines into production, improve the energy situation or reactivate mining and processing after they have been closed down may take years.

Outstanding increases were recorded by Sweden, the Netherlands, Norway and Denmark. I commend the outstanding performance of these four countries.
In contrast, the overall disappointing results of the DAC group and aid performance are due principally to the weak efforts of the United States, Germany and Japan — the DAC countries with the strongest economies of the group. In my judgment it will not be possible to achieve the broad human needs objectives that DAC members have set for the poorest 25 per cent of the world's people without an early and large increase in aid commitments by the three major countries, the United States, Japan and Germany. I call on the governments of these three countries to address urgently this priority need.

Maurice J. Williams
DAC Chairman

DEVELOPMENT AID: ANOTHER YEAR OF DISAPPOINTING RESULTS

Official Development Assistance (ODA)

• *Volume*

Net disbursements of ODA by DAC countries amounted to $14.8 billion in 1977, $1.1 billion or 8 per cent more than in 1976. However, most of this increase in dollar terms was offset by higher prices: the corresponding real flow of ODA resources was only marginally higher than in 1976.

As DAC Members' GNP rose in current dollars by almost 13 per cent between 1976 and 1977, ODA slipped back as a share of GNP from 0.33 per cent in 1976 to 0.31 per cent in 1977, the second lowest ratio in the 1970's, and indeed, since statistics on aid flows were first collected in the mid-1950's.

This disappointing figure is mainly attributable to a further and sharp decline in the ODA/GNP ratio of two of the largest donors, United States and Germany, and the relative stagnation of Japan's ODA/GNP ratio (1). The other 14 DAC countries again improved their performance collectively — their ODA as a share of their combined GNP rose from 0.47 per cent in 1976 to 0.49 per cent in 1977, with particularly outstanding increases recorded by Sweden, the Netherlands, Norway and Denmark. The gap between the countries with dynamic ODA programmes — the Scandinavian countries and the Netherlands in particular — and most of the other DAC Members has been widening continuously over the last five years, largely due to the lower ratios recorded for the United States, Japan and Germany (See Chart).

Any recovery in the aid-to-GNP ratio must rely on improved performance by the big donors. The immediate prospects are uncertain. 1977 commitments, which will to some extent determine the disbursements made in 1978, were only 7 per cent above the 1976 level. By contrast, a number of donors have announced new initiatives, some of which may be reflected in 1978 disbursements. In particular, Japan has announced its intention of doubling its ODA over the next three years. The United States indicated at the Conference on International Economic Cooperation (CIEC) that its ODA would be substantially and progressively increased. The budget submitted to Congress early this year contains projections indicating a doubling of foreign economic assistance between fiscal 1977 and 1982, with a further expansion in 1983.

Twelve DAC countries increased their outflow of ODA in 1977 in dollars and in national currency. Of them, nine raised it as a share of their GNP. Particularly rapid growth was again achieved by *Sweden,* which reached 0.99 per cent of GNP for ODA flows alone (0.82 per cent in 1976). The *Netherlands'* ODA reached 0.85 per cent of GNP after 0.82 per cent, and *Norway* achieved an ODA/GNP ratio of 0.82 per cent after 0.70 per cent in 1976. Good progress was also made by *Denmark* climbing from 0.56 per cent in 1976 to 0.61 per cent. *France* remained on the relatively high plateau of 0.63 per cent after 0.62 per cent in 1976. *Japan's* performance (0.21 per cent compared to 0.20 per cent in 1976) may be expected to improve as measures are taken to implement its stated intentions of doubling ODA disbursements in some three years.

Canada recovered from 0.46 per cent in 1976 to 0.51 per cent. *Australia,* whose disbursements in national currency increased by 22.4 per cent, raised its ODA/GNP ratio from 0.42 per cent to 0.45 per cent, and *Austria's* ODA doubled as a share of GNP from 0.12 per cent to 0.24 per cent, following an administrative reorganisation of its development lending programme.

Among donors reporting lower ODA as a share of GNP, the *United States'* ODA/GNP ratio dropped from 0.25 per cent to 0.22 per cent, the lowest figure it has ever recorded, due mainly to a fall in drawdowns of commitments by IDA. The fall in total US ODA may also reflect lower prices of food aid and difficulties in disbursing committed funds under a number of specific bilateral programmes (2). *Germany* reported a fall from 0.31 per cent to 0.27 per cent. This fall was due in particular to project implementation delays, lack of absorptive capacity in some developing countries and other reasons beyond German control. However, German commitments were 14 per cent up in dollar terms in 1977, and cash authorisations for 1978 are 24 per cent higher, more than double the percentage

(1) These three countries with France are the four largest DAC donors in terms of ODA disbursements (see Chart on next page).
(2) The excess of commitments over disbursements in 1976 and 1977 represents a pool of available funds of some $3 billion, much of which may be expected to flow to developing countries in 1978 and 1979, over and above disbursements related to new commitments in 1978.

increase of the total German budget. The *United Kingdom* reported that project bottlenecks hampered completion of intended disbursements in certain recipient countries, and its ODA/GNP ratio remained unchanged at 0.38 per cent. Decreasing contributions to multilateral organisations by *Belgium* held its total ODA flows to the same figure as in 1976, which, expressed as a percent of GNP, meant a reduction from 0.51 to 0.46. For *Italy,* receipts of amortization exceeded new loan disbursements, leading to a negative figure under this item and a further fall in *Italy's* ODA/GNP ratio from 0.13 per cent in 1976 to 0.09 per cent, the lowest figure ever recorded for any year other than 1964. *New Zealand* reported a near-stability of its ODA figures in nominal terms, and in relation to GNP the ratio declined from 0.41 per cent in 1976 to 0.35 per cent in 1977. *Finland's* aid programme continued to stagnate in national currency. As a share of GNP, it fell slightly from 0.18 per cent to 0.17 per cent. *Switzerland's* ODA/GNP ratio remained at its 1976 level of 0.19 per cent.

• *Structure*

The preliminary figures indicate only minor changes in the structure of ODA resources provided in 1977 compared to 1976. However, the trend observed since 1970 of a rapidly rising share of flows to multilateral agencies may now be weakening. While these flows further increased by $400 million to $4.6 billion, their share in total ODA increased only very slightly at 31 per cent.

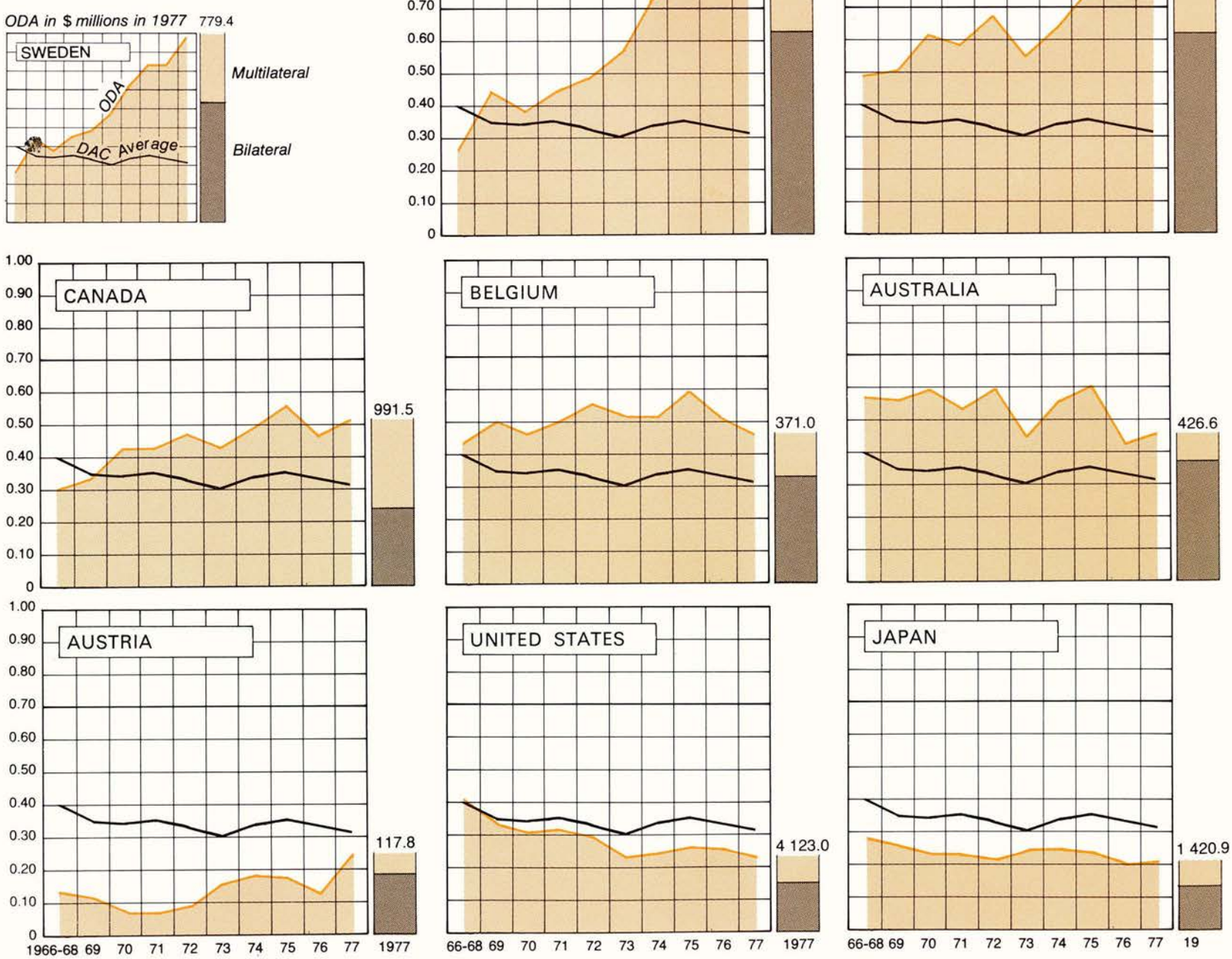
The share of bilateral grants in total disbursements, which reached $7.2 billion compared with $6.5 billion in 1976, rose from 47 per cent to 49 per cent. Of this, technical co-operation represented 20 per cent, compared to 21 per cent in 1976. The volume of net bilateral development loans rose only marginally.

• *Terms*

The very concessional average terms of official development assistance commitments improved slightly in 1977, with an average grant element of 89 per cent, compared to 88.5 per cent in 1976, reflecting an increase in the share of grants in total commitments from 69.6 per cent in 1976 to 71.5 per cent in 1977. The grant element of ODA loans remained roughly at the 1976 level of 62 per cent.

The average grant element achieved of 89 per cent exceeds the standards required by the recently strengthened DAC Terms Rec-

OFFICIAL DEVELOPMENT ASSISTANCE *(Net disbursements)*
1966-1977 as per cent of GNP



ommendation, under which each DAC donor committed itself (3), to reach a minimum grant element of 86 per cent in its ODA programme.

While data are still preliminary, it is clear that 11 countries complied with the 1972 Terms Recommendation (Australia, Belgium, Canada, Denmark, France, Germany, the Netherlands, Norway, Sweden, United Kingdom, United States) compared to 12 countries in 1976. New Zealand reported a sharp decline in ODA commitments, reducing its ODA/GNP commitments ratio to 0.25 per cent, significantly below the DAC average of 0.44 per cent. Of the other 5 countries not complying with the Terms Target, Austria, Finland and Switzerland extend their ODA at highly concessional terms, but their ODA is too low to consider them as qualifying under the Recommendation.

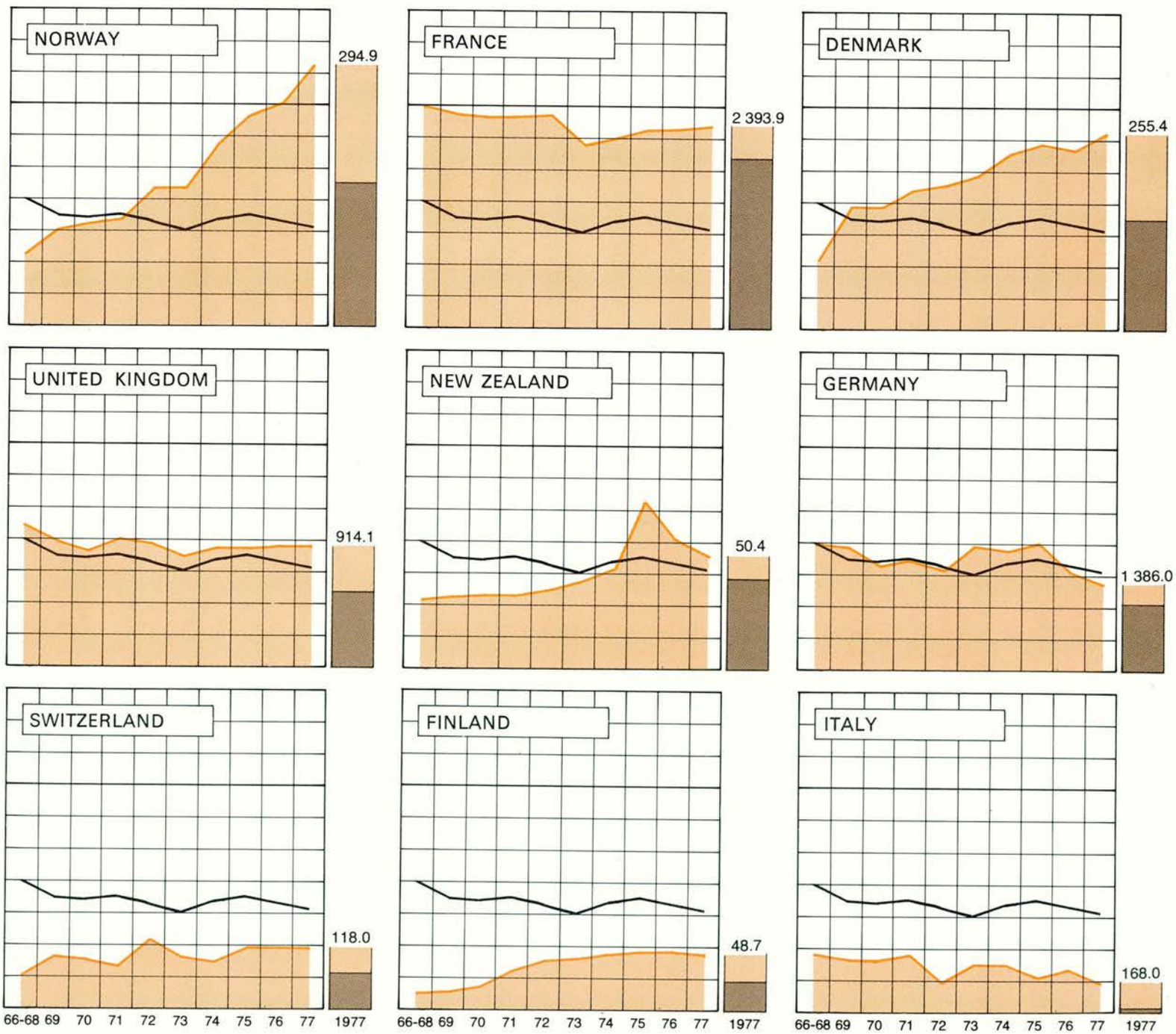
Total Official Flows

In addition to ODA, the official sector conveys further resources to developing countries, in the form of export credits (directly, or by provision of supporting finance for private export credits) and portfolio investment. These resources, referred to as "other official flows", are mainly provided on a non-concessional basis, and tend to be concentrated on the relatively higher-income developing countries. In 1977, other official flows from DAC countries amounted to $3 billion compared to $3.3 billion in 1976. Total official flows, correspondingly, amounted to $17.8 billion, equivalent to 0.38 per cent of DAC Members' GNP, compared to $17 billion (0.41 per cent of GNP) in 1976.

Total Official and Private Flows from DAC Countries

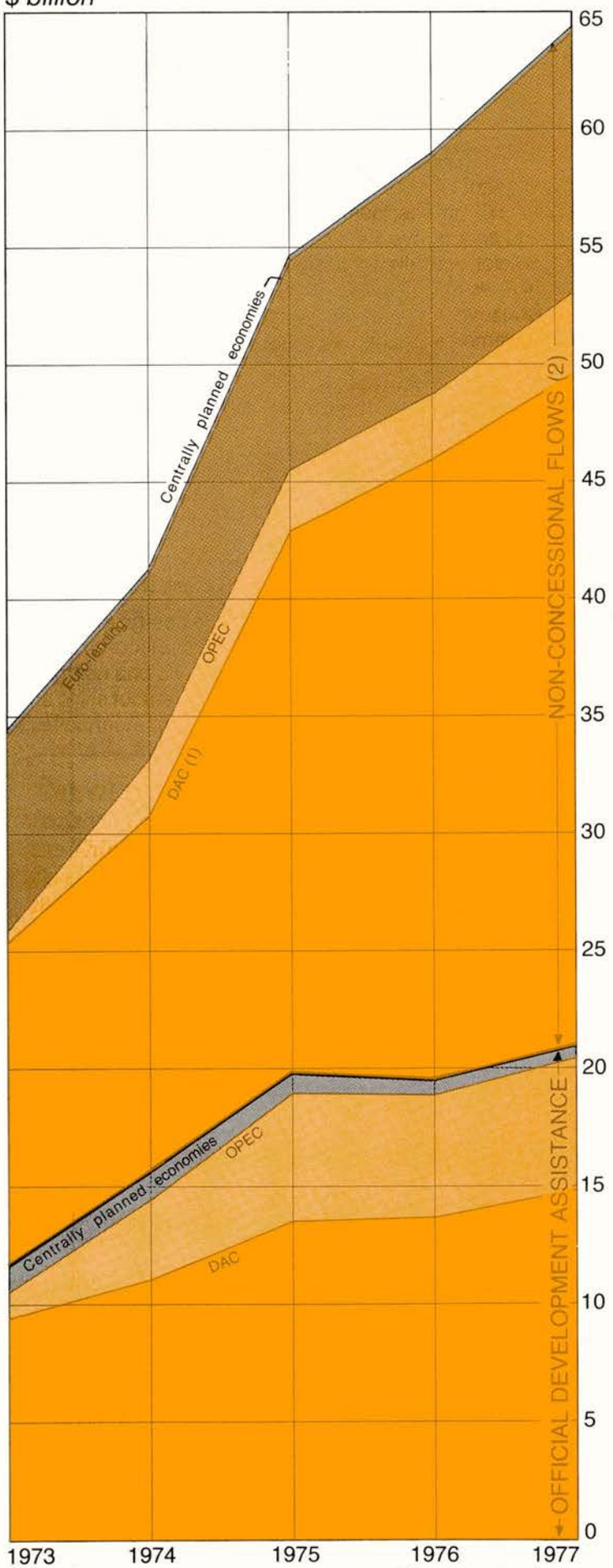
The preliminary data available indicate that total official and private flows from DAC countries combined reached $43.7 billion in 1977 compared to $40.7 billion in 1976, roughly unchanged in real terms. Expressed as a share of GNP, this was a further fall from 0.98 to 0.93 per cent. If international bank lending — practically all of which is undertaken by DAC country banks and their overseas

(3) Except Italy, which reserved its position. Its terms performance as such has in fact been better than those set forth in successive DAC Recommendations, although its ODA volume has been lower than the standards required by them.



TOTAL NET FLOWS TO DEVELOPING COUNTRIES

$ billion



(1) Including multilateral pipeline, i.e. difference between inflow and outflow from multilateral agencies.

(2) Other official and private flows.

branches — is included, the total flow reached $54.7 billion in 1977 (1.17 per cent of GNP) compared to $50.7 billion in 1976 (1.22 per cent of GNP).

The various types of private flows moved differently. Private direct investment recovered from $7.8 billion in 1976 to $10 billion in 1977. Both bilateral and multilateral portfolio investment dropped from $6.1 billion to $4.9 billion and from $3.1 billion to $2.4 billion respectively. By contrast, net private export credits increased further from $5.4 billion to $7.1 billion.

Total Receipts of Developing Countries

In 1973, the year before the oil crisis, the total net resource inflow into developing countries from all sources was $35 billion. It increased to $58 billion in 1975, $59 billion in 1976, and $64 billion in 1977, reflecting to a large extent developing countries' needs of finance as expressed in their current balance deficits, which for non-oil developing countries, amounted to $59 billion in 1975, to $46 billion in 1976, and to $42 billion in 1977.

The additional resources (4) were used in 1976 and 1977 by a number of developing countries to increase their depleted reserves; the total reserves of non-oil developing countries increased by some $11 billion in 1976 and by some $12 billion in 1977. However, as real imports rose, reserves for most non-oil developing countries represent a lower number of months of imports than in the early 1970's (5).

The Chart at left shows total resource flows by major type and origin. Three major sources can be distinguished.

- *DAC Countries*

As already noted, DAC countries provided in 1977 $43.7 billion of net financial resources to developing countries. About one third of this was provided at concessional terms. These flows from DAC countries represent over two-thirds of the developing countries' total receipts; if international bank lending is added, well above four-fifths.

- *International Bank Lending*

International bank lending (sometimes referred to as Euro-lending), is estimated to have amounted to some $11 billion net in 1977 compared to $10 billion in 1976 (6).

- *Non-DAC Donors*

The flow of financial resources from OPEC countries is estimated to have amounted in 1977 to some $9 billion, over 60 per cent of it at concessional terms, compared to $8.1 billion in 1976. Total OPEC flows represented over 3 per cent in terms of these countries' GNP in 1977 and concessional flows some 2 per cent of GNP. The major donors were Saudi Arabia, Kuwait, the United Arab Emirates and Iran. There are no data available for 1977 for aid from the centrally-planned-economy countries, which in 1976 amounted to $0.6 billion.

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(4) Comparison of resource flows and payments deficit figures calls for care in view of differences in the geographical coverage and method of compilation. In particular, movements of capital to OPEC countries ($4-6 billion annually) and transfers of technical assistance ($3-4 billion annually) are included in the resource flow figures, but account must also be taken of other adjustment items.

(5) For non-oil developing countries as a whole, reserves normally represented over 5 months of imports up to 1973. In 1977, reserves represented rather less than 4 months of imports.

(6) Figures subject to substantial revision. They are estimated from data prepared by the Bank for International Settlements, which have been (roughly) adjusted to exclude changes in short-term claims of the banking system, and amounts reported to DAC under bilateral portfolio lending. They include loans by affiliates of DAC country banks resident in offshore banking centres.

In the early 1970s, labour markets began to deteriorate and around 1973 the industrialised European countries took the unilateral decision to restrict the further inflow of foreign labour.
The cessation of migratory flows has multiple repercussions both on the traditional labour-exporting countries and on the highly industrialised countries of the OECD area. To study this new situation and to propose a development strategy which takes account of migration problems, OECD set up a Group of Independent Experts under the chairmanship of Charles P. Kindleberger, Professor of Economics at Massachusetts Institute of Technology (1). The Group has just completed its report which is presented in the following article.

MIGRATION, GROWTH AND DEVELOPMENT

by Charles P. Kindleberger,
Professor of Economics, Massachusetts Institute of Technology

Traditionally, labour migration has been the fortuitous result of a coincidence of needs: excess demand for labour in one part of the OECD area coupled with excess supply in another. It has undoubtedly played a positive role in the growth of European countries since the end of the war.

It permitted the industrialised countries to fill job vacancies with reduced upward pressure on wages and prices. This added to national output in those countries and protected their competitive positions in world trade.

It permitted the less-advanced countries of Southern Europe to export some of their unemployment thus avoiding the cost of providing unemployment compensation. Remittances sent home by emigrants was the main source of foreign exchange for many of these countries and served as a base for financing the import of capital equipment required for development.

Restrictive Measures: Causes...

There are two primary reasons for the reversal of immigration policies in host countries. First, European labour markets began to deteriorate in the late 1960s. Economic performance faltered and although it later picked up momentum briefly, labour markets have given cause for pessimism ever since. With the erosion of excess labour demand, the perceived economic benefits of continued importation of manpower declined precipitously. Simultaneously, there was a perceived rise in the social costs of trying to absorb a continued inflow of foreigners. As the pattern of migration was transformed from temporary rotation to more permanent resettlement, migrants claimed larger shares of public goods and services. Social tension has arisen between migrants and indigenous populations, prompted to some degree at least by competition for shrinking job opportunities.

Restrictions are therefore essentially a response to rising social costs and declining economic benefits. They seem to have three main objectives: to prevent unemployment among indigenous populations; to minimise the growing social tensions created by the presence of large numbers of foreigners; to reduce the host countries' long-term dependence on foreign labour. →

(1) The decision to set up this Group was taken in March 1976 at a meeting of Ministers of Labour of OECD countries, following a proposal made by the Turkish Delegation.

THREE-STEP MACHINERY FOR CONSULTATION

It would be desirable for efforts to solve the problems of migration and of the relationship between OECD industrialised Member countries and developing Member countries to be conducted at different but complementary levels. The Group of Independent Experts therefore has recommended that OECD provide machinery for consultation between emigration and immigration countries. The purpose would be:

- *to permit these countries to begin bilateral consultations now so as to avoid "fait accompli" situations when one country's actions create problems for another;*
- *within the same framework, but perhaps less immediately, to promote agreements — going beyond the traditional "manpower agreements" of the past which were primarily concerned with the supply of manpower to immigration countries — to set up operational programmes to organise better the international utilisation of manpower and to coordinate governmental actions in this field;*
- *in the medium term to develop programmes so that policies leading to the termination of migratory flows are tied to job creation in the countries of emigration.*

In the long term the Group sees a need for a new type of relationship between less-developed and highly-developed countries within the OECD, based on intensified economic cooperation; the aim would be to create a real development strategy which takes into account the rational use of human resources within the OECD area. Such a global and multi-dimensional strategy will have to take account of the evolution of the economy and of the international division of labour as well as the growth targets Member countries will set for themselves for the next two decades.

Migration and Unemployment in Emigration Countries - 1973

	Unemployment rate	*Unemployment rate without emigration*
TURKEY	4.5	5.1
GREECE (a)	1.1	1.4
YUGOSLAVIA	4.2	4.8
SPAIN	2.7	3.4
PORTUGAL (a)	5.3	6.2
FINLAND	2.3	2.6

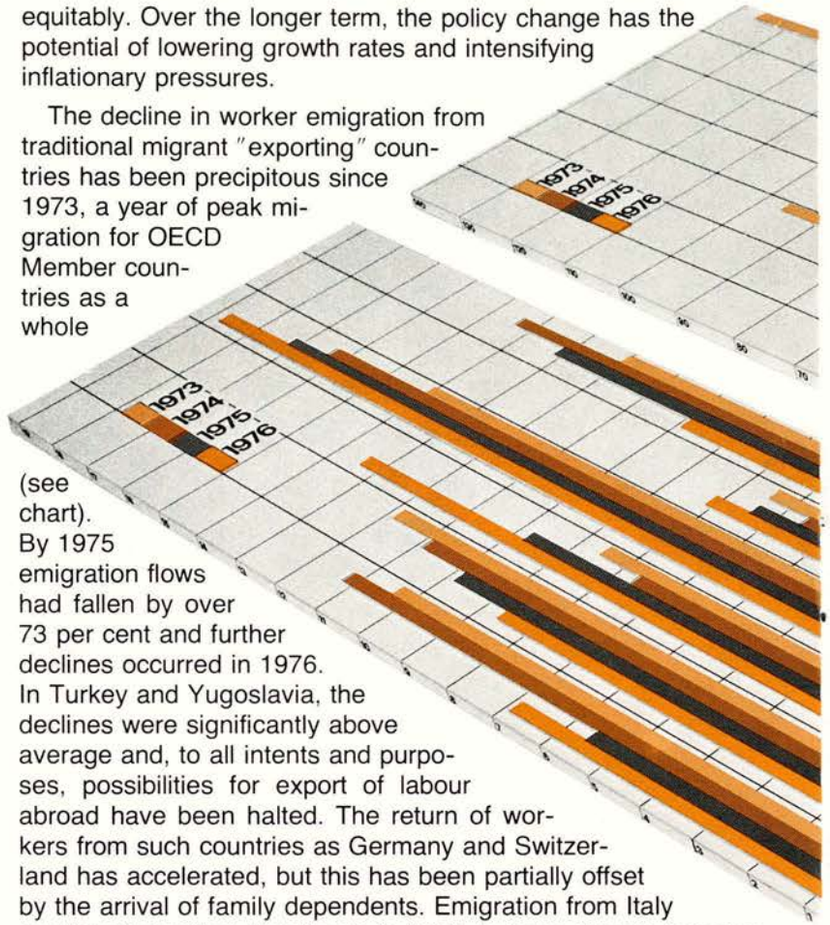
(a) 1974
Sources: SOPEMI, OECD except for Yugoslavia (reply to 1976 OECD, questionnaire) and Portugal (Joa Moura, Employment in Mainland Portugal: Problems and Policies, Conference on the Portuguese Economy, 1975)

... and Consequences

Restrictions on migratory flows have the effect of distorting both the optimal economic allocation of labour and the international distribution of income. Quite apart from considerations of efficiency, basic standards of international equity give rise to concern about a unilateral decision, the costs of which are borne not by the decision-maker but by someone else. It is precisely this kind of situation which international cooperation is designed to prevent, and the unilateral imposition of restrictions represents a breakdown in this cooperation.

To the extent that restrictions are extended into the future — which is what most host countries are now predicting — there will be both short- and longer-term consequences for the sending countries as well as for receiving countries. In the short term, the burden on the first group of countries will take the form of higher unemployment and worsening trade balances. These may be termed the "transitional costs" of restriction, i.e. the costs of moving from a liberal policy to one of restriction on the importation of labour. There is every reason to question whether a policy that simply restricts the inflow of labour distributes this transitional burden equitably. Over the longer term, the policy change has the potential of lowering growth rates and intensifying inflationary pressures.

The decline in worker emigration from traditional migrant "exporting" countries has been precipitous since 1973, a year of peak migration for OECD Member countries as a whole (see chart). By 1975 emigration flows had fallen by over 73 per cent and further declines occurred in 1976. In Turkey and Yugoslavia, the declines were significantly above average and, to all intents and purposes, possibilities for export of labour abroad have been halted. The return of workers from such countries as Germany and Switzerland has accelerated, but this has been partially offset by the arrival of family dependents. Emigration from Italy continued at rather high levels in 1975, in large degree because of free worker movements associated with Italian membership in the EEC, but the influx slowed in 1976.

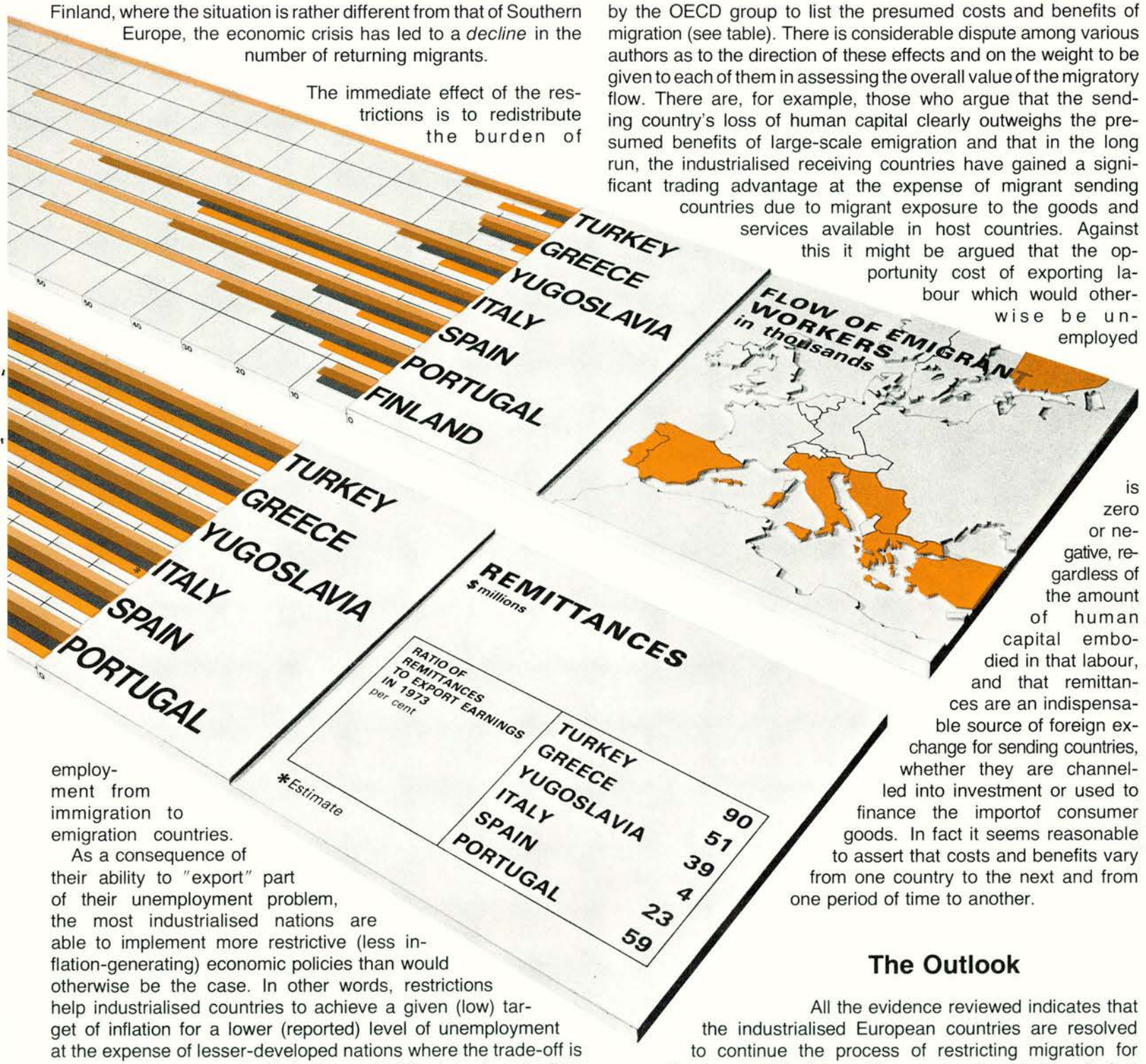


It is difficult to be precise about the number of migrants returning to their home countries. Most countries do not collect adequate data on returning migrants. The OECD's continuous reporting system on European migration (SOPEMI) has estimated that approximately 80,000 workers returned to Turkey between 1974 and 1976. The number returning to Spain over the same time period is estimated to be 184,000 and to Yugoslavia 115,000. The number of returnees to Portugal has not yet proved to be significant while in

The immediate consequence of restricting immigration is to transfer the unemployment burden from the most industrialised countries to the traditional exporters of manpower.

Finland, where the situation is rather different from that of Southern Europe, the economic crisis has led to a *decline* in the number of returning migrants.

The immediate effect of the restrictions is to redistribute the burden of employment from immigration to emigration countries.



As a consequence of their ability to "export" part of their unemployment problem, the most industrialised nations are able to implement more restrictive (less inflation-generating) economic policies than would otherwise be the case. In other words, restrictions help industrialised countries to achieve a given (low) target of inflation for a lower (reported) level of unemployment at the expense of lesser-developed nations where the trade-off is consequently worsened. While the available data do not allow precise pinpointing of this phenomenon, they do give an idea of the magnitude of the problem.

The second major consequence of the restrictions is the reduction in remittances by foreign workers to their home countries. This effect will not be fully felt until later since those who have already settled permanently abroad can continue to send money home for the present. Remittances have been an important source of foreign exchange for less-advanced OECD countries in recent years (see chart) although there are wide variations from one country to the next. How much of the reduction already experienced is due to the recession and how much to migration restrictions is, of course, not known.

The geographic redeployment of labour clearly affects a number of components of the social and economic system — wages, prices, payments balances, savings and consumption rates, etc. — in both sending and receiving countries. An attempt has been made by the OECD group to list the presumed costs and benefits of migration (see table). There is considerable dispute among various authors as to the direction of these effects and on the weight to be given to each of them in assessing the overall value of the migratory flow. There are, for example, those who argue that the sending country's loss of human capital clearly outweighs the presumed benefits of large-scale emigration and that in the long run, the industrialised receiving countries have gained a significant trading advantage at the expense of migrant sending countries due to migrant exposure to the goods and services available in host countries. Against this it might be argued that the opportunity cost of exporting labour which would otherwise be unemployed is zero or negative, regardless of the amount of human capital embodied in that labour, and that remittances are an indispensable source of foreign exchange for sending countries, whether they are channelled into investment or used to finance the importof consumer goods. In fact it seems reasonable to assert that costs and benefits vary from one country to the next and from one period of time to another.

The Outlook

All the evidence reviewed indicates that the industrialised European countries are resolved to continue the process of restricting migration for the foreseeable future. The resolve is aided by, in fact is crucially dependent upon, the current lack of pressure from employers due to the relatively depressed economic climate. Would the continuation of restrictions be possible if there were a return to the kinds of growth rates in the demand for labour experienced during the 1960s? The answer is clear: the international labour market outlook is the key to the future of migratory flows.

The group is convinced that there is likely to be a persistent slack in demand for labour in the OECD area as a whole at least until 1985. After that the outlook is much less certain, since so much depends on the policies chosen by individual countries. What *is* relatively certain however is that even if labour demand rises after 1985 and industrialised countries are prepared to admit more foreign labour once again, such admissions will be limited; in no case will they be sufficient to make a substantial contribution to what demographic data indicate will be a difficult employment problem in a number of developing countries. And migration is

MIGRATION

Short-Term Costs and Benefits

	Benefits		Costs	
	Individual	*Social*	*Individual*	*Social*
Emigrant Countries	1. increased earnings and employment opportunities 2. (*) training (human capital) 3. (*) exposure to new culture, etc.	1. (*) increased human capital with return migrants 2. foreign exchange for investment via migrant remittances 3. increased output per head due to outflow of unemployed and underemployed labour 4. reduced pressure on public capital stock	1. transport costs 2. adjustment costs abroad 3. separation from relatives and friends	1. loss of social investment in education 2. loss of "cream" of domestic labour force 3. (*) uncertainty of continued inflows of remittances may hinder development plans 4. (*) social tensions due to raised expectations of return migrants 5. (*) demonstration effects on consumption patterns worsen the balance of payments 6. (*) remittances generate inflation by easing pressure on financing public sector deficits
Immigrant Countries	1. (*) cultural exposure etc.	1. permits growth with lower inflation 2. increased labour force mobility and lower unit labour costs 3. rise in output per head for indigenous workers	1. greater labour market competition in certain sectors	1. (*) dependence on foreign labour in particular occupations 2. increased demands on the public capital stock (e.g. provision of more social services) 3. (*) social tension with concentration of migrants in urban areas

(*) Indicates uncertain effects

likely to be much lower than in the Sixties whether restrictions are continued or not.

Migration and Longer-Term Development

The solution to the migration problem lies, ultimately, in the narrowing of international disparities in opportunity. This means, primarily, a more rapid increase in the growth rates of the developing countries. Given current constraints on the development process (high production costs, depressed demand for output, growing balance-of-payments difficulties) it will be difficult to meet growth targets. The loss of migration possibilities is an additional constraint. International cooperation in the form of monetary assistance, capital flows or trade agreements can no doubt improve the prospects, and there is a pressing need for such cooperation, for the political and economic costs of failing to achieve the development objectives would be borne by the OECD as a whole (2).

Aside from the long-term problem of economic development which cannot be divorced from the problem of migration, there is an equally urgent need for international action in the area of manpower utilisation. Although depressed demand is a worldwide problem, not limited to a single trading area, the OECD has the opportunity to coordinate the policies of many governments on this matter. Sharing the costs of unemployment is just as valid an objective as sharing the benefits of economic growth.

*
* *

Given the magnitude of the development problem, a concerted effort comprising a number of integrated elements — foreign investment, reinsertion funds, more labour-intensive growth strategies — is required. An integral part of such an effort might at least be to suspend policies of encouraging return migration until the developing countries are economically able to assimilate incremental returns. The problem of migration is but one manifestation of the problem of unequal international development. Migration will remain a problem as long as international disparities in opportunity exist and this holds whether it is hidden by administrative covenant or not.

(2) It is in this spirit that OECD's Council at the Ministerial Meeting of June 1977 noted that cyclical economic difficulties aggravate structural problems and long-term development as well as employment and balance of payments problems of certain Member countries. The Council asked the relevant bodies in the OECD to consider means of overcoming these difficulties.

WHAT PROGRESS ON ENERGY?

IEA countries have agreed to hold the line on oil imports to 26 million barrels a day in 1985. How are they doing in carrying out this pledge? The results of an intensive examination of each country's energy programmes by the Agency's Standing Group on Long-term Cooperation (SLT) answers this question and makes recommendations to each country and to the group as a whole.

Performance to date by IEA members as a group is judged to be "inadequate". No country escapes criticism. Present projections indicate that IEA countries are far from reaching their target of 26 million tons of imported oil in 1985. Oil imports are now projected at 29.2 million barrels a day, and this figure may be on the optimistic side since it assumes a strengthening of present energy policies in some countries (1). "Unless certain programmes planned e.g. by Germany and Japan are promptly executed"and unless real domestic energy prices are at least kept constant, the figure might be 10-15 per cent higher — 33 ½ million barrels. (All figures — the target and the projections — exclude bunkers.)

If, as IEA and the countries now project, oil demand for the world as a whole (including OPEC's demand for its own oil and bunkers for all countries) increased to 42-48 million barrels and OPEC production is only 36-38 million barrels a day, a potential "gap" of some 4-12 million barrels a day could develop. Such a "gap" could be translated into higher real prices, the IEA's present study concludes.

What is responsible for this new estimate? IEA cites four factors:

• "The major part of the difference" is due to revisions in US figures. In the previous review cycle in 1976-77, the US forecasts prepared in late 1975 assumed the passage of such measures as decontrol of new natural gas prices, oil price decontrol by 1979 and accelerated leasing of the outer continental shelf, none of which have yet come to pass. This year the US projections count only on the measures already in place at the beginning of 1977. Thus the US projection for oil imports is almost 6 million barrels a day higher than last year (11.5 mbd as against 5.9).

• On the other hand, eight countries — Belgium, Canada, Denmark, Japan, New Zealand, Sweden, Switzerland and the United Kingdom — have submitted lower estimates; the largest differences are due to measures taken or being considered by Canada and Japan while the UK has increased its estimates of oil and gas production from the low point of the range to the half-way point.

• Five countries' estimates remain basically unchanged while Greece, Italy, Luxembourg and Turkey in addition to the US indicate higher levels of oil imports.

• Norway's estimate of net exports has dropped somewhat. In the interim, methods have been refined and new information solicited with the result that the IEA considers this year's estimates "more realistic" than last year's.

Attainment of the 26 million barrel a day objective would, in the words of the report, "require greatly increased efforts". "National programmes are too often at the stage of policy formulation" particularly in the US but elsewhere too. These programmes need to be accepted by legislative bodies.

1. NET OIL IMPORTS IN 1976 AND PROJECTIONS FOR 1985 AND 1990

million barrels per day

	1976	*1985*	*1990*
AUSTRIA	0.2	0.3	0.3
BELGIUM	0.5	0.6	0.8
CANADA	0.2	0.7	0.6
DENMARK	0.3	0.2	0.2
GERMANY	2.6	3.0	3.1
GREECE	0.2	0.3	0.4
IRELAND	0.1	0.2	0.4
ITALY	1.8	2.5	2.6
JAPAN	5.3	7.6	8.0
LUXEMBOURG	—	—	—
NETHERLANDS	0.5	1.0	1.0
NEW ZEALAND	0.1	0.1	0.1
NORWAY	(0.1)	(0.5)	(0.4)
SPAIN	0.9	1.0	1.0
SWEDEN	0.6	0.6	0.6
SWITZERLAND	0.3	0.3	0.3
TURKEY	0.2	0.6	0.8
UNITED KINGDOM	1.6	(0.5)	(0.1)
UNITED STATES	7.0	11.4	13.9
TOTAL	**22.3**	**29.2**	**33.6**

— Less than 0.05 million barrels per day
( ) Figures are net oil export
Source: *Submissions by IEA Member countries*

Stronger Conservation Measures

Countries are projecting smaller increases in total energy consumption than in the last round (3.7 per cent increase per year as against 4.1 per cent) partly as a result of slower projected economic growth but also as a result of more efficient energy use. Energy requirements are expected to increase less in response to rises in output: energy use per unit of GDP is expected to be 5 ½ per cent lower than forecast in the last review.

Desirable measures

Priority is given by the IEA to the following:

Pricing/Taxes

• oil prices at prevailing world levels
• electricity prices covering long-term marginal costs of production and gas prices designed to encourage conservation

Residential/Commercial

• building codes with mandatory minimum thermal efficiency standards for all new buildings
• adequate incentives and other measures for retrofitting existing buildings
• appliance labelling →

(1) Countries' assumptions differ. Some, such as Japan and Germany, have assumed that measures and programmes will be improved, others that present policies will be continued. Economic growth rate assumptions also differ and are chosen by the country.

Transportation

- significant taxes on gasoline and progressive taxes on automobiles related to fuel efficiency
- mandatory fuel efficiency standards for automobiles
- financial support for public transportation

Industry/Energy Sector

- incentives for energy efficient equipment and processes
- incentives for combined production of heat and electricity; use of waste heat and district heating
- energy management schemes, particularly for energy intensive industries
- advisory service for small and medium-sized firms

Information/Education

- strong in-house government programmes to conserve energy
- active information campaigns to convince consumers to save energy

How are the countries doing on conservation?

On the basis of these criteria, the Chairman of the Standing Group on Long-Term Cooperation has reached the following rough judgements on individual country efforts:

- *Denmark, the Netherlands and Sweden* have strong and quite comprehensive conservation programmes which are being implemented effectively. However, continuous adequate funding will be essential
- *Canada and Norway* also have enacted essentially sound conservation programmes, particularly in the residential/commercial sector. Low electricity tariff rates and, in Canada's case, pricing domestic oil at less than prevailing world prices and gas at less than oil equivalence diminish somewhat such efforts.
- *Germany, Italy, New Zealand and the United Kingdom* have conservation programmes which are strong in certain sectors but need significant reinforcement in others, particularly in the industrial or residential/commercial sectors. In some cases, funding to implement programmes adopted may not be adequate.
- *Belgium, Greece, Japan, Spain and the United States* are in the process of adopting stronger conservation programmes. Unfortunately, adoption of such programmes is not certain, and existing efforts are not deemed adequate.
- *Austria, Ireland, Luxembourg, Switzerland and Turkey* do not now have adequate conservation programmes. Few concrete measures have been enacted, and measures which have been adopted suffer from inadequate funding.
- Oil pricing policies in *Canada* and *the US* result in disparities between the average domestic price level and prevailing international prices; gas prices in the US are significantly below the fuel's market value.

All countries, the IEA concludes, could improve their conservation programmes.

Accelerated Development

The judgement of "inadequate" performance also extends to the development of alternative energy sources. "The ultimate long-term test of the adequacy of efforts by participating countries is the accelerated development of indigenous energy resources, as evidenced by the trend in the proportion of total energy requirements met by the indigenous resources and policy efforts or resource commitments to this end." It is true, the IEA notes, that indigenous resources are estimated to remain at about 66 per cent of total energy resources in 1985 but a not inconsiderable amount of this projected indigenous production may not materialise.

Posters in the United Kingdom incite consumers to save energy.

Desirable measures

Energy self-sufficiency for the area as a whole is projected to drop to 62 per cent by 1990. To reverse these projected adverse trends, intensified efforts will be required along the following lines:

Oil and Gas

- incentive prices and returns for producers commensurate with risks inherent in offshore and frontier area activity
- exploration, development and leasing policies which facilitate a better definition of the resource base
- reasonable assurances to lessees and operators of a stable and predictable regulatory framework
- special fiscal and pricing incentives for the development, demonstration and commercialisation of non-conventional and synthetic hydrocarbons
- government actions to diminish the financial, technical and regulatory uncertainties involved in developing the complex and expensive logistical systems that will be required
- provision to facilitate an increase in the refinery sector's capability to handle heavier grades of crude and produce a higher proportion of lighter products.

Solid Fuels

- prompt leasing or development of economically promising reserves
- clear, reasonable standards for environmental protection relating to production and transportation
- a positive central government role in striking a reasonable balance among disparate national, regional, and social objectives affected by solid fuel production and transportation
- policies and — where necessary — incentives to assist in the development of required infrastructure
- government efforts to assist in increasing assurance, among users, of reliable flows on reasonable terms.

Electricity

- active government policies, including regulations and incentives as necessary, aimed at the substitution and eventual reduction of oil used as baseload boiler fuel
- encouragement of the development and utilisation of indigenous non-oil fuels for electrical generation
- government measures to facilitate and streamline the regulatory procedures for siting and operating non-oil fired electrical generation facilities
- policies to facilitate international trade, both intra-IEA and external to the Group, in non-oil fuels for electricity generation.

How are the countries doing on accelerated development?

Canada, Germany, Greece, the United Kingdom and the United States have active programmes of solid fuel production and utilisation which give considerable potential as a substitute for oil.

Denmark, Ireland, the Netherlands and Spain are seriously considering increased use of solid fuels; *Spain and Turkey* have ambitious plans for increased solid fuel production; *Norway* is undertaking to consider non-oil fuels as a long-run alternative to hydro-electricity.

Canada, Norway and the UK have in place hydrocarbon leasing and incentive policies which already show promising results on exploration, and have the prospect of sustaining production in the second half of the 1980's.

Although the estimated hydrocarbon resources appear meagre by comparison with the largest IEA oil producers, *Austria, Denmark, Greece, Ireland, Italy, Japan, New Zealand, Spain and Sweden* have in varying stages of implementation active hydrocarbon exploration and development programmes which in the aggregate could make a meaningful contribution to IEA energy balances.

The sharp decline in US gas production anticipated by the mid-1980's, and the decline in US oil production expected by 1990, are a significant element in the difficulties the IEA faces in meeting the group objectives. While exploratory drilling is at a record high level, implementation of the National Energy Plan's (NEP) pricing proposals for oil and gas is essential if the anticipated declines are to be mitigated or offset.

Although the present two major exporters, *Canada and the Netherlands,* project a phasing out of exports after 1985, gas trade is expected to increase rapidly within the IEA, because of exports from *Norway and non-IEA* countries. *Austria, Belgium, Germany, Italy, Japan, Switzerland and the US* are the major importers (both from IEA and non-IEA supplies).

Nuclear powered electricity continues to grow and will contribute substantially to the energy programmes of *Belgium, Canada, Germany, Japan, Switzerland, the United States and the United Kingdom. Italy and Spain* expect a sizeable contribution from nuclear power and measures have been taken to improve financing. Programmes have slowed down in *Austria, Germany, the Netherlands, Sweden and Switzerland.* Other participating countries do not now have nuclear power plants in operation, though *Denmark, Greece, Ireland and Luxembourg* are considering adopting nuclear power; and *Turkey* has made a positive decision in this regard.

THE RECORD OF INDIVIDUAL COUNTRIES

The following are summaries of the comments on individual countries' efforts. The most important statistical parameters are presented for the IEA as a whole and for each individual country (1): the overall demand for total primary energy (TPE) in millions of tons of oil equivalent; domestic production; energy imports; the role of oil imports in meeting energy demand; the ratio of energy consumption to GDP (tons of oil equivalent per $1 000 of GDP at 1970 prices and exchange rates) and energy consumption per capita in tons of oil equivalent. On average 50 million tons of oil equivalent (mtoe) = 1 million barrels a day.

TOTAL IEA MEMBER COUNTRIES

	1976	*1985*	*1990*
TPE (Demand) (mtoe)	3,291.6	4,551.3	5,226.6
Production (mtoe)	2,135.2	2,923.8	3,253.2
Net Imports (mtoe)	1,527.5	2,051.0	2,240.4
Oil Imports (per cent of TPE)	40.7	37.1	34.6
TPE/GDP (toe per thousand US $)	1.44	1.36	1.32
TPE/Capita (toe)	4.89	6.33	6.98

AUSTRIA

Austrian per capita consumption is currently considerably lower than the IEA average but energy requirements to 1985 are forecast to increase rapidly, by 4.1 per cent a year between 1975 and 1985—as against the 3.7 per cent figure for the entire IEA—despite more modest economic growth (4 per cent as against 4.3 per cent). The increase in the residential and commercial sector is expected to be particularly rapid—almost 5.5 per cent as against 2.1 per cent for the IEA as a whole. The Austrian authorities foresee possible conservation of 15 per cent if new measures can be evolved.

	1976	*1985*	*1990*
TPE (Demand)(mtoe)	23.4	33.4	39.7
Production (mtoe)	9.2	11.8	13.7
Net Imports (mtoe)	14.7	21.3	26.1
Oil Imports (per cent of TPE)	42.3	40.1	42.6
TPE/GDP	1.28	1.30	1.30
TPE/Capita	3.14	4.61	5.59

Indigenous energy production is expected to increase as a result of the development of hydro and nuclear power (oil, coal and gas production is declining) but the authorisation to operate the Zwentendorf nuclear power plant, expected to be completed in 1978, is still being discussed by Parliament. With nuclear power in operation, oil imports would increase by more than 25 per cent but remain constant as a share of total consumption (42 per cent).

By the end of 1977, the Austrian electricity industry had completed a 10-year development plan which was also transmitted to the authorities.

The Austrian federal constitution gives little power in energy matters to the federal government leaving energy policy basically to the Länder. Negotiations are continuing with the Länder to achieve a conservation programme. An active policy of encouraging non-oil imports has been embarked upon. Electricity is being imported from Poland and discussions are going on about the feasibility of importing coal by pipeline. Discussions about the exploration of lignite with the Hungarian Government are also under way. Natural gas is currently being

(1) The individual reports on which these summaries are based were prepared by rapporteurs and are published on their responsibility.

imported from the USSR and in 1983 Austria will receive deliveries from Iran.

Austria is in the first phase of energy policy development—seeking energy policy objectives. Instruments still have to be developed and political support mobilised. Conservation is the weakest aspect of policy, especially in the residential/commercial sector where no significant conservation measures have been taken since the last review of Austrian energy policies.

Thus the "most important" recommendation of the IEA is that Austria acquire adequate legislative and administrative powers to carry out an effective energy policy. Clear objectives should be formulated and support enlisted among the Länder and the general public.

Effective means should be sought to influence the development plans of the Austrian electricity industry to comply with IEA principles and especially to substitute alternative fuels for oil, the IEA report suggests. Energy cooperation with neighbouring countries should be continued. A decision on the first nuclear plant, already built, should be made, and a fallback strategy developed in case nuclear power and imported gas fall short. Importing coal from Hungary and Poland seems to be important in this respect.

Austria, Germany and Italy already import natural gas from the USSR in this pipeline system which is being extended to France and perhaps to Scandinavia.

BELGIUM

Heavily dependent on oil imports before the oil crisis—they accounted for almost 60 per cent of energy requirements—Belgium has already reduced that dependence to 51 per cent and hopes to reduce it still further to 47.5 per cent by 1985.

With only coal as an indigenous resource, Belgium has imported natural gas from the Netherlands, Norway and Algeria and has opted heavily for nuclear energy. Nuclear power already supplies 25 per cent of electricity and is expected to furnish 50 per cent by 1985. "The outstanding feature of Belgium's energy programme is the very significant contribution which nuclear power is making to the country's total energy requirements," IEA's report notes. "When account is taken of the densely populated nature of the country, Belgium's contribution to energy by way of nuclear power must be regarded as unique amongst IEA Member countries." After 1985, however, difficulties are expected in finding suitable sites for nuclear power.

Energy conservation is clearly the weakest element in the Belgian programme, according to the IEA, though Belgian industry is energy intensive and there is scope for conservation. "The strong programme for nuclear power plants must be matched in other sectors such as conservation and development of indigenous coal resources," the report notes. "Until such efforts are made, the energy programme cannot be judged as adequate in support of the IEA reduced oil import objectives."

Specific conservation recommendations include many of those mentioned on page 28.

	1976	*1985*	*1990*
TPE (Demand) (mtoe)	44.9	60.2	71.5
Production (mtoe)	7.4	12.9	13.2
Net Imports (mtoe)	36.6	47.6	58.3
Oil Imports (per cent of TPE)	50.6	47.5	53.1
TPE/GDP	1.42	1.34	1.31
TPE/Capita	4.70	6.80	7.10

CANADA

Canada's role in the energy field is a complex one. With one of the highest rates of per capita energy consumption, it is also one of the few IEA countries which is on balance an exporter of energy: formerly an exporter of oil, it now exports natural gas and uranium, accounting for 21 per cent of world output of the latter. Yet Canada also imports energy, and the Eastern part of the country—the Maritime provinces and Quebec—are dependent on oil imports.

Developing an integrated national energy policy is a "delicate and often time consuming" affair since the Federal Government has jurisdiction only over interprovincial and international trade while the provincial governments exercise jurisdiction over energy resources produced within their territories, and there are "widespread differences of interest between consuming and producing provinces."

Yet Canada's energy policies, existing and prospective, are characterised by the IEA as making "a very substantial contribution" to reducing dependence on oil imports and to the 12 principles adopted by the IEA in October 1977 (see OECD Observer, November 1977, No. 89).

The National Energy Strategy adopted in 1976 is described as one of "energy self-reliance" by the Canadians themselves.

It has five major targets.

1. To move domestic oil prices towards international levels over the next two to four years and to keep natural gas prices in an "appropriate competitive relationship" with oil. This policy is being implemented by increasing the price of oil by $1 every six months so that the level of $13.75 (Alberta wellhead average price) will be reached in January 1979. (There are certain safeguards.) IEA applauds this price policy especially in light of the fact that such a policy has not as yet been adopted in the United States and recommends that the schedule be adhered to whatever happens in the U.S. If necessary, special steps might be taken to temper the effect on industries whose competitiveness is particularly affected. Gas price increases are tied to oil price increases (85 per cent of the thermal value).

2. To reduce the average rate of growth of energy use in Canada over the next ten years. The official target is 3.5 per cent a

year growth, and Canada's projections are based on this figure, but the Office of Energy Conservation of the Department of Energy, Mines and Resources thinks that it is possible to limit the growth to 2 per cent (over the period 1975 to 1990). Already a strong conservation programme has been put into effect. For example, a programme to insulate existing buildings ($ 1.4 billion over 7 years) should cover virtually all such structures, and industry has adopted voluntary targets for conservation (12 per cent saving by 1980). Progress should be monitored, says the IEA report, so that mandatory measures can be introduced if necessary or incentives improved.

IEA suggests the difference in targets is crucial since, if growth is kept to the 2 per cent level, Canada could export some 700,000 barrels a day of energy (oil equivalent) whereas net energy imports would be necessary with the higher 3.5 per cent consumption figure.

However, the report notes that although conservation is off to "an impressive start", with agreement by Federal and Provincial Governments, implementation is largely in the hands of the provinces; thus performance should be monitored by both to make sure that what is on paper is actually carried out. An increase in gasoline taxes should be considered as should the introduction of mandatory fuel efficiency standards and progressive taxes on cars in accordance with their fuel consumption.

3. To reduce Canadian net dependence on imported oil in 1985 to one third of total oil requirements or 800,000 barrels a day, whichever is less.

4. To maintain self-reliance in natural gas until such time as northern resources can be brought to market under acceptable conditions.

5. To at least double exploration and development in the frontier areas over the next three years under acceptable social and environmental conditions.

Aims three to five reflect the changing supply situation in Canada with conventional sources of oil running down: despite a recent find in West Pembina in Alberta, the decline is not expected to reverse.

Apart from hydro power which is a very clean and still plentiful source of electricity, Canada has great potential as a source of various other forms of energy. As conventional sources of oil run out, it will be necessary to turn to the substantial reserve of tar sands and heavy oil; exploiting these means technical difficulties and high costs but, with the price moving upwards and an improved fiscal regime just announced, could be profitable. The Federal Government, the provinces of Alberta and Saskatchewan and private companies already have joint arrangements to develop these sources.

As to gas, proven reserves have been increasing, especially in the frontier areas. These are federal lands hence not subject to the usual provincial-federal problems. But there are others: the environmental balance is a delicate one, the climate is harsh, and local residents are pressing ownership claims. IEA urges that these resources be developed and that an early decision be taken on the so-called Dempster Spur (which would take gas from the McKenzie Delta in the Northwest to the Canadian pipeline system) and on transfer facilities for gas from the Arctic.

East-West transport facilities also need to be improved and extended so as to reduce the dependence of the Eastern provinces on imported oil.

Coal too is plentiful but problematic in several ways: it is far from population centres and hence expensive to transport, and facilities are lacking. Moreover, there is a question whether coal should be used now for electricity when hydropower is still available or kept for the future when it can be made into less polluting synthetic natural gas. As yet there is no national coal policy and one is urgently needed, the IEA notes.

Finally uranium is plentiful enough not only to supply Canada's own substantial nuclear energy programme but for export. Production is forecast at 12,500 tonnes in 1985 of which domestic demand is expected to account for less than 20 per cent. "Steps should be taken to ensure that the producing provinces fully appreciate the opportunities for Canada as a world supplier of uranium so that this is taken into account in their approach to environmental, labour and other problems affecting uranium mining," IEA's report concludes. Canada will clearly continue to be an important source of uranium, and her export policies will have important impact on the policies of many other IEA countries. Thus while her policy of exporting only that which is surplus to her own protected supply seems reasonable on merit, there is the danger that this policy, in combination with the rules about maximum ownership of mining enterprises and the overall self-reliance policy might mute possibilities for increasing production.

This touches on the larger problem of Canadian energy policy as seen by the IEA: "The Canadian policy of self-reliance... seems to be misnamed in overall energy terms. There has been a tendency to concentrate on interpretation of this policy in terms of hydrocarbons, particularly oil", the IEA report notes. In this sense the policy as defined meets Canada's obligations under the IEA objective and, given the prospects for future oil production, there is probably not much scope to improve upon it. But this approach runs the risk of ignoring Canada's potential as a producer of coal and uranium, and the concept of self-reliance, if interpreted to encompass all energy sources seems too restrictive and may have a deleterious effect on the attitude of the governments of producing provinces towards increasing production, particularly where environmental and social factors weigh heavily."

"The Federal Government has an important role in acquainting provinces with joint international efforts underway in the IEA and ways in which Federal and Provincial Governments can cooperate in meeting the challenge of the current international energy situation."

A special problem is the relationship between Canada and the United States whose energy markets are closely linked and interdependent. Exchanges and common delivery systems are of mutual benefit, the IEA judges, and should not be avoided in the concern for self-reliance.

Institutionally Canada has a mechanism for reconciling the various interests involved—environmental, geographical and others—the National Energy Board, and IEA's report suggests that the practice of submitting major energy related projects to this body be continued.

	1976	*1985*	*1990*
TPE (Demand) (mtoe)	202.8	280.0	331.2
Production (mtoe)	213.7	269.5	309.8
Net Imports (mtoe)	*10.9* (1)	10.5	21.4
Oil Imports (per cent of TPE)	5.0	12.2	9.5
TPE/GDP	1.87	1.71	1.64
TPE/Capita	8.87	10.94	12.27

(1) Exports

DENMARK

The overall aim of Danish energy policy is to reduce dependence on imported energy—and particularly imported oil which in 1973 accounted for 91 per cent of the country's total primary energy requirements, the highest in the IEA. The objective is to reduce this dependence to 61 per cent by 1985. The rate of increase of overall consumption of energy would also be reduced, from over 6 per cent a year during the period 1960-1973 to 1.2 per cent a year over the years 1976-1985, far slower than the IEA average.

The major thrust in conservation is to develop a nationwide heating plan with district heating set to cover 24 per cent of heating requirements in 1985, and the approval of the Ministry of Housing is required for the installation of small oil-fuelled space

heating systems. This is particularly important in view of the role of residential and commercial buildings in energy use (over 50 per cent in 1976 as against an average of some 30 per cent for IEA as a whole) and its recent rapid growth.

What is called by IEA "an aggressive conservation programme" has been undertaken to reach the lower consumption targets. A revised building code, now voluntary, will become mandatory on 1st February 1979; grants of 25 per cent to cover retrofitting costs have been made; speed limits have been instituted; taxes on new motor vehicles, already high, have been increased; measures have been taken to integrate bus and railroad lines, to improve public transportation; grants to industry for improved efficiency and for the utilisation of combined heat and power (25 per cent of approved investments) have been made.

Denmark already has a high degree of energy efficiency and IEA characterises the task of holding down demand "a formidable one" but by no means impossible given the comprehensive Danish approach to energy demand management.

A switch to coal for electricity generation is also planned (from 35 per cent of electricity fuel input in 1975 to 65 per cent in 1985). Already the share is 50/50.

Domestic energy resources are being developed offshore and also in Greenland but on a restricted basis because of social, political and environmental concerns. A government plan for energy policy presented to Parliament in 1976 and updated in April 1977 postpones the decision on nuclear energy until the issue can be assessed. The most serious constraint is considered to be the lack of long-term international solutions to the problems involved in disposing of radio-active wastes. Denmark wants a satisfactory resolution of this problem on an international cooperative basis. The lack of a decision makes it unlikely that any nuclear electricity will be produced before the late 1980s and no nuclear power is included in Denmark's 1985 forecasts. IEA recommends removal of constraints on the use of nuclear energy so that firm political decisions can be made on the role of nuclear power.

A considerable R&D effort is being made in renewable energy (geothermal, solar and wind) but only a small contribution—5 per cent of energy requirements—is expected from these sources by 1990.

Denmark is making a great effort to attain a secure energy future for itself, the IEA report concludes. "A great range of alternatives is being investigated on both the demand and supply sides of the energy question. Therefore in relative terms, adequacy of efforts is more than satisfactory. On the other hand, relative to the national situation of very high current import dependence on oil, at least the scope and the extent of the current effort is required for several years."

	1976	*1985*	*1990*
TPE (Demand) (mtoe)	19.3	20.6	22.9
Production (mtoe)	0.3	6.4	8.4
Net Imports (mtoe)	18.6	14.5	14.5
Oil Imports (per cent of TPE)	82.4	47.6	45.4
TPE/GDP	1.04	0.78	0.71
TPE/Capita	3.81	3.96	n.a.

Children at Tvind school in Denmark are helping to build a giant windmill. A considerable effort is being made in renewable sources of energy, but they will make a small contribution in volume terms.

GERMANY

To reduce dependence on imported oil, Germany had been relying heavily on the development of nuclear power. But the uncertainties generated by the public/political debate on the role of nuclear energy and the delay in implementation of nuclear programmes, partly because of court action, has led to a shift in priorities in the German energy programme. Conservation which received minimal attention prior to 1976/77 has been reinforced, and nuclear power is less emphasised. A revised German energy programme announced on 14th December 1977 specifies that nuclear power is now to be used only "as necessary" after conservation efforts and the exploitation of domestic coal. Plans for nuclear capacity for 1985 have been revised downward from 45 to 24 GW of which 4.4 is presently halted by the courts and 1.3 GW is not yet licensed.

The development of nuclear power will depend on the decision to build a waste management centre at Gorleben (Niedersachsen) or on disposal of the radioactive waste abroad, but construction of the former has not as yet been authorised, and international cooperation has not resolved the problems connected with the nuclear fuel cycle. IEA's report recommends strenuous efforts to create the appropriate environment for nuclear power development and this means solving the problems connected with the "back end" of the fuel cycle (waste disposal, recycling, etc.) as well as legal regulations for siting, licensing, construction and operation of nuclear plants which will reduce the risk of court action.

The new programme on conservation is in line with past recommendations of IEA and with IEA objectives and focusses on pricing and taxation. (Compulsory speed limits however have not been adopted nor have guidelines for energy-intensive industries.) Budget appropriations have been substantially increased and the Go-

	1976	*1985*	*1990*
TPE (Demand) (mtoe)	260.3	337.8	371.0
Production (mtoe)	118.5	147.7	171.1
Net Imports (mtoe)	141.8	190.1	199.9
Oil Imports (per cent of TPE)	50.8	44.7	41.5
TPE/GDP	1.20	1.11	1.04
TPE/Capita	4.21	5.70	6.40

The uncertainty generated by public debate has led to a shift in priorities in the Germany energy programme.

vernment is moving towards more direct regulation of how energy is to be used. But IEA questions the adequacy of incentives and coverage. The German Government sees the major potential for conservation in space heating and some measures have been taken (e.g. subsidies for district heating) but a DM 4 billion programme for retrofitting existing buildings has not received the agreement of the Länder, and the Government is obliged to present the programme to Parliament as an amendment to the Housing Modernisation Act which would not require approval of the individual Länder.

Germany does not permit the construction of new oil-or gas-fired electricity plants, and oil is used for less than 10 per cent of electricity generation and is being phased out despite intense lobbying on the part of German refiners to ease this restriction. Use of hard coal, on the other hand, is being encouraged with substantial public support and long-term agreements. Here too there have been delays in the courts which may recur unless laws are formulated clearly defining what emissions are allowed.

Increased use of gas now imported from Norway, the Netherlands and the Eastern European countries and, after 1980, Algeria and Iran, is another important element in German energy strategy.

The German Government foresees oil imports of 3 million barrels a day in 1985 and IEA judges this projection to be attainable despite the shortfall in nuclear capacity and possible delay in retrofitting but notes that, with a more aggressive energy policy, the 1985 figure could be reduced. If however Parliament fails to approve the conservation programme, oil imports would "claim quite a high fraction of the 26 million barrels a day". "If the Government fails to intervene more vigorously to implement its energy policy options—notably on energy conservation—its present programme must be judged as an insufficient response to the IEA's group objective."

Specifically this means reaching an agreement with the Länder on conservation, amending current laws on property rental which discourage energy-saving investment, an increase in incentives to industry (a tax credit already exists) and guidelines for energy use.

GREECE

With low per capita energy use, Greece gives priority to economic development so that consumption will almost double by 1985. Despite a programme to increase energy efficiency in industry (elasticity of energy to GDP is planned to decline from 1.6 to 1) and to augment indigenous production (tripling of lignite, doubling of hydro capacity and intensification of oil and gas exploration with the first field scheduled to produce in two or three years) (2); it will be necessary to double oil imports by 1985. The IEA experts take the need for development and the consequent need for oil imports into account and thus conclude that "if conservation measures now being prepared are implemented, Greece will make an adequate contribution to the fulfillment of the group target".

The conservation programme is in the "take off phase". In transport the record is "good" with high gasoline prices, high and progressive taxes on cars and "reasonable" speed limits. But there is no incentive programme in industry, and conservation in transport may be overestimated. "The most serious lack", IEA judges, is financial incentives to encourage retrofitting of existing houses.

More public financing and manpower are urgently needed: at present conservation takes less than .001 per cent of the Government budget and three full-time staff members. Greece should enact rapidly the proposed legislation which gives tax deductions for installing domestic solar water heaters and, if necessary, provide financial support to help firms develop their solar heating production capacity.

(2) The first nuclear plant is expected only in 1987.

	1976	*1985*	*1990*
TPE (Demand) (mtoe)	13.2	25.3	33.5
Production (mtoe)	3.5	9.8	14.1
Net Imports (mtoe)	9.7	15.5	19.4
Oil Imports (per cent of TPE)	70.4	57.3	54.0
TPE/GDP	1.11	1.24	1.25
TPE/Capita	1.45	2.70	3.40

IRELAND

Overall energy requirements are projected to rise by 8 per cent a year, nearly more than twice the OECD average, with a particularly rapid rise projected for industry — 16 per cent a year (1).

Already heavily dependent on imported oil (70 per cent of energy consumption) Ireland is planning to more than double oil imports by 1985 despite a national policy aim of reducing such dependence. This contrast highlights "current deficiencies" in Ireland's policies.

Energy is priced at world market levels and covers all costs as well as producing a surplus for capital works, but there are few mandatory conservation measures and only a small budget for energy conservation. Oil is still considered the cheapest alternative in electricity generation. "Conservation programmes need strengthening", the report notes. As to domestic production, Ireland has only a small resource base. Thus Ireland "has fallen behind in its implementation of effective energy policies and faces very adverse energy supply/demand prospects". Its policies are "inconsistent" with the IEA's objective of limiting oil imports. A change in government in July 1977 has resulted in a decision to review energy policy and the IEA report recommends a "comprehensive energy strategy".

	1976	*1985 (1)*	*1990 (1)*
TPE (Demand) (mtoe)	7.0	14.2	21.6
Production (mtoe)	1.4	2.9	2.7
Net Imports (mtoe)	5.4	11.3	18.9
Oil Imports (per cent of TPE)	70.0	74.6	84.3
TPE/GDP	1.49	2.03	2.57
TPE/Capita	2.19	3.94	5.54

(1) Since the IEA study completed, Ireland has revised its energy projections

ITALY

	1976	1985	1990
TPE (Demand) (mtoe)	136.0	199.5	245.0
Production (mtoe)	25.6	41.5	62.0- 72.0
Net Imports (mtoe)	110.2	159.5	183.0-173.0
Oil Imports (per cent of TPE)	67.5	62.0	55.7-51.6
TPE/GDP	1.24	1.27	1.25
TPE/Capita	2.42	3.40	4.07

One of the main problems in Italy has been to secure legal authority for an energy plan. But in the autumn of 1977 a National Energy Plan (an updated version of a plan originally put forward two years earlier) was approved by Parliament and by the Inter-Ministerial Committee for Economic Planning which coordinates energy with other policies. The context is one of economic growth, and the plan foresees energy consumption rising by 4.3 per cent a year, more than the OECD average but less than foreseen in the plan as originally presented. Oil imports are projected to increase from 1.8 million to 2.5 million barrels a day which, however, represents a smaller share of total consumption than is now the case.

Much of the difference is to be made up with nuclear power. After a protracted debate Parliament has adopted a plan for the immediate construction of eight nuclear units with a total of 8,000 MW and options for four more, and an invitation to tender has gone out. The IEA report calls this "encouraging", but possible delays are foreseen and there may be public opposition. Thus the 11.4 GW projected for 1985 may not be achieved. Only two of the sites have been authorised so far. Italy should "press ahead" with the programme, IEA recommends, approving more units and authorising more sites. For the other phases of the fuel cycle, Italy is dependent on cooperation with other countries. In the event of delay, Italy needs a fallback strategy. The projections of nuclear energy are in any case more "realistic" than at the time of the last review and this is one of the two particularly "positive features" in the new plan. The other is that the new bill seeks to ensure that the Ente Nazionale per l'Energia Elettrica (ENEE) will have adequate funding to build the nuclear power stations. This is being done through adjusting electricity rates, held down partly for social reasons, upward.

Exploration and development of other sources of energy are also being intensified, but known domestic resources of fossil fuels are limited. Production of natural gas can substantially increase and the Government is to present a bill to Parliament setting forth better conditions for oil and gas research and exploration which "should be rapidly implemented". Natural gas will also be imported under a 20-year contract with Algeria; a pipeline will connect the two countries by 1982 or 1983.

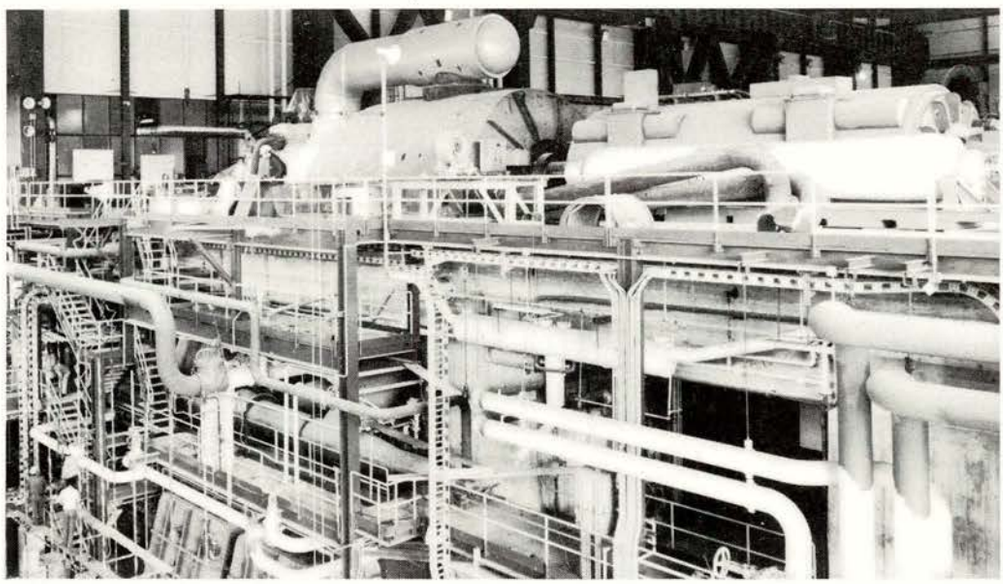
As to conservation, specific legal authority may be needed as well as substantial funding and adequate incentives. In the residential and commercial sector regulations permitting maximum room temperatures and insulation standards were issued only in February of 1978, but there is no financial support for retrofitting of existing buildings so conservation is only beginning and there is uncertainty over the availability of public funds. In industry legal authority and funds exist to encourage the expansion of non-energy intensive industrial sectors but this is a long-term matter.

Heavy taxes on gasoline have raised the price at the pump to $ 2.16 per US gallon or 57 US cents per litre but taxes which encourage fuel efficiency and mandatory fuel efficiency standards are needed. Long haul railways should be improved and coastal navigation encouraged.

A major defect of the Italian plan is that it foresees additional oil-fired electricity generation. An increase in consumption of oil of nearly 50 per cent for this purpose is projected, a policy which IEA suggests "should be reconsidered"; the feasibility of diversification into coal should be examined.

Overall the Plan "appears to be in accord with IEA principles" but Italy's contribution will be adequate only if the Plan is put into effect quickly.

A major defect of the Italian plan is that it foresees additional oil-fired electricity generation. Below oil-fired plant at Amilasso.



JAPAN

The Energy Plan published in August of 1977 (actually a revision of a 1975 plan) presents two scenarios, one with present policies, and the other with maximum effort (the so-called Accelerated Policy Case). The latter assumes a GNP growth rate of 6.1 per cent per year (1975-1985) and a growth in energy consumption of 5.4 per cent, among the highest forecast in the IEA while oil imports are forecast to increase from 5.4 to 7.6 million barrels a day in 1985 which is almost 30 per cent of the IEA's group objective of 26 million barrels per day. This case would seem to represent "an adequate effort to reach the IEA import ceiling", according to the report. But the IEA has reservations about Japan's ability to carry out this scenario which at the present time is "largely in the realm of a proposal" with "no substantial progress in actually implementing an energy policy since the last review".

Compared with Japanese policy efforts to "diversify" and "secure" foreign crude oil

	1976	1985	1990
TPE (Demand) (mtoe)	366.3	595.5	718.6
Production (mtoe)	46.1	97.7	157.3
Net Imports (mtoe)	320.2	497.8	561.3
Oil Imports (per cent of TPE)	72.0	64.0	55.5
TPE/GDP	1.34	1.28	1.26
TPE/Capita	3.24	4.88	5.70

supplies and to implement a "national policy crude" (i.e. achieve Japanese participation in the exploration of foreign oil), little priority has been given to conservation—only 7 people and 250 million yen in public funds as against 2 400 people and 500 billion yen for supply programmes. Yet there is great potential for energy conservation: kerosene prices have been kept low; little effort has been made to promote district heating despite its advantageousness in areas of high population density. IEA's list of recommendations to the Japanese Government on conservation covers all fields with particular emphasis on residential, commercial and industry. It also calls for "higher priority, increased funding and increased manpower" for conservation.

A proposed Energy Conservation Promotion Law is "a good step in the right direction" (it would institute a building code, set standards for household appliances and fuel efficiency among other things). Failure to pass the law would result in a further increase in oil imports of 650,000 barrels of oil a day in 1985.

As to energy supply, a number of the projections in the accelerated policy case would seem to be "at risk", and this could entail the import of still another 650,000 barrels of oil a day. For example, a fivefold projected increase in liquified natural gas imports by 1985 could be endangered by difficulties in constructing the infrastructure and finding sites for receiving terminals and price considerations. A more realistic estimate is that LNG will almost quadruple.

An expected increase in steam coal from 500,000 tons a year in 1976 to 40 million tons in 1990 is uncertain due to environmental standards and their cost implications, and this could put almost a tenth of the imported coal projections at risk.

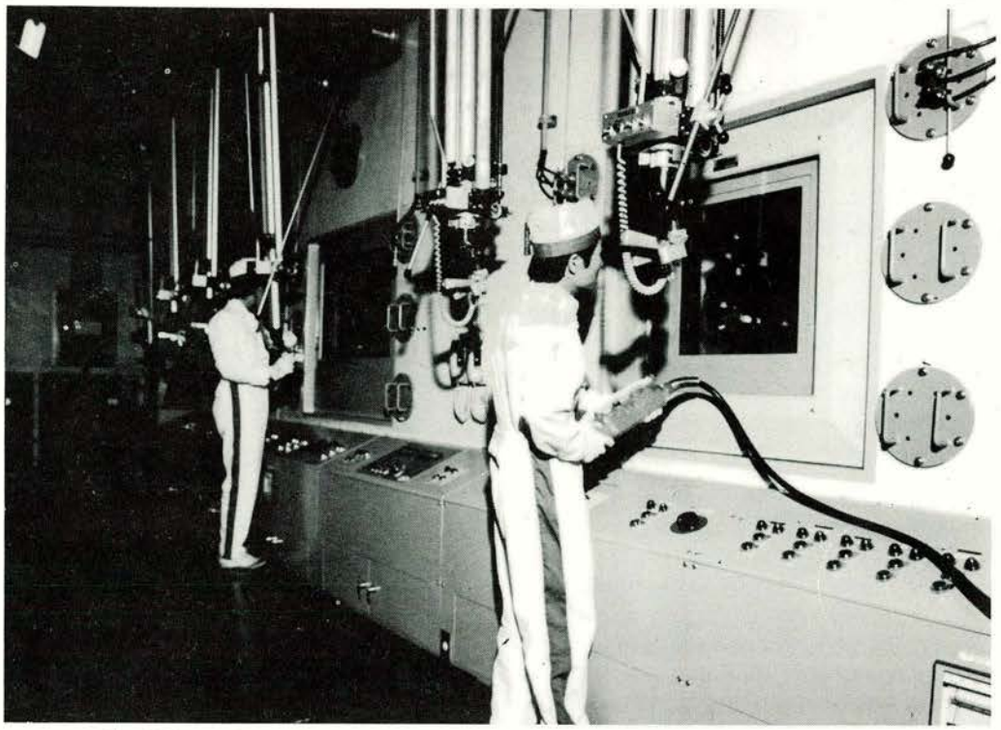
Domestic production of oil and gas is projected to increase fourfold by 1985 to 260,000 barrels a day oil equivalent but this would require intensive development of the offshore continental shelf.

Most unsure is nuclear power. None of the 12 nuclear plants foreseen for 1985 are as yet authorised, though sites for eleven were included in a recent list of "priority sites" of the Ministry for International Trade and Industry (MITI). Almost half the nuclear projections for 1985 are estimated to be at risk. Japan has long term contracts for the supply of uranium to cover foreseen needs. A 200-ton pilot reprocessing plant at Tokai Mura is already in operation (a second is planned) and there are reprocessing contracts with France and the United Kingdom. However, a major effort on waste disposal is essential. Japan has given priority to the breeder reactor.

The major constraints on all of these supply measures are:

- *Lack of public acceptance*

The population is concerned by the environmental and safety problems associated with coal-fired power plants, refineries and nuclear plants, and all have suffered delays. Grants, financed by a tax on electricity, are given to municipalities to facilitate public acceptance of these sites. Stringent safety requirements are enforced.



The 200-ton pilot nuclear fuels reprocessing plant at Tokai Mura now in operation.

- *Inadequate investment*

Projected investments to 1985 are 68 trillion yen ($300 billion) overall, about twice the amount invested in the preceding ten years, with public funds accounting for about 10 per cent of the total. The availability of the public contribution is in doubt.

A recent tax of 3.5 per cent on crude oil and petroleum products and other appropriations increased the energy budget by 41 per cent to 500 billion yen for 1978/79. The new funds are termed an "encouraging development" but still leave a substantial funding problem. "There is a need for more concrete action" the IEA report concludes. "As long as the Japanese Government has not committed itself to implement a vigorous energy policy, efforts have to be judged less than adequate.

LUXEMBOURG

Luxembourg has not formulated any comprehensive energy objectives nor fixed any quantitative targets. IEA's Secretariat has forecast that energy use will increase by 58,000 barrels a day oil equivalent to 150,000 barrels, over the period 1976 to 1985 and oil imports by 8,000 barrels. Luxembourg does not endorse these projections. The only announced aim is greater use of natural gas so as to reduce oil requirements, but long lead times are required to provide new transmission networks. Coal is not seen as a substitute for oil for environmental reasons.

There is no conservation strategy. The few important measures which have been taken include automobile taxes graduated by engine size, speed limits and free public transport for students and half-fare for the aged.

Electricity is imported from neighbouring countries on long-term contracts at prices below marginal costs. This stimulates demand for electricity. Gasoline prices are lower than in surrounding countries due to different tax schemes. Thus present endeavours are not adequate.

The very high per capita use of energy per person—higher than any other in the IEA—is due in large part to the important role of the iron and steel industry in Luxembourg's economy: it accounts for two-thirds of the country's energy requirements. The IEA report recognises that the Government's scope for energy policy is limited by the impact of this industry on the local eco-

	1976	*1985*	*1990*
TPE (Demand) (mtoe)	4.64	7.47	8.60
Production (mtoe)	0.16	3.30	3.30
Net Imports (mtoe)	4.49	4.17	5.30
Oil Imports (per cent of TPE)	31.0	24.3	23.4
TPE/GDP	3.87	4.24	4.22
TPE/Capita	12.85	18.82	20.62

The very high per capita use of energy per person in Luxembourg is due in large part to the important role of the iron and steel industry.

nomy but notes that there is potential for conservation not only in the iron and steel sector itself but overall: "Luxembourg has very high energy consumption levels in other sectors and this shows a need to formulate energy policy objectives consistent with overall IEA goals." The IEA report recommends a series of measures along the lines suggested for IEA members generally (see page 28) with particular emphasis on the nuclear programme: an early decision on the postponed Remerschen nuclear project is called for.

THE NETHERLANDS

Prior to 1974, Dutch policy was designed to exploit natural gas reserves as rapidly as possible before cheap nuclear energy reduced their value. Now Dutch reserves of natural gas are declining, and production is expected to do the same within the next few decades. To cope with this new situation, the Dutch Government is phasing gas out of industry and electricity generation (3) and has decided not to renew existing export contracts for natural gas after their expiration. (About 55 per cent of 1976 production was exported.) Because of long-term contracts, export levels will remain fairly high until 1985 but will decline rather quickly thereafter to end almost completely by 1994.

To fill the gap, the Government is expecting to increase oil imports, one of the few IEA countries to be making such plans. Oil imports are expected to almost double by 1985.

The IEA report evaluates the Dutch efforts as follows: "As far as an increase in oil imports is inevitable, it would appear that with regard to the group objective of reduced oil import dependence, a special effort of the Netherlands in other areas is desirable." For the period up to 1985, the Netherlands' planned increase in oil imports is largely offset by the continuing natural gas exports. However, the Dutch domestic energy programme requires strengthening. The Government expects to supplement oil and Dutch gas with imports of gas from the North Sea. In the longer run a reintroduction of coal is envisaged, both in electricity generation and in industry, and gasification of imported coal is planned for the mid-80s. Nuclear capacity will only be enlarged after certain safety and environmental problems have been solved, possibly towards the end of the 1980s. The 1974 Dutch forecast of almost 600,000 barrels a day of oil equivalent in 1985 has been revised to less than a third of that figure. Research on solar and wind energy is continuing, and gasification of Dutch coal *in situ* is also being studied.

IEA's report urges the Dutch Government to plan for the swifter introduction of replacement fuels and to accelerate exploration in the North Sea. The question is raised whether the present royalty and tax schemes give adequate encouragement. Certain areas between the mainland and the Wadden Islands seem promising but are environmentally sensitive and have not been leased because of public pressure. The IEA report questions this in light of the environmental costs of using coal or higher sulphur gas as a substitute for clean natural gas.

As to conservation, current efforts are "quite impressive with some exceptions". In 1976 and 1977 the Dutch Government stepped up publicity, brought the price of gas almost to parity with oil except for household use and instituted a new building code, measures to encourage district heating and a progressive tax on automobiles based on weight; a tax on gasoline to encourage a switch to diesel fuel, and subsidies for industry were provided.

But conservation efforts may be threatened by insufficient or delayed financing, and therefore adequate long-range financing over a number of years should be guaranteed to avoid "stop-go-stop" progress. The modest goals inherent in the energy balances projected by the Dutch Government can be achieved. If the Government adopts and finances a proposed scheme for energy conservation in the residential and industrial sectors, consumption in 1985 might be lower than forecast. Dutch energy balances need revision and a new White Paper is being prepared.

	1976	*1985*	*1990*
TPE (Demand) (mtoe)	64.2	90.1	98.8
Production (mtoe)	77.5	73.5	55.4
Net Imports (mtoe)	*13.2* (1)	16.6	43.4
Oil Imports (per cent of TPE)	39.1	53.3	51.2
TPE/GDP	1.68	1.60	1.50
TPE/Capita	4.66	6.26	6.68

(1) Exports

(3) Dual firing will be maintained so that in an emergency consumers can switch back to gas.

Dutch reserves of natural gas are declining and production is expected to do the same.

NEW ZEALAND

The energy policy choices of the New Zealand Government are perhaps less complex than those faced by other IEA countries: although New Zealand's objective of industrialising further (to reestablish growth in the face of declining export markets) will require increased energy input per unit of output, the country is well endowed with indigenous resources—though so far no oil. New Zealand has coal and natural gas reserves, and still has hydro and geothermal potential, both of which are renewable and hence their intensification is a strong feature of the New Zealand programme, though perhaps somewhat ambitious in light of environmental and land use problems.Discovery and development of the large offshore Maui gas fields with reserves of 139 Mtoe in particular will ease the transition and help decrease dependence on imported oil which is expected to stay at the present level of 740,000 barrels a day which means a significantly lower percentage of total energy use.

Natural gas can be used to substitute for oil in all uses except transport. Already measures are in place to encourage such substitution. Low electricity tariffs which had encouraged the trend to "the all electric" home have been doubled, though they will still cover only about two-thirds of the cost of providing new electricity production. This gap must be eliminated if natural gas is to substitute for electricity.

Exploration for onshore oil and gas had flagged in recent years, so in 1977 the New Zealand Government took over responsibility and will form a state company. Offshore exploration was reactivated in 1975, the Government providing 40 per cent of the cost of offshore exploration in return for a 51 per cent participation in the event of discovery, but drilling ceased again after disagreement with the international companies except in one area. "It is important that this impasse be resolved and exploration accelerated" the report notes.

As to coal, New Zealand's is very low in sulphur content which diminishes the environmental constraints and coal could be used more widely in industry.

On nuclear power the Government has reserved its position pending a report by the Royal Commission on Nuclear Power and debate on long-term energy policy which is scheduled to begin this year with publication of a green paper on energy. Even if it is not required before the end of this century, IEA's report suggests that preparatory work should not be shelved and that there be public education on nuclear safety, waste disposal and other fuel cycle issues.

Use of methanol and LPG is under consideration as a substitute for gasoline but this programme needs incentives.

As to conservation, measures have been reinforced and mandatory building codes for homes including mandatory insulation instituted in April of 1978 but there is still no energy labelling or mandatory insulation for non-residential buildings and the gasoline tax is still very low. If increased, it could provide funds for conservation programmes.

The extent of the projected increase in energy use as a ratio of GDP— from 1.4 to 1.67—is "disconcerting" as is the enlargement of electricity markets. New industry growth provides the opportunity to effect efficient use of energy. Public grants are not given for budgetary reasons. The IEA suggests they should be added to tax incentives already in force.

The New Zealand programme, including as it does keeping oil imports to current levels, should make "a positive contribution" to achievement of the IEA objective of reducing group dependence on imported oil, the IEA report notes. But there is a question as to whether the target is ambitious enough given New Zealand's possibilities.

	1976	*1985*	*1990*
TPE (Demand) (mtoe)	10.8	15.4	18.2
Production (mtoe)	7.1	11.7	14.2
Net Imports (mtoe)	3.7	3.7	4.0
Oil Imports (per cent of TPE)	32.8	24.0	22.0
TPE/GDP	1.40	1.67	1.68
TPE/Capita	3.48	4.67	5.20

NORWAY

In a dramatic change, Norway will become by 1985 the largest exporter of hydrocarbons in the IEA relative to their own consumption and one of the largest in absolute terms: net exports will increase almost tenfold from 1976 levels to reach well over a million barrels a day of oil equivalent, divided approximately half and half between oil and gas. These exports together will be double the size of total domestic demand which is projected to slow down from its historical pre-1973 rate of increase of 5 per cent a year to 3 per cent. "It appears that Norway's effort in all major facets of energy activity is considerable" says the IEA report.

Production of oil and gas is projected to reach 1.3 million barrels a day by 1980 as compared with 280,000 barrels a day in 1976 and then to drop off sharply at the end of the decade unless new discoveries are brought on stream. This level represents a balance among many diverse objectives, and the Norwegian Government sees no possibility of acceleration, but the projected level seems feasible.

The anticipated drop-off in production highlights the importance of exploration activity in new areas including those north of the 62° parallel which is a "more expensive and hazardous environment" and thus presents problems to the Norwegian Government in terms of safeguarding regional, social and commercial objectives. Exploration in the North, originally set for 1978, has been delayed to 1980. In 1978 attention will be focussed on drilling east of the Statfjord field which is already under development.

IEA's examiners consider that this exploratory activity must continue. The fourth leasing round south of the 62° parallel and the anticipated leasing of blocks north of that parallel should "proceed at the currently planned pace". The Ekofisk incident has led to tightened safety standards generally, and IEA notes that these should be respected and suggests special safeguards for the North. Norway's IEA related obligations and activities receive very careful public and Parliamentary scrutiny and the Government has very clear and explicit national policies with regard to hydrocarbon production and trade including thorough and well-debated periodic reviews. Norwegian leasing policy has been used to moderate oil sector activity. In future, special provisions to regulate the timing of development and, if necessary, the rate of production from new finds may also be used. IEA adds that it will be important to maintain a fiscal and regulatory regime which encourages participation by quali-

	1976	*1985*	*1990*
TPE (Demand) (mtoe)	20.9	27.5	31.0
Production (mtoe)	26.8	81.1	69.6
Net Exports (mtoe)	*5.9*	*53.6*	*38.6*
Oil Exports (per cent of TPE)	*28.2*	*97.5*	*71.0*
TPE/GDP	1.41	1.20	1.12
TPE/Capita	5.05	6.55	7.20

fied foreign entities in hydrocarbon activity including related equipment and services, given the rate of production in the 80's and the need to explore in harsh environments.

Planning for a gas gathering system and discussion with other countries which may contribute to or benefit from such a system should continue so that feasibility is determined early on.

Norway relies almost totally on hydro facilities for electricity and this form of energy is also to supply all the expansion projected through 1985. IEA thinks this is feasible but notes that some of the country's hydroelectric potential cannot be used because of environmental concerns. Oslo is evaluating a proposed multiple fired plant (coal, waste, oil). This approach merits careful consideration given the remoteness and cost of new hydro sites and the expected growth in Norwegian coal production in the Svalbard archipelago. As to nuclear power, Norway has reserved its position and has not yet formulated a nuclear policy, but Norway will "soon have to come to grips with the issue of sources of electrical power which are environmentally less benign than hydro".

Concern with conservation is more recent than with production and has been the object of less attention and relatively small amounts of public funding. Before 1973 however, Norway's use of energy was quite efficient, particularly in the residential and transportation sectors: a building code with mandatory thermal efficiency has been in place since 1950; taxes on gasoline and automobiles have been high and the public transportation system is well developed. A recent sharpened focus on energy conservation has resulted in a Plan of Action which foresees revision of the national building code, increased loans for retrofitting homes, more aid to industry for conservation, funds to reduce losses in electricity transmission and distribution, and R & D grants for demonstration projects in conservation. IEA's report suggests that more funds may be needed for industry because of its fragmentation (60 per cent of the firms employ less than 10 people).

The Plan of Action should also be implemented promptly which may require more staff and resources.

SPAIN

Spain forecasts substantial growth in energy demand, from 1.3 million barrels a day oil equivalent to nearly 2 million barrels a day. Oil imports are forecast to rise only slightly. The difference will be made up by domestic production—oil is expected to increase from a negligible amount to 150,000 barrels a day. Drilling in 1976 was at an all time high and a number of exploration licences have been granted. Coal and lignite are also expected to reach 260,000 barrels a day oil equivalent, almost doubling 1976 production. Nuclear powered electricity is to supply 226,000 barrels (a downward revision of about a third from the last review but 9 times higher than present installed capacity). Spain also has uranium ore and is expected to produce enough to cover almost half of her domestic requirements in the period 1977-87.

	1976	*1985*	*1990*
TPE (Demand) (mtoe)	65.7	98.4	122.8
Production (mtoe)	15.7	41.0	56.8
Net Imports (mtoe)	50.0	57.4	66.0
Oil Imports (per cent of TPE)	69.4	48.2	42.3
TPE/GDP	1.47	1.50	1.58
TPE/Capita	1.83	2.81	2.98

Hydro power is expected to almost double; gas imports, particularly liquified natural gas will substitute for oil in industry, while coal, nuclear and hydro will be used in electricity generation so that oil-fired capacity will decrease by a third. A submarine pipeline to carry natural gas from Algeria is being considered.

These projections incorporate the expected results of a National Energy Plan which has still to be considered by Parliament and which aims to slow the growth of energy demand in a way that is compatible with economic development as well as to reduce dependence on energy imports and diversify their source. Measures now in place on both conservation and supply are not considered by the IEA report to be adequate to stabilise oil imports as projected. Low energy prices, particularly electricity, hamper conservation; there are at present no mandatory measures, and the funding of Government conservation efforts should be increased. A broad-ranging conservation programme is required which ensures effective use of energy in homes, covers marginal costs for electricity production and provides more incentives for conservation by industry. If adopted, the new plan would help achieve IEA's group objective but implementation will depend on the realism of nuclear projections and whether the plan is adequately supported by pricing, incentives and specific measures of implementation.

SWEDEN

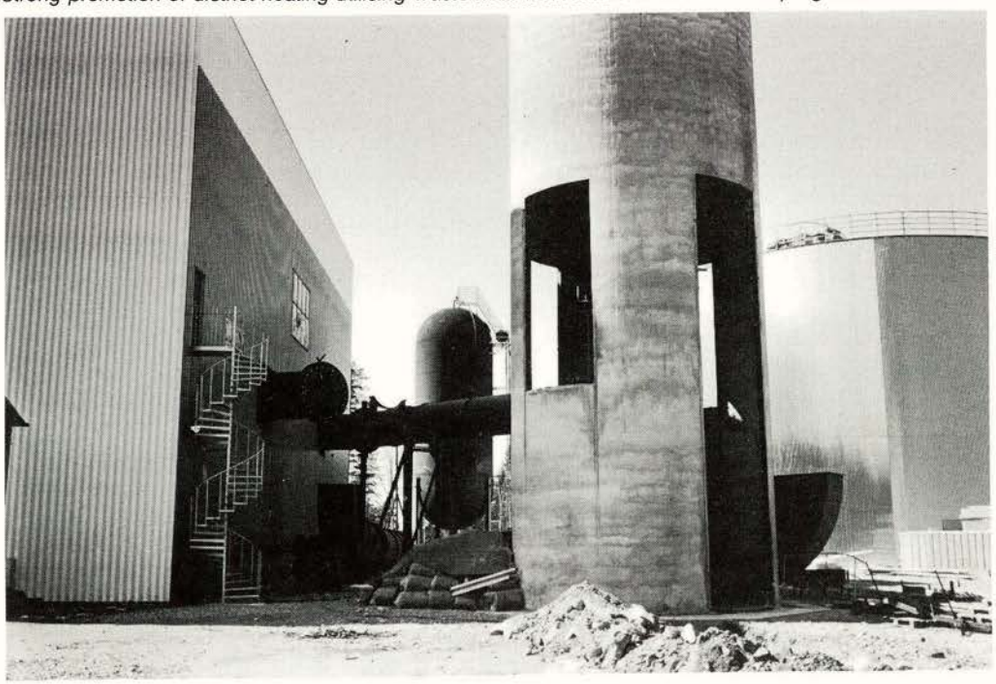
In October 1976 when a new government took office, an Energy Commission was established to review energy policy options to 1990, and the major decisions will not be made before the end of 1978. It is working on four alternative scenarios all of which call for enhanced conservation (4).

Figures submitted to the IEA for Sweden (5) show a small decrease in oil imports. Achievement of this result is predicated on a very strong conservation programme, a substantial increase in nuclear power, a small rise in hydro power and in coal production and imports. Sweden produces no oil or gas.

(4) Since the IEA examination, the Commission has submitted its report which is now under discussion.

(5) The energy balances submitted by Sweden are those of the National Swedish Industrial Board. The Swedish Government has neither confirmed nor rejected them.

Strong promotion of district heating utilising waste heat is a feature of the Swedish programme.



	1976	1985	1990
TPE (Demand) (mtoe)	49.6	60.5	65.0
Production (mtoe)	19.5	30.5	34.1
Net Imports (mtoe)	30.4	30.0	30.9
Oil Imports (per cent of TPE)	56.9	46.0	43.7
TPE/GDP	1.32	1.16	1.09
TPE/Capita	6.05	7.21	7.74

As to conservation, in 1975 Sweden set a maximum annual increase of 2 per cent to 1985 as compared to the historical 4-5 per cent and, beginning in the 1990s, a zero growth rate.

The existing conservation programme is "quite strong". Substantial amounts of public funds have been made available to promote conservation; there is a strong building code with minimum thermal efficiency standards for all new buildings, progressive taxes on cars, substantial funding for retrofitting of residential and commercial buildings, government regulation of energy intensive industries and strong promotion of district heating including the utilisation of waste heat. Funds for this and for the combined production of heat and power should be increased. Gasoline prices are low by European standards, and the IEA report recommends that they be increased. Electricity prices do not always cover marginal costs and the report recommends higher prices and the phasing out of declining block rates.

"The weakest point in the Swedish programme is the uncertainty concerning the nuclear programme", the report notes. The Energy Commission is working on four scenarios, two of which call for the phasing out of existing nuclear stations by 1985 or 1990 (six nuclear plants with 3.8 GW of installed capacity are now operating and four others are under construction). Another scenario is to carry out the nuclear programme decided upon in 1975 (13 reactor units) with no further development. The final scenario foresees further expansion of nuclear power. The Swedish Government proposed and Parliament has passed nuclear safety regulations which require utilities to show how and where absolutely safe disposal of radioactive waste can take place, with or without reprocessing, before new nuclear reactors can be put into operation. A programme for the development of management techniques for spent fuel and radioactive waste in geological formations is underway. Sweden has large uranium reserves in the Ranstad in Northern Sweden (an estimated 300,000 tons of uranium content) and they are being explored but they are not as yet being exploited because of intense environmental opposition as well as the uncertainty of the nuclear programme. The level of production forecast by the mining company concerned is 300 tons a year which is not enough for export. "A timely and clear decision on nuclear power is required" says IEA's report. In the event of a decision to discontinue its development, some other reliable alternative to imported oil should be sought.

The report recommends development of indigenous sources such as hydro, uranium and peat, if Sweden is to make an adequate contribution to IEA objectives, but environmental considerations also play an important role in use of these energy sources. Two-thirds of the hydro potential has already been exploited; there are only two power stations where coal could be used on a regular basis, and use of coal is opposed because of its emission of particles. IEA's report recommends "the use of steam coal in an environmentally acceptable manner" for district heating and industry. There are huge peat deposits which IEA's report says could, together with biomass and municipal waste, reduce oil demand. There is evidence of growing interest in coal utilisation in the fact that Sweden is considering a law requiring all new power stations and district heating plants to be dual-fired.

Natural gas would have to be imported, but there is as yet no infrastructure, and Sweden is considering cooperation with Denmark on gas deliveries and importation of Soviet gas via the European grid.

SWITZERLAND

Swiss energy policy is still in the development stage. A Federal Commission for an Overall Energy Strategy (GEK) created in 1974 is to publish its final report this year and this will serve as a basis for a general energy debate in Parliament late this year or early next year. This debate may result in constitutional amendments permitting improved coordination between Federal and Cantonal energy programmes.

The interim report of the GEK advises against deferring action until Federal instruments are in place and recommends full

In Switzerland, hydropower is still very important.

use of the powers presently at the disposal of the Confederation and the Cantons. Forecasts submitted on this basis show total energy requirements increasing from 428,000 barrels a day oil equivalent in 1976 to 534,000 in 1985. Oil imports are seen to increase only slightly. Natural gas is to play a key role because of the country's fuel substitution policy. The infrastructure is in place, and the natural gas needed to meet demand is under contract from firms in Italy and Germany. Subsidies or tax credits for tank storage may be necessary.

Nuclear energy, which is expected to double by 1985, is also important but the projection seems to be at risk. Whether it is realised or not depends on the outcome of the Government's proposal to amend the Atomic Law and the "popular initiative aimed at ensuring the rights of the people and security in constructing and operating nuclear installations". Three large nuclear power stations now under construction at Gösgen, Leibstadt and Kaisergaust, have already been delayed.

Given the limited amount of indigenous resources, energy conservation offers the

	1976	1985	1990
TPE (Demand) (mtoe)	21.4	26.7	29.4
Production (mtoe)	8.1	11.7	12.9
Net Imports (mtoe)	13.9	15.0	16.5
Oil Imports (per cent of TPE)	62.3	49.6	49.1
TPE/GDP	1.0	1.0	0.9
TPE/Capita	3.3	4.2	4.6

largest potential for achieving the energy projections. In the 1976 Review of Conservation Programmes, Switzerland's programme was described as "unsatisfactory". Since then a number of measures have been implemented: an energy conservation bureau in the Federal Office for Energy Economics, a 500,000 franc campaign for energy conservation, a formal appeal to the Cantons for conservation measures and subsidies for retrofitting existing houses. These measures are "only modest first steps" and still fall short of IEA's recommendations. It seems likely therefore that the aim of reduced oil consumption will not be achieved unless Switzerland implements stronger energy policies.

UNITED KINGDOM

For the immediate future the United Kingdom is pursuing the aim of reduced dependence on imported oil through energy production and conservation and is expecting to achieve net self-sufficiency by 1980. "Supply is the strongest part of the UK's programme" the IEA report notes. The effort on both oil and gas is "impressive and effective".

Unlike many IEA countries, the UK has many options open because of the "breathing space" given by North Sea oil and gas. Rather than setting specific production goals or committing themselves to the development of export potential, the UK forecasts ranges of energy production for oil and gas for 1985. The range of forecasts is very broad. At the lower end of the range (2 million barrels a day of oil and 700,000 barrels a day oil equivalent of gas) the UK will be essentially self-sufficient in net energy production and consumption. At the upper end (3 million barrels a day of oil and 900,000 of gas) the UK could be a substantial net exporter of oil, up to 1 million barrels a day. "Needless to say such a level of net exports could make a substantial contribution to overall IEA objectives" says the report. Significant net exports are unlikely, however, unless production of oil and gas is towards the top end of the range. More precise targets would thus be helpful in assessing the adequacy of UK efforts.

The IEA report suggests that the level of development should be increased to ensure the potential for net exports in the 1980s and export policy should be clarified. Recently growth in the pace of exploration has moderated. The Government has announced a policy of smaller and more frequent licensing rounds in order to reduce bottlenecks and ensure a constant level of activity. The IEA report notes that future licensing rounds should be held with a view to a continued high level of exploration. Furthermore the Government should encourage development of marginal fields and give fiscal incentives for exploration in less promising areas while the infrastructure is still flexible. The amount of natural gas recoverable could be increased if a decision were made to proceed with a natural gas gathering pipeline either in the UK sector alone or in cooperation with Norway. Discussions between the two countries, which the IEA report recommends, should be brought to an early conclusion.

	1976	*1985*	*1990*
TPE (Demand) (mtoe)	206.9	244.0	268.0
Production (mtoe)	127.9	262.0	262.5
Net Imports (mtoe)	78.8	*18.0* (1)	5.5
Oil Imports (per cent of TPE)	38.0	*9.8* (1)	1.7 (1)
TPE/GDP	1.52	1.32	1.24
TPE/Capita	3.70	4.29	4.62

(1) Exports

A petroleum revenue tax, instituted after the 1973/74 price rise, is designed to capture economic rents. The state oil company, British National Oil Co. (BNOC), is to play an increased role in the development of oil and gas: it will hold majority participation in all future licenses and the Government is negotiating BNOC participation in already licensed projects.

Despite the growing importance of oil and gas, UK energy policy continues to be based on a balanced four-fuel economy. Nuclear power capacity is forecast to double. The strategy for the back end of the fuel cycle has not yet been fully formulated although planning permission has just been given for extension of the reprocessing plant at Windscale.

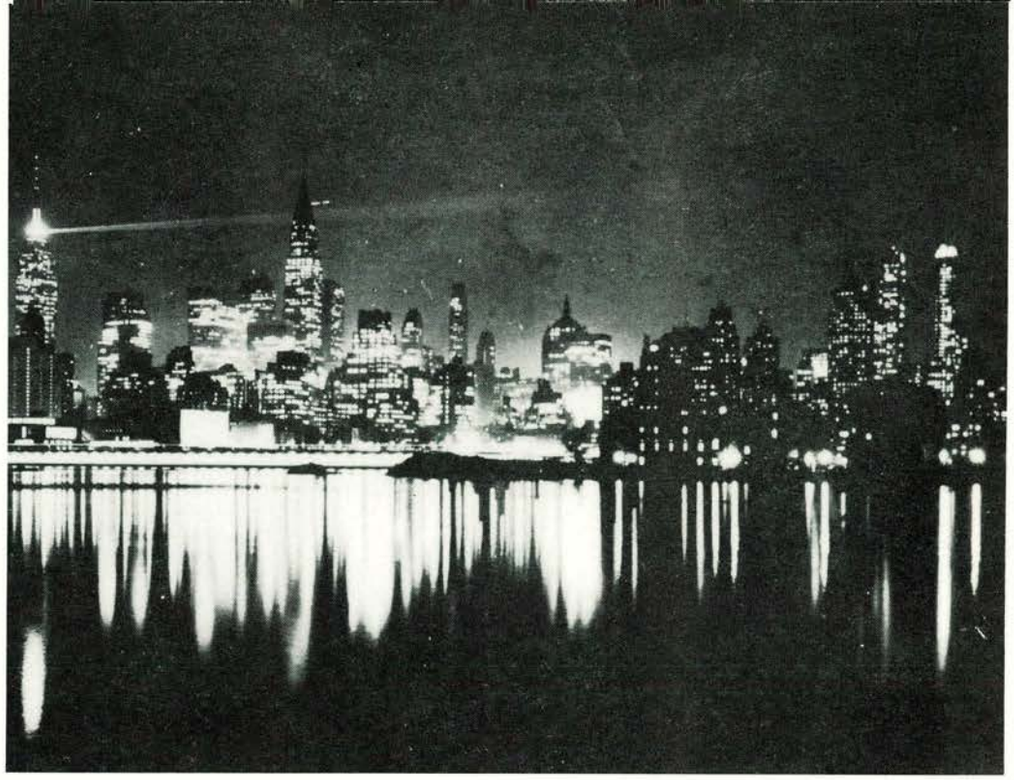
Coal is still by far the largest domestically produced fuel and the strategy, agreed to by the National Coal Board, the unions, and the Government, is to increase production from 122 million tons in 1976 to 170 million tons by the year 2000. Exploration will be continued.

As to conservation, the UK has achieved "some of the best results in the IEA" and energy conservation is a key element in the UK energy strategy. Most of the UK's energy conservation programme appears to have been under-financed, although this has to some extent been corrected by recently announced measures.

The UK's forecast rests on an assumption that measures in place will be strengthened and those under consideration will be aggressively implemented and the real out-turn may be some 200,000 barrels a day of oil equivalent higher than forecast. Transport is the sector in which the fewest measures have been introduced. The amount of oil used in electricity generation has been reduced but the scope for coal is limited by various factors, among them the high proportion of heavy oil produced and consequent competitive prices. Government policy should encourage additional cracking capacity to make lighter oils. Generally conservation should be strengthened with more resources and better coordination of pricing policy, financial incentives and fiscal measures. In particular close attention should be paid to the price relationships between competing fuels: natural gas prices are below the thermal equivalent of alternative fuels and should be raised.

Planning permission has just been given for a nuclear fuels reprocessing plant at Windscale.

UNITED STATES



The United States dominates the overall energy picture of the IEA area, with half its total energy consumption and two-thirds of its energy production. In less than a decade, the US has more than quadrupled its imports to 8.7 million barrels a day in 1977, almost 30 per cent of the IEA total. The decline in domestic oil and natural gas production, the delay in implementation of a comprehensive and effective energy policy and the continuing strong growth in energy demand (reflecting, in part, the relatively rapid recovery of the US economy) have all contributed to the surge of oil imports.

The President of the US in April 1977 submitted a National Energy Programme (NEP) to the Congress designed to reverse this trend and to reduce US oil imports to 6 million barrels a day in 1985 as against the 11.5 million barrels now forecast without the plan. Other goals of the programme are to reduce energy growth to less than 2 per cent a year, to reduce gasoline consumption by 10 per cent, to increase coal production from 700 million to over a billion tons a year, to bring 90 per cent of residences to minimum energy efficient standards and to use solar energy on a large scale in new and existing residences (2.5 million solar heating units by 1985).

The legislative process is still underway. A House-Senate Conference is now working on the proposal and has reached agreement on conservation, on measures to encourage the conversion of industry and electricity generation from oil to more abundant coal and on phased deregulation of natural gas prices.

But it has been unable to reach agreement on a key, controversial issue: a proposed equalisation tax on crude oil which could raise oil prices to prevailing world levels. This could discourage consumption and encourage new production.

A proposed reform of utility rates has been substantially weakened by the Committee and a standby gasoline tax was rejected.

The IEA report applauds the 6 million barrels a day oil import objective contained in the Administration's plan and notes that passage by the Congress of effective energy legislation as soon as possible is of the utmost urgency.

In view of the delays, and particularly the probable modifications to the plan from its original formulation, it appears that many of the targets including the oil import target will not be attained by 1985. If the US Government's oil import objective is not attained, the IEA group objective of 26 million barrels a day will be at risk. Thus the contribution of the US at this time must be judged inadequate.

The Administration's plan as originally formulated "includes most of the important elements of a comprehensive energy programme". But the IEA considers that the US must go even further if the oil import objective is to be realised. The continuation of price controls on oil even for a few years "will delay energy saving action particularly in space heating" while "failure to introduce substantial gasoline tax increases enables drivers to continue to use low priced gasoline". From the production point of view, market prices should be given to oil producers and, as appropriate, to gas producers in order to encourage domestic production. For non-conventional types of oil and gas, additional incentives should be introduced. Accelerated leasing of Federal lands and the outer continental shelf would help.

On coal the IEA report comments that if the exemptions proposed by the House-Senate Committee on conversion to coal are interpreted or administered too broadly, the potential of the programme might be "significantly limited". 1977 Amendments to the Clean Air Act would limit the potential for Western coal development by requiring the best control technology for new coal-fired generation plant regardless of sulphur content of the coal to be used. The amendments also require the use of locally or regionally available coal. This would limit the advantages that low-sulphur Western coal would otherwise have in Eastern markets. IEA also recommends that in order to accelerate the development of coal which in the West is on Federal lands, the current suspension of leasing be lifted that US production policy take into account foreign demand and the necessary infrastructure for export be built.

As to nuclear development, the Administration's policy is to encourage the use of light water reactors and defer commitment to advanced nuclear technologies based on the use of plutonium. As an adjunct to this policy, uranium enrichment capacity is to be expanded and enrichment services guaranteed to any country that shares the non-proliferation objectives of the US and accepts conditions consistent with those objectives.

The policy of encouraging light water reactor power should be explained clearly to the public so as to avoid misunderstanding about its relation to non-proliferation. A slowdown in nuclear development would not only risk using more oil and gas but, given the preponderant role of the US in world nuclear development, would influence the course of that development in the world as a whole. Finally, the suspension of domestic reprocessing (part of the deferment of advanced nuclear technologies) has given rise to uncertainty for the electricity generating companies. Clear policies in these areas should be established as soon as possible.

	1976	*1985*		*1990*
		without NEP	with NEP	
TPE (Demand) (mtoe)	1,743.9	2,345.0	2,250.0	2,638.5
Production (mtoe)	1,410.5	1,778.2	1,930.0	1,951.4
Net Imports (mtoe)	333.4	566.8	320.0	689.1
Oil Imports (per cent of TPE)	19.1	24.2	14.2	26.0
TPE/GDP	1.51	1.41	1.37	1.37
TPE/Capita	8.10	10.00	9.60	10.70

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