



WORLD ENERGY OUTLOOK



ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, PARIS

1977

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WORLD ENERGY OUTLOOK

A Reassessment of Long Term Energy Developments
and Related Policies

A Report by the Secretary-General

**ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT
PARIS 1977**

The Organisation for Economic Co-operation and Development (OECD) was set up under a Convention signed in Paris on 14th December, 1960, which provides that the OECD shall promote policies designed:

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

The Members of OECD are Australia, Austria, Belgium, Canada, Denmark, Finland, France, the Federal Republic of Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

The International Energy Agency (IEA) was established by decision of the OECD Council on 15th November, 1974 as an autonomous body within the framework of the Organisation. On 18th November, 1974, the sixteen Members of the Organisation then participating in the Agency entered into an Agreement on an International Energy Program.

The International Energy Program is implemented through the IEA. The principal aims of the Program are:

- i) development of a common level of emergency self-sufficiency in oil supplies;
- ii) establishment of common demand restraint measures in an emergency;
- iii) establishment and implementation of measures for the allocation of available oil in time of emergency;
- iv) development of a system of information on the international oil market and a framework for consultation with international oil companies;
- v) development and implementation of a long-term co-operation programme to reduce dependence on imported oil, including: conservation of energy, development of alternative sources of energy, energy research and development, and supply of natural and enriched uranium;
- vi) promotion of co-operative relations with oil producing countries and with other oil consuming countries, particularly those of the developing world.

The countries which participate in the IEA are: Austria, Belgium, Canada, Denmark, Germany, Greece, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The Commission of the European Communities takes part in the activities of the Agency.

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LIST OF SYMBOLS AND ABBREVIATIONS

API=American Petroleum Institute
 b/d=barrels per day
 boe/d=barrels of oil equivalent per day
 Btu=British Thermal Unit
 cal=calorie
 cf=cubic feet
 CPE=centrally planned economies
 EPA=Environmental Protection Agency (USA)
 EPCA=Energy Policy and Conservation Act (USA)
 FEA=Federal Energy Administration (USA)
 f.o.b.=free on board
 FPC=Federal Power Commission (USA)
 G=giga=billion (thousand million)
 GDP=Gross domestic product
 h=hour
 IBRD=International Bank for Reconstruction and Development (World Bank)
 K=kilo=thousand
 Km=kilometer
 l=liter
 LDC=Less developed countries
 LNG=liquefied natural gas
 M=mega=million
 mcf=thousand cubic feet
 mpg=miles per gallon (US)
 mpig=miles per imperial gallon
 NEB=National Energy Board (Canada)
 NEO=National Energy Outlook (USA)
 NGL=natural gas liquids
 OCS=Outer Continental Shelf
 p.a.=per annum
 SNG=synthetic natural gas
 T=tera=trillion (million million)
 t=metric ton
 TER=total energy requirements
 TFC=total final consumption
 toe=tons of oil equivalent
 W=watt
 Wh=watt hour

EXECUTIVE SUMMARY

PURPOSE AND ORIGIN OF THE REPORT

This report analyses projected trends in energy needs and supplies and the implied oil import demand of OECD and other major global regions for the next 15 years. It also calls for realising the opportunities still available to improve the energy supply-demand balance and thus reduce oil imports. While the scope is global and covers all energy, the focus is on OECD's needs and opportunities, and on oil as the most versatile and crucial fuel in the mid-term.

The report is a revision and extension of OECD's *Energy Prospects to 1985*, which when published at the beginning of 1975 was one of the first studies to take account of the significant increases in energy prices. The earlier study, begun in 1973, was prepared on the basis of only a year's experience with higher prices and even shorter experience with the severity of the economic recession of 1974-75. Further experience has produced a lowering of expectations about early response of supply and demand of energy, and also realisation that medium-term economic growth rates may be lower than expected prior to 1974. But great uncertainty still prevails in the continuing disequilibrium in both energy markets and the world economy. This report is but one of many re-assessments that will be required as the world energy market evolves towards a new equilibrium.

SCOPE AND BASIC ASSUMPTIONS

The findings of this study arise from several scenarios or cases. There are three different economic growth rate cases. The central growth rate case is combined with two different energy policy scenarios. The other two growth cases are briefly considered to demonstrate the importance of the growth parameter. Throughout there is but one price assumption for the reference Saudi crude: \$11.51 per barrel in 1975 dollars¹.

While this study parallels *Energy Prospects to 1985* in many aspects, recent developments have called for some modification of scope, focus and technique.

1 After the OPEC Ministerial Conference in Doha, Qatar, on 15-17 December, 1976, it was announced that Saudi Arabia and the United Arab Emirates had decided to raise their crude oil prices by 5 per cent as of 1 January, 1977, and the other OPEC member countries (Algeria, Ecuador, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Venezuela and Qatar) had decided to increase the price of "marker" crude oil from \$11.51 per barrel to \$12.70 per barrel, an increase of about 10 per cent, as of 1 January, 1977, and to \$13.30, a further increase of about 5 per cent, as of 1 July, 1977. At the same time, the Saudi Arabian Oil Minister indicated that Saudi Arabia would lift its ceiling on crude oil production and would review its position in mid-1977 in the light of Middle East peace developments and the results of the Conference on International Economic Co-operation. Under these circumstances, it is impossible to determine at the present time what the effective price of crude oil will be. Consequently, the price assumption which underlies the projections of energy demand and supply given in the *World Energy Outlook* has been retained unchanged.

This study therefore:

- draws upon extensive re-assessments completed by nearly all major energy consuming and some energy producing countries after the oil price increases of 1973-74, but at the same time relies less upon member states' official forecasts than the first study;
- highlights the uncertainty in growth by putting three growth cases;
- presents an alternative or accelerated policy case to demonstrate the potential for changing projected results with stronger policies;
- encompasses the world, not simply the OECD as in the original study;
- looks at horizons beyond 1985; and
- explores the potential savings that might accrue from adoption of various conservation practices.

KEY CONCLUSIONS AND IMPLICATIONS

Continuance of present policies governing supply expansion and conservation will lead down the path of higher demand for oil imports by industrial countries. OECD net oil import needs in 1985 are put at 35 million barrels per day (Mb/d) or 1 750 million tons of oil equivalent (Mtoe). This level is 9.7 Mb/d (484 Mtoe) greater than in 1974. Demands by the rest of the world (excluding OPEC countries) may be roughly balanced by their projected supplies. Hence demand for exports from the present members of OPEC could be 35 Mb/d (1 750 Mtoe) and when OPEC consumption is included, total required OPEC production could be 39.3 Mb/d (1 964 Mtoe).

By 1985, the present members of OPEC may have expanded their rated production capacity to about 45 Mb/d and other exporters to some 5.5 Mb/d but then as now the margin between the rated capacity and the exporters' desired level of output may be quite large. This could produce a close and uncertain balance between crude liftings and the demand for exports. The exporters' desired level of output may not be sufficient to accommodate possibly greater oil demand generated by spurts of economic growth in the mid-1980's that exceed the growth of industrial countries assumed here. Similarly, that level of output could be pressed if the developing world's import needs are larger than indicated by a recent staff study of the World Bank.

The future desired level of production by oil exporting countries will be determined by a complex set of forces working on each exporting country and is difficult to predict, except, of course, for those countries whose present reserves can no longer sustain past levels of output. But even in the case of those countries with a greater measure of discretion in setting output levels, there is cause for concern. The large volume of revenues raises questions about the degree of absorption of the revenues in the domestic economies to spur economic growth, and faster growth has implications for societal change. On a deeper, philosophical level are other important forces: the preferences of some societies of oil exporting countries to hold physical assets such as oil, or to defer receipt of current income to the future, or simply to see the opportunities of future generations in a different light than seen in industrial societies. These preferences may also be reinforced by apprehensions about depletion. As a consequence, all the oil projected to be sought at today's price may not be made available by exporting countries, in which event large increase in the real price of oil would occur as a result of unilateral price action by producers. This would necessitate rapid and costly adjustments by energy consumers throughout the world which could threaten maintenance of moderate economic growth which is so vital to the

employment of the rising world population, not to say improvement of real standards of living of the peoples of the developing countries. This risk, on the supply side, is compounded by the increased vulnerability of industrial states, resulting from higher import demand, to a deliberate reduction of oil supplies to achieve a political objective of some oil exporters.

Notwithstanding the doubts about exporters satisfying the projected demand of 35 Mb/d (1 750 Mtoe) in the reference case, OECD's net import needs could rise even higher than projected if there were any slackening in the present commitment to supply expansion and conservation embodied in current policies (some of which await implementation). For example, replenishing of depleted reserves to maintain present oil production levels in some OECD countries would require doubling the historical finding rates. Holding oil imports of OECD down to the projected level of 1985 will require (assuming a 5 percent annual depletion of reserves) the finding and developing of reserves sufficient to support an output of about 10 Mb/d (500 Mtoe) of crude oil and natural gas liquids merely to sustain the 1974 production level, plus additional reserves to support a further 5 Mb/d (250 Mtoe) to increase OECD output to the projected 1985 level. This reference scenario implies strenuous effort, in the form of considerable capital mobilization and reduced energy consumption. The lesson of the past three years is that it is an achievement that cannot be taken for granted.

Table I. Projected World Oil Trade
Mtoe (Mb/d)
Net Imports (+)/Exports (—)

	1974	1980	1985			
			Reference Case		Accelerated Policy Case	
Canada	—9 (—0.2)	38 (0.8)	54 (1.1)	35 (0.7)		
United States	290 (5.9)	458 (9.3)	477 (9.7)	211 (4.3)		
OECD Europe	708 (14.2)	624 (12.4)	738 (14.7)	554 (11.0)		
Japan	263 (5.2)	348 (6.9)	441 (8.7)	382 (7.6)		
Australia/New Zealand	14 (0.3)	30 (0.6)	40 (0.8)	35 (0.7)		
Total OECD	1,266 (25.3)	1,498 (30.0)	1,750 (35.0)	1,218 (24.4)		
Centrally Planned Europe	—41 (—0.8)	—25 (—0.5)	20 (0.4)	20 (0.4)		
Centrally Planned Asia	—7 (—0.1)	—25 (—0.5)	—60 (—1.2)	—60 (—1.2)		
Oil Importing Developing Countries	161 (3.2)	148 (2.9)	149 (3.0)	149 (3.0)		
Other Countries	39 (0.8)	57 (1.1)	61 (1.2)	61 (1.2)		
Non-OPEC Oil Exporting Developing Countries	—46 (—0.9)	—150 (—3.0)	—189 (—3.8)	—189 (—3.8)		
Residual ¹	72 (1.4)	25 (0.5)	25 (0.5)	25 (0.5)		
Total net import demand	1,444 (28.9)	1,528 (30.6)	1,756 (35.1)	1,224 (24.5)		
OPEC Consumption ²	97 (1.9)	146 (2.9)	208 (4.2)	204 (4.1)		
OPEC Production	1,541 (30.8)	1,674 (33.5)	1,964 (39.3)	1,428 (28.6)		

1. Change in stocks at sea and statistical difference.

2. Includes bunkers.

BASIC POLICY ALTERNATIVES

Faced with the economic and political consequences of increasing import demand, OECD countries have but one realistic alternative to minimize inherent risks of enlarged imports of oil: to take positive action to expand energy supply

—particularly the “conventional” sources of oil, natural gas, coal and nuclear energy; to realise greater energy savings through more effective conservation measures; and to build larger stockpiles to buffer the effect of any deliberate supply reductions. Failure to do so, and instead deferring the acceptance of the consumer and taxpayer cost of these actions until the dangers are more apparent and the time available to make adjustment is shorter, courts the danger of considerable economic dislocation, slower growth and higher unemployment.

In regard to the “conventional” energy sources, policy action is required promptly—that is, within the next year or so—in order to make any appreciable addition to supplies by the early 1980’s. Equally prompt action is needed in regard to the “non-conventional” sources if the necessary technologies are to be developed on a commercial basis by the 1990’s.

The type of policies needed to bring about increased production include elimination of price controls on crude oil and natural gas; accelerated granting of exploration leases and production licences, principally in Alaska, the North American Continental Shelf, and some sectors of the North Sea; moderation of environmental requirements of new energy development, particularly coal and nuclear power; incentive measures for application of secondary and tertiary oil recovery techniques; and active promotion of coal utilisation by removal of demand constraints. Coal and nuclear fission should be substituted for oil wherever possible. Government support programmes for project development in solar energy, coal conversion and extraction techniques from shale oil and tar sands should also be strengthened.

On the demand or conservation side, significant potential exists for further reducing future energy demand per unit of aggregate output. A number of measures could be taken now. Pricing energy at world levels would have some immediate conservation effect through market forces. Firm and outspoken political commitment by national leaders to the need for energy conservation, together with selected mandatory measures such as speed limits, could heighten public awareness and create the psychological climate necessary to reinforce market effects. Measures of a more structural nature could be implemented now for growing effect in future years, such as automobile and other transportation efficiency standards, industry conservation monitoring and insulation standards and building codes. Other structural measures in the transportation, industry and residential/commercial sectors could enhance even further the long-term prospect for achieving large energy savings.

The accelerated policy alternative described in this study reflects these additional policy options which could be taken in the fields of conservation and increased production of indigenous sources. Taken together, they represent a potential to reduce OECD countries’ net oil imports by 1985 by as much as 10.6 Mb/d (532 Mtoe)—a saving of 30 percent under the level of imports that may be required in the absence of prompt policy action.

The total savings would result from increasing energy supply by 290 Mtoe and lowering demand for energy by 242 Mtoe². Although more than half this potential saving could be achieved in North America alone, every region could make an important contribution. The thrust of the policy options on supply is that faster development will come mostly through relaxation of policies that impede the operation of market forces. On demand, however, the policy options call for more active government programmes to bolster the dampening effect of price on demand through dissemination of information on cost-savings or by tax or other inducements.

2. Included in the savings of energy demand is 36 Mtoe in reduced demand for bunkers which is not a “conservation” measure in itself.

The purpose of more vigorous policy on the part of OECD countries to arrest the current trends toward supply-demand imbalances would be, of course, to moderate the general economic and political consequences of growing oil imports. As the more detailed examination of regions and countries shows, the time lags—especially in creating new production—are long and require that new policies be implemented shortly if they are to have any influence on oil import levels by 1985.

FACTORS INFLUENCING OECD ENERGY DEMAND TO 1985

The total energy needs in 1985 of OECD projected in the reference case—5 094 Mtoe—are lower than in the comparable price case in *Energy Prospects to 1985*³ primarily because the recent severe economic recession coupled with inflation has produced expectations of slower growth rates (4.0 per cent annually, 1972 to 1985, as contrasted to 4.9 percent, 1972 to 1985).

Total energy needs are seen as increasing more slowly than economic growth rates—at 3.6 percent annually from 1974 to 1985 for an implied energy/GDP growth elasticity of 0.84, which compares with 0.99 prevailing between 1960 and 1974. It has been difficult to identify separately the effect upon energy demand in the past two years produced alternatively by: recession, higher energy prices, milder weather and non-price conservation—although all observers put the likely level of effect of these forces in that descending order.

The slower growth rate case assumes an average growth rate one-half percentage point lower than in the central cases, throughout the period to 1985, which produces an OECD energy demand of 4 845 Mtoe or nearly 5 percent lower than in the reference case. The higher growth rate case, a half percentage point higher, produces an OECD energy demand of 5 344 Mtoe by 1985, or about 5 percent greater than in the reference case. Expressed differently, in terms of the effect upon oil imports, a full one percent increase in GDP in 1985 would increase the demand for oil imports 2 percent or 700 000 b/d by 1985.

The accelerated policy case projects a reduction of demand through implementation of conservation programmes amounting to 242 Mtoe in 1985. More than one-third is assumed achievable in the United States alone, in transportation (higher fuel efficiency standards in cars), the household sector (greater home insulation and appliance labelling), and the industrial sector (monitoring of industry conservation practices). There is also considerable potential for savings from automobile fuel efficiency, insulation and information programmes in the European and Pacific regions.

SUPPLY EXPANSION WITHIN OECD BY 1985

The current estimates of indigenous supply expansion within the OECD region are lower for all sectors than the estimates given in *Energy Prospects to 1985*.

Continued reduction in oil production in the United States; technical delays in the North Slope and portions of the North Sea; postponements in issuing licences to build pipelines in North America; and delays in granting leases to explore new regions or issuing licences to produce proved fields of some sections of the North Sea and Outer Continental Shelf of North America, have resulted in lower

3. The figures quoted from *Energy Prospects* have been converted by the new conversion factors now being used at the OECD and as a result differ somewhat from the numbers in *Energy Prospects*.

production estimates than in *Energy Prospects to 1985*—887 Mtoe as contrasted to the earlier estimate of 1 312 Mtoe—despite new discoveries and mark-up of official estimates of reserves in some areas.

Natural gas production prospects for 1985 are also lower than those of the earlier study, due largely to the continuance of price controls upon natural gas in the United States, the slower-than-expected pace of approving a gas pipeline system from Alaska and the Canadian north, and the slowing of projected production in the Netherlands. The estimate of 773 Mtoe by 1985 is less than the 1 016 Mtoe projected in *Energy Prospects to 1985*.

Coal output for 1985, projected at 863 Mtoe, is also down from the 1 025 Mtoe of the earlier study.

It is nuclear power, however, where the greatest short-fall from earlier expectations has occurred. The projection of OECD nuclear capacity in 1985 is now put at only 325 gigawatts with an output of 464 Mtoe—considerably less than the 748 Mtoe foreseen in the comparable price case of the earlier study, and below government targets set prior to the setting of higher oil prices at the end of 1973. The continual mark-down of nuclear expansion results from resistance to nuclear energy from conservationists and environmentalists, the escalation of capital costs primarily to meet higher security standards, and lower expectations of generating load requirements (in turn due to slower economic growth).

OECD ENERGY PROSPECTS TO 1990 AND BEYOND

Before considering the energy prospects for the rest of the world, it is imperative to look beyond 1985 even though extrapolation of trends becomes less reliable. Some order of magnitude estimates of the possible course of oil import requirements are instructive for today's policy formulation. The justification for more vigorous policy does not lie only in reducing dependence in 1985; it lies even more strongly in preventing the consequences of possible "policy drift" from emerging beyond 1985.

By 1990, OECD countries will need to achieve a very significant expansion of their nuclear power programmes in order to displace fossil fuels in electricity generation sufficiently to hold net oil imports below the high of 40.5 Mb/d (2 025 Mtoe) projected in the reference case; they would have to do even better to achieve the reduction implied in the accelerated policy case. Alternatively, large new reserves of oil would need to have been proved, developed and licensed for production in the OECD region. While economic growth and electricity growth might slow below the already reduced rates projected to 1985, this would imply economic and social costs for industrial states. Through 1995, continued large-scale expansion of nuclear power would be required to supply simply the growth increment in energy needs.

THE REST OF THE WORLD TO 1985

The countries outside the OECD comprise the developing world and from an energy viewpoint are considered in this study as belonging to the broad groupings: the centrally planned economies of the USSR, Eastern Europe and Asia; the many developing countries that are not members of OPEC; and the OPEC countries. Obviously the latter will continue to play a crucial role in the world energy market as suppliers of oil and natural gas. But the centrally planned economies and the non-OPEC developing countries, including new or re-emerging oil exporters, while subject to considerable uncertainty because of either state

secrecy or scanty information about both their energy needs and resources, as well as their energy and development policies, could soon become a deciding factor in determining whether the potential demand for oil moving in international trade will be satisfied.

The Eastern European trading bloc has expanded energy trade both with industrial states of OECD, especially in natural gas exports, and with OPEC countries. There should continue to be a modest increase in this trade but the net exports of energy from the countries of this bloc are projected to decline. China is expected to find increasing internal needs for its own rapidly expanding oil production, and since it is not compelled by large foreign debt to export oil it may make available no more than 1.2 Mb/d (60 Mtoe) for exports in 1985—but the exportable surplus could vary a half million barrels daily in either direction as the result of a change in domestic oil needs.

The estimates of the energy needs for the remainder of the developing countries (outside OPEC) were derived by the staff of the World Bank and were largely adopted here. These countries have widely disparate needs and opportunities in energy, but as a group they are projected to go from their aggregate net oil imports of 2.3 Mb/d (115 Mtoe) in 1974 to net oil exports of 0.8 Mb/d (40 Mtoe) in 1985—in large part because of the growing oil exports of Mexico, Egypt and Malaysia. The aggregate level, of course, masks the plight of the many low-income, energy-poor countries which will not share directly in the projected reduction in import needs. If, for instance, the three named countries ultimately became members of OPEC, the remaining developing countries outside OPEC might see net oil import requirements rise to as much as 1.3 Mb/d (65 Mtoe) in 1985. The section dealing with the prospects of the developing countries, however, highlights some of the frailties of these projections that are known to all who have attempted to make them.

Finally, estimates are offered for the oil needs of OPEC, which are put at about 4.2 Mb/d (208 Mtoe) (including bunkers) in 1985. The supplies of crude oil offered by OPEC for export are assumed to match the potential world demand for OPEC oil even though, as mentioned earlier, the gap between expanded productive capacity and demand will narrow and the gap between demand and the exporters' combined desired level of output will be even narrower. It is also clear that the discretion in setting the combined level of output will become more concentrated in the governments of one or two member states of OPEC as world demand increases under assumed constant prices and the reserves of less important exporters are depleted without significant replenishment by reserve additions.

The costly, abrupt adjustments that might be necessary to realign demand to a set level of supply from OPEC are, of course, the very risks that would be avoided by a transformation and revitalization of the energy policies of many of the industrial states of the OECD, such as the policy options contained in the accelerated policy case.

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A further elaboration of these findings appears in the regional summaries and detailed country assessments in the main body of the report. The tables of energy balances and the technical annexes will further assist the reader to understand the basis for the findings.

Table II. Energy Production, Consumption and Imports in the OECD to 1985 - Reference and Accelerated Policy Scenarios
Mtoe

	Production			Net Imports ¹			Total Energy Requirements ²		
	1985		1980	1985		1980	1985		1980
	Refer- ence	Accel- erated		Refer- ence	Accel- erated		Refer- ence	Accel- erated	
Solid Fuel	634.2	723.5	863.7	870.7	34.4	52.8	60.2	54.4	685.6
Oil and NGL	634.8	810.0	887.2	1,007.7	1,266.1	1,497.7	1,750.3	1,217.6	1,780.9
Natural Gas	695.6	694.1	773.2	871.1	12.5	56.5	112.2	122.8	704.2
Nuclear	58.0	216.3	464.3	522.3					58.0
Hydro and Other	237.3	264.5	307.2	307.2					237.3
Total	2,259.9	2,708.0	3,295.1	3,579.0	1,313.1	1,607.9	1,922.7	1,394.8	3,466.1
									4,203.7
									5,094.1
									4,885.4

Table III. Energy Projections for the OECD for 1985 - Low Growth, Reference and High Growth Scenarios
Mtoe

	Production			Net Imports			Total Energy Requirements ²		
	1985		1980	1985		1980	1985		1980
	Low Growth	Refer- ence		High Growth	Refer- ence		Low Growth	High Growth	
Solid Fuel	838.7	863.2	877.4	39.9	60.2	52.8	878.6	923.4	944.8
Oil and NGL	887.2	887.2	887.2	1,593.3	1,750.3	1,497.7	2,366.8	2,513.8	2,689.5
Natural Gas	772.2	773.2	773.2	93.5	112.2	56.5	865.7	885.4	904.3
Nuclear	441.7	464.3	484.7				441.7	464.3	484.7
Hydro and Other	291.9	307.2	320.1				291.9	307.2	320.1
Total	3,231.7	3,295.1	3,342.8	1,726.7	1,922.7	1,607.9	4,844.7	5,094.1	5,343.6

1. Columns do not sum to total for 1974 and 1980, since net imports of electricity are not included in the column breakdown but are included in the total.
2. The rows do not sum to total. For 1980 and 1985 the differences are due to the omission of marine bunkers from total energy requirements. For 1974, the differences are due to marine bunkers and stock changes.