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# An Energy Strategy for World Bank Borrowing Countries of Europe, Middle East and North Africa

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Projects Department  
Europe, Middle East and North Africa Regional Office

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AN ENERGY STRATEGY FOR WORLD BANK BORROWING  
COUNTRIES OF EUROPE, MIDDLE EAST AND NORTH AFRICA

WEIGHTS AND MEASURES

1 kilowatt (kW)	= 1,000 watts ( $10^3$ W)
1 Megawatt (MW)	= 1,000 kilowatts ( $10^3$ kW)
1 Gigawatt (GW)	= 1 million kilowatts ( $10^6$ kW)
1 kilowatt-hour (kWh)	= 1,000 Wh ( $10^3$ )
1 Gigawatt-hour (GWh)	= 1,000,000 kWh ( $10^6$ kWh)
1 Terawatt-hour (TWh)	= 1,000 million kWh ( $10^9$ kWh)
1 kilovolt (kV)	= 1,000 volt ( $10^3$ V)
1 kilovolt-ampere (kVA)	= 1,000 volt-amperes ( $10^3$ VA)
1 Megavolt-ampere (MVA)	= 1,000 kilovolt-amperes ( $10^3$ kVA)
1 kilocalorie (kcal)	= 3.968 British thermal units (Btu)
	= 4.1868 kilojoules (kJ)
1 kilojoule (kJ)	= 0.2388 kilocalorie (kcal)
1 Megajoule (MJ)	= 1,000 kilojoules ( $10^3$ kJ)
1 Gigajoule (GJ)	= 1,000,000 kilojoules ( $10^6$ kJ)
1 Terajoule (TJ)	= 1,000 million kilojoules ( $10^9$ kJ)
1 Petajoule (PJ)	= 1,000 million kilojoules ( $10^{12}$ kJ)
1 tonne of oil equivalent (toe)	= 10,200,000 kilocalories
	= 42.7 Gigajoules
1 Hertz (unit of frequency (Hz))	= 1 cycle per second
1 bar (unit of pressure)	= 14.5 lbs per sq. inch
1 kilogram (kg)	= 2.206 pounds (lb)
1 ton (metric ton) (t)	= 1000 kg
	= 2,206 lb
	= 1.102 short ton
	= 0.984 long ton
1 meter (m)	= 3.281 feet (ft)
1 millimeter (mm)	= 0.001 m
1 kilometer (km)	= 1,000 m
	= 3,281 ft

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**GLOSSARY OF ABBREVIATIONS**

bb1	barrel (measure of oil volume)
BOAT	Build Operate and Turnover
CAM	Country Assistance Management
CIF	Cost, Insurance and Freight
DFC	Development Finance Corporation
EGY	Bank Energy Department
EIS	Energy and Industry Staff
EMENA	Europe, Middle East and North Africa
ESMAP	Energy Sector Management Assistance Program
ESW	Economic and Sector Work
GDP	Gross Domestic Product
GWh	Gigawatt-hour (unit of energy)
ICB	International Competitive Bidding
IDA	International Development Association
IFC	International Finance Corporation
kgoe	Kilogram of oil equivalent (unit of energy)
LRMC	Long Run Marginal Cost
MENA	Middle East and North Africa
Mtoe	Million tons of oil equivalent (unit of energy)
MW	Megawatt (unit of power)
OAPEC	Organization of Arab Petroleum Exporting Countries
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
OPEC	Organization of Petroleum Exporting Countries
PDRY	Peoples Democratic Republic of Yemen
PERL	Public Enterprise Rehabilitation Loan
RESP	Regional Energy Strategy Paper
SAL	Structural Adjustment Loan
SECAL	Sector Adjustment Loan
SRA	Sector Work
TA	Technical Assistance
toe	ton of oil equivalent (unit of energy)
YAR	Yemen Arab Republic

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ABSTRACT

This paper examines the response of 14 selected countries in the Europe, Middle East and North Africa (EMENA) region to the 1973-74 and 1978-80 oil price increases and examines the strategies these countries should adopt now that they are faced with lower and more uncertain international energy prices in the medium term. It concludes that they were partly successful in increasing their indigenous energy production but had relatively little success in managing demand. As a consequence, this group of countries moved from being a net exporter of energy to a net importer. The paper proposes a continuation of the strategy recommended by the World Bank in the past - energy conservation, development of indigenous resources to substitute for imports, economic pricing, efficient investment and operations and the removal of institutional rigidities - but with some change in emphasis, since some capital intensive conservation, fuel substitution and resource development projects will need to be delayed. The paper analyses the role of the World Bank in the energy sector of these 14 countries: its objectives, lending instruments, technical assistance and sector work. Priority should be given first to promoting the policies needed for the efficient development of the sector and second, to mobilizing cofinancing to meet the potential foreign exchange gap arising from increasing financing needs, compared to the limitations, if not declines, in resources from traditional sources. To accomplish this, the paper supports a move towards more policy based lending, particularly sector loans.

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COUNTRIES OF EUROPE, MIDDLE EAST AND NORTH AFRICA

Table of Contents

	<u>Page</u>
I. INTRODUCTION .....	1
II. OVERVIEW .....	2
III. ENERGY DEMAND AND SUPPLY .....	6
IV. SECTOR STRATEGY AND POLICY REFORMS .....	9
V. THE ROLE OF THE WORLD BANK .....	14

AN ENERGY STRATEGY FOR WORLD BANK BORROWING  
COUNTRIES OF EUROPE, THE MIDDLE EAST AND NORTH AFRICA 1/

I. INTRODUCTION

1.01 The energy sector in the 14 countries of the Europe, Middle East and North Africa (EMENA) region is characterized by problems of demand management, supply and the efficiency of sector institutions, in an environment of persistent macroeconomic pressures. This paper reviews these issues, provides an overview of energy demand, supply and investment, re-examines the appropriate strategy for addressing these issues and the role of the World Bank in the sector. Despite the diversity of the 14 countries with respect to resource endowments, development strategies, policy coordination, and quality of institutions, the problems faced and the solutions for dealing with them are similar.

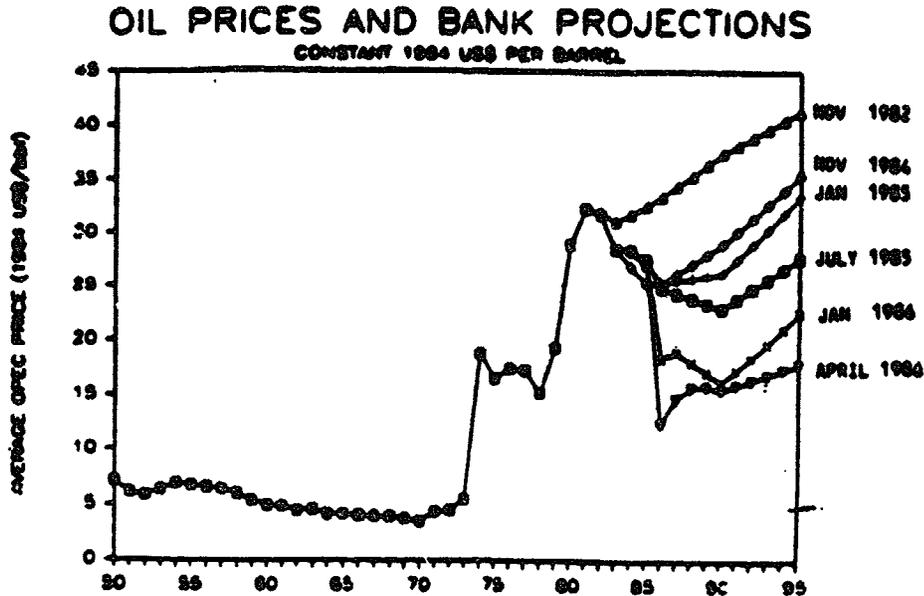
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1/ This paper is a summary of a more detailed report prepared by the Power and Energy Division of the World Bank's EMENA region. In this paper, all references to EMENA, the EMENA region or EMENA countries are to the 14 countries which are, or have recently been active borrowers from the World Bank: Algeria, Cyprus, Egypt, Hungary, Jordan, Morocco, Portugal, Romania, Syria, Tunisia, Turkey, Yemen Arab Republic, Peoples' Democratic Republic of Yemen and Yugoslavia.

## II. OVERVIEW

2.01 The 14 countries examined can be classified as oil exporters--(Algeria, Egypt, Syria and Tunisia) and oil importers (Cyprus, Hungary, Jordan, Morocco, Portugal, Romania, Turkey, Yemen Arab Republic (YAR),

FIGURE 1.1



People's Democratic Republic of Yemen (PDRY). 1/ Three countries (Cyprus, Jordan and PDRY) have discovered virtually no commercial energy resources.

2.02 The oil exporters now face lower prices for oil and gas exports. In addition, Egypt's and Tunisia's energy exports could fall as resources are depleted and domestic demand increases. This will require painful economic adjustment, especially since the four exporters already had a combined debt of about \$50 billion in 1986. 2/ All had problems in meeting debt service payments, and all but one had debt service ratios greater than 30%. Egypt is one of the worst affected, both directly as an oil exporter and indirectly through effects of reduced remittances and Suez canal revenues.

2.03 For the oil importers, the oil price increases of 1973-74 and 1979-80 resulted in oil imports rising from 10% of merchandise exports in 1973 to more

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1/ Following the discovery of substantial oil and gas resources, YAR will move from oil importer to oil exporter. Poland, which joined the World Bank in mid 1986 is a net energy exporter, exporting coal and importing oil and natural gas, but has not been included in this report.

2/ Officially reported debt to the World Bank Debtor Reporting System.

than 40% in 1983. The average GDP growth rate for EMENA oil importers slowed from 6.2% p.a. in the 1970s to about 2.6% p.a. during 1980-85. Between 1973 and 1985, their combined external debt increased 31 times. Five oil importing countries (Morocco, Turkey, Portugal, Yugoslavia, Hungary) had debt service ratios above 20% in 1986; while the average for the five exceeded 30%.

2.04 Continuing efforts by oil importing countries to reform their fiscal, monetary, trade and investment regimes, coupled with the modest resumption of growth in the industrialized countries and declining oil prices, led to some export recovery and moderate progress in reducing current account deficits in some countries in 1985. In 1986, however, slower growth in the industrial countries and oil-exporting middle-income countries constrained exports by this group of countries. In addition, lower oil prices have had an indirect negative impact on some oil importers resulting from lower economic assistance and remittances from regional oil producers. The outlook for the rest of the decade remains uncertain. Rising debt burdens, reduced external capital flows, and the continuing need for financial adjustment will limit the scope for expansionary domestic policies; few countries in the region can expect to resume the high growth rates of the 1970s, although growth rates could improve compared to those experienced in the early 1980s.

2.05 Higher economic growth rates in the oil importers will stimulate energy demand and investment. Providing governments use the opportunity of lower international prices to ensure domestic energy prices are at economic cost, resource mobilization in the sector should improve and shortages of local finance should be reduced. However, the prices of imported plant and machinery, which are currently depressed, might increase as demand picks up in the OECD, and the cost of foreign borrowing depends on how the OECD countries react to lower oil prices. In the case of the oil exporters, slower growth in energy demand and acute financial constraints will lead to a scaling down of energy investment and will require improvements in pricing policies and investment selection.

#### Energy Sector Developments and Prospects

2.06 Analysis of recent trends and prospects for the energy sectors of the 14 EMENA countries suggests the following broad conclusions:

- (a) EMENA countries responded to the oil price shocks of 1973-74 and 1979-80 with a partially successful attempt to increase domestic supply rather than to manage demand. In contrast to the OECD countries, where energy per unit of GDP decreased by about 25% in the decade after 1973, energy intensity in EMENA increased by 16% . Only Hungary and Cyprus sustained declines;
- (b) during 1973-80 the 14 countries as a group shifted from being a net exporter of energy to a net importer, since then exports have marginally recovered to ensure a small surplus in 1985: energy production during the period 1973-85 increased by only 4% p.a. for a combination of institutional, energy resource, financial, pricing and technical reasons, while consumption grew at 5% p.a. stimulated by artificially low prices, particularly in the oil exporting countries;

- (c) with the downturn in energy exploration and development caused in part by lower international oil prices, energy consumption is likely to continue outstripping domestic supply, increasing the dependence of the 14 countries on imported energy, even if energy demand management measures are fully implemented;
- (d) energy investment requirements in the 14 countries could be as much as \$14 billion p.a. during the period 1986-90 (of which \$9.9 billion would be foreign exchange), compared to \$8.4 billion p.a. during 1981-85 (all at 1984 prices). However, if economic growth is -- as is likely -- slower than most countries have planned, and if countries implement more serious energy demand management programs, this requirement could be lower. Higher economic growth rates in the oil importers due to lower oil prices could lead to upward revisions of both energy demand and investment, particularly in electric power, but there is uncertainty as to the magnitude of these effects;
- (e) financing the foreign currency requirements for investment is likely to be difficult because of reduced private flows to the petroleum subsector (cutbacks by commercial banks and international oil companies), uncertain prospects for ODA, declining OPEC assistance and reduced oil revenues and workers' remittances.

#### An Energy Strategy for EMENA Countries

2.07 These conclusions suggest that a viable energy strategy for EMENA countries should comprise:

- (a) the implementation of policy reforms designed to (i) price energy at economic cost; (ii) implement parallel programs of energy conservation; (iii) substitute cheaper indigenous fuels for higher cost fuels (e.g. oil) and achieve an economic balance between imports and indigenous production; (iv) minimize investment costs and attract domestic and foreign private investment; and (v) ensure sector management and operations are, to the extent possible, autonomous and free from bureaucratic rigidities;
- (b) programs of energy conservation and fuel substitution. These remain strong priorities at present oil prices and would remain economically justified even if prices fell to \$10/bbl, although some capital intensive projects will become marginal; and
- (c) exploration and development of indigenous oil, gas, coal and hydro resources, especially as higher international energy prices are expected in the mid 1990s--the end of the implementation period for many energy projects. But energy investment planning will need to be more selective than in the past in view of the greater uncertainty and resource depletion.

### Role of the World Bank

2.08 Constraints to World Bank support differ among countries but include, at the sector level, weak policy dialogue, procurement practices, absorptive capacity, investment cutbacks and limited energy resources. In addition, macroeconomic issues, including creditworthiness and World Bank exposure have constrained World Bank lending. The availability of resources from other financial sources, on the other hand reduces the need for World Bank support. Pricing and financial issues which have dominated the Bank's energy sector dialogue with governments in the past, have become less pressing with the fall in energy prices but could re-emerge if international prices rise or domestic inflation rates remain high. Adoption of the strategy proposed above by EMENA countries would help overcome these constraints and could be actively supported by the World Bank in the following ways:

- (a) by giving top priority to assisting countries carry out energy sector policy reforms and mobilize cofinancing;
- (b) by shifting future World Bank lending towards broad-based sector adjustment or investment loans, whose disbursements need not be tied to specific projects. These would directly address policy constraints to macroeconomic and sectoral performance, improve the framework for investment and hence for project lending by external agencies, tackle interrelated sectoral issues involving several agencies and facilitate substantive operations in small countries; and
- (c) by continuing, where appropriate, specific investment, or project lending, aimed at creating new capacity, restoring the performance of existing capacity or ensuring its maintenance.

### III. ENERGY DEMAND AND SUPPLY

3.01 The response of the EMENA oil importers to the oil price increases was mainly to try to raise domestic energy output. Little action was taken to reduce consumption through increased efficiency in energy use. Energy intensity - a crude indicator of efficiency consisting of the ratio of commercial energy consumption (in tons of oil equivalent (toe)) to GDP - increased or remained unchanged in all EMENA countries between 1973 and 1983, with the exceptions of Hungary and Cyprus, and increased by 16% overall. By contrast, energy intensity decreased by 23% in Western Europe, 25% in USA, 33% in Japan, 19% in Thailand and 4% in Korea, although most other developing countries experienced similar trends to EMENA. Although slow structural adjustment of their economies and, to a lesser extent, the decreasing share of traditional fuels in energy supply, account for part of the failure to reduce consumption, energy audits in several countries confirm that energy is used inefficiently in EMENA. Even at lower energy prices, there is still plenty of scope for conservation.

3.02 Energy consumption in the 14 EMENA borrowers amounted to 280.7 Mtoe in 1985, about 4.5% of the world total. During the period 1973-85, consumption increased at an annual average rate of 5.0% overall, 3.8% in the oil importers and 11.2% in the oil exporters. The growth of consumption started to slow down in the 1980s and this slowdown is expected to continue. Overall consumption is projected to rise at a steady 3.1% p.a. between 1985 and 2000. For oil importers, consumption is expected to increase at 2.3% p.a. between 1985 and 1995, and 2.6% p.a. thereafter. Consumption of the exporters would increase at 5.4% p.a. over 1985-90 and 4.7% p.a. during 1990-2000 (Table 1.1). These projections are based on GDP projections that do not take account of the impact of lower oil prices on economic growth and assume that Governments implement effective pricing and demand management policies. In theory, growth rates of energy consumption could more than double if demand management policies were not implemented and economic growth were to be higher than the rates of 4.0-4.5% assumed for the region as a whole. However, in practice the resources would not be available to sustain high rates of energy growth, particularly in countries not actively promoting energy efficiency. Moreover, there are many indirect effects on GDP of lower oil prices arising from changes in the GDP of OECD countries, which include increases in the prices of other commodities, higher costs of manufactured imports, greater opportunities for exports to OECD countries and effects on interest and exchange rates. These macroeconomic impacts need further analysis on a country by country basis.

Table 1.1

EMENA: Outline Energy Balances 1973 - 2000  
(Mtoe)

	<u>Actual</u>		<u>Projected</u>		<u>1973-85</u>	<u>Annual Ave. Growth Rates (% p.a.)</u>	
	<u>1973</u>	<u>1985</u>	<u>1990</u>	<u>2000</u>		<u>1985-90</u>	<u>1990-2000</u>
<u>Production</u>	171.7	284.9	316.4	364.9	4.3	2.1	1.4
Oil Exporters	75.1	149.5	153.4	147.5	5.9	0.5	-0.4
Oil Importers	96.6	135.4	163.0	217.4	2.9	3.8	2.9
<u>Net Imports</u>	<u>-16.1</u>	<u>-3.7</u>	<u>9.9</u>	<u>81.6</u>	-11.5	..	23.5
Oil Exporters	-57.1	-83.7	-69.1	-14.0	3.2	-3.8	-14.7
Oil Importers	41.0	80.0	79.0	95.6	5.7	-0.3	1.9
<u>Stock Changes</u>	-1.0	0.5	-	-	-	-	-
<u>Gross Consumption</u>	<u>156.6</u>	<u>280.7</u>	<u>326.3</u>	<u>446.5</u>	5.0	3.1	3.1
Oil Exporters	18.2	64.8	84.3	133.5	11.2	5.4	4.7
Oil Importers	138.5	215.9	242.0	313.0	3.8	2.3	2.6
Oil Importers: Imports as % of Consumption	29.6	37.0	32.6	30.5			
Oil Exporters: Exports as % of Production	76.0	56.0	45.0	9.5			

Sources: UN Energy Statistics and World Bank data.

3.03 Despite the priority given to substituting indigenous energy for imports, aggregate commercial energy output rose at only 2.9% p.a. during the decade 1973-83, more slowly than consumption, so that the 14 countries' dependence on imported oil not only increased, but in 1980 they changed, as a group, from being a net exporter to a net importer of energy. The reasons for this shift include institutional weaknesses, insufficient energy resources, shortages of both foreign exchange and local currency, insufficient incentives (and specifically, inadequate energy prices) to promote development and mobilize resources, and technical and operating problems. However, since 1980 the growth in consumption has slowed, exports have increased and oil importers have increased the growth rate of energy production, so that the 14 countries

have achieved a small net surplus in exports in 1985. Energy production is projected to continue to grow at declining rates; 2.1% p.a. during 1985-90 and 1.4% over the period 1990-2000 (Table 1.1). Production will fall in some countries owing to depletion of petroleum resources. Although there may be scope for stimulating petroleum production through increased exploration, particularly in Egypt, this looks unlikely given the fall in oil prices and cutbacks in the activities of the international oil companies. There is also some risk that projected supplies might not materialize due to uncertainties over the economics, finance and safety of nuclear power programs, and the institutional, manpower, technical and financial problems that plague the coal subsector. Consequently, the Region would become dependent on imported energy again, with net imports amounting to about 3% of consumption in 1990 and 18% at the end of the century.

3.04 The 14 EMENA countries are, according to their official plans, expecting energy investment of about \$14 billion p.a. during the period 1986-90, compared to about \$8 billion during the previous five years (all at 1984 prices). However, these do not necessarily take account of the possible impact of measures to restrain the growth of energy demand or improve the productivity of energy investment. Nor do they always take into account the impact of other macroeconomic policies and resource constraints. These policies and constraints could well reduce the required level of energy investment.

3.05 Reliable data on the financing of energy investment do not exist. However, of the Regional energy investment in 1981-85 of \$36 billion, it can be estimated that 65% (\$23 billion) would have been financed from external borrowing. Assuming that the pattern of borrowing for energy investment was similar to the aggregate for the 14 countries, lending for energy would have consisted of bilateral ODA (37%), financial institutions (35%), multilateral sources (21%) and suppliers' credits (7%).

3.06 A range of adverse developments - including reduced commercial bank financing, oil company cutbacks on foreign investment, declining flows from OPEC countries, uncertainty over bilateral ODA and reduced workers' remittances - seems likely to make financing energy investments more difficult over the next five years. In the case of the petroleum subsector, reduced foreign finance is at least partly due to expectations of lower returns resulting from lower oil prices. During the period 1986-90 as much as \$9.9 billion (1984 prices) of foreign financing might be required, mainly in the power and coal subsectors. If financing requirements for new investment are to be met, policy in the borrowing countries will need to emphasize economic pricing to manage demand and mobilize domestic resources, together with institutional reform and improvements in the operational efficiency and financial viability of sector enterprises, so as to reduce demand and investment costs and to mobilize domestic and foreign finance.

#### IV. SECTOR STRATEGY AND POLICY REFORMS

##### Overview of Sector Strategy

4.01 Despite differences of detail and emphasis, a common strategy framework applies to all the 14 EMENA countries, despite the fall in oil prices. The main objectives of this strategy are to (a) increase foreign exchange earnings by energy exporters and to reduce energy importers' foreign exchange costs; (b) minimize investment needed for energy supply so as to free resources for other uses; and (c) ensure that energy shortages do not constrain economic development.

4.02 A strategy to achieve these objectives would involve: (a) pricing energy at economic cost; (b) implementing parallel programs of energy conservation; (c) minimizing the risks to the balance of payments and economic growth of higher international energy prices and supply disruptions through economic fuel substitution, diversification of supplies, and achieving a balance between imports and indigenous production; (d) minimizing investment costs and attracting domestic and foreign private investment; and (e) ensuring that the management and operations of the sector are, to the extent possible, autonomous and free from bureaucratic rigidities. Most EMENA countries subscribe to these objectives but have taken insufficient action to implement them. Moreover, there are some objectives and strategies which could conflict with these, for example: (a) equity considerations in pricing policy; (b) inward looking industrialization policies; (c) promotion of energy self sufficiency with limited weight given to costs; (d) the influence of domestic manufacturers and foreign suppliers in investment decisions; and (e) different policies regarding private sector involvement.

##### Energy Pricing

4.03 The fall in international prices in early 1986 has improved the relation of domestic energy prices to economic cost, but significant distortions remain in some countries. Until 1986 oil prices were priced at economic cost in all countries, except for some oil exporters, but the prices of natural gas, local coal and electricity were generally below economic cost. Resolution of this issue has been complicated by the fact that energy price setting is typically the responsibility of government rather than energy enterprise. In setting energy prices, governments have given greater weight to industrial competitiveness, impact on household budgets and inflation, than economic efficiency or the financial viability of energy enterprises. Lower international oil prices have narrowed the gap between domestic energy prices and their economic costs. Some prices, particularly oil products, are now above economic cost. However, the energy pricing issue is likely to re-emerge if, in the future, international oil prices rise or exchange rates depreciate.

4.04 With the fall in oil prices, most countries have a choice between maintaining domestic prices near current levels, thus generating additional budgetary resources and losing the benefits of economy wide cost reductions, or passing on lower prices with the risk of encouraging investments that might

create problems if prices were to rise in the future. Given the fallibility of energy price projections, a case could be made for passing on lower prices to consumers, at least to the projected price plateau of about \$15/bbl at constant 1984 prices (Fig 1.1) or alternatively setting an automatic mechanism that bypasses direct political intervention. However, there are generally fiscal, balance of payments, debt, as well as political considerations which make domestic energy prices hard to increase when international prices rise. In addition, there are lags in adjusting the capital stock to changing energy prices, and insufficient institutional capacity for automatic adjustments. It is therefore not appropriate, in most countries, to pass on the fall in international energy prices to consumers.

### Conservation

4.05 Energy conservation offers a cheap alternative to investment in energy supply, thus freeing resources for other investment; it also raises the overall productivity of the economy, especially since conservation usually requires technological improvements in the industrial sector. Hungary has implemented a well conceived energy efficiency program, and other countries (Cyprus, Tunisia, Jordan) are also starting to implement conservation measures. Obstacles to such programs have been energy price distortions, lack of macro incentives for efficiency, lack of know-how, and shortages of finance. Analysis of energy audits has shown that conservation remains economic and should still be a priority for policy at present oil prices (about \$16-19 per bbl), at which they are projected to remain; and would be economic even at lower prices.

### Resource Development

4.06 The development of indigenous energy resources by the EMENA oil importers to substitute for imported oil has been hampered by poor resource endowment and financial, technical, operational and institutional constraints. Despite exploration for oil and gas in all oil importers other than Cyprus, substantial commercial reserves have been found only in YAR. The development of hydro (Yugoslavia, Turkey, Morocco) and coal and lignite (Turkey, Yugoslavia, Romania) has been constrained by lack of finance and implementation problems. Operational problems have occurred in power stations burning low grade coal or lignite (Turkey, Romania, Hungary) and adverse environmental impacts have occurred that are expensive to correct.

### Environment

4.07 Environmental issues are a potential constraint to coal use in Romania, Portugal, Hungary, Yugoslavia and Turkey. International concern for transboundary air pollution (acid rain) is already leading to a tightening of emission standards which will in turn require expensive desulphurization or fluidized bed combustion technologies. This could reduce the competitiveness of coal, especially when lower gas prices might favor decentralized combined cycle cogeneration plants. Other environmental issues concern emissions from domestic coal use, automobiles and land degradation from deforestation. Policy issues concern (a) the tradeoff between pollution and energy supply costs; (b) the impact of environmental considerations on energy supply

strategy; and (c) the appropriate means for implementing environmental policies.

#### Renewables

4.08 Although there is considerable technical potential for renewable technologies (especially solar water heating), their adoption has been retarded by low domestic energy prices, poor quality of locally manufactured devices and lack of information to potential manufacturers and consumers. The economic case for renewables was not particularly strong even at high oil prices and is weakened by their fall. New policies are needed to encourage local entrepreneurs to supply solar heaters (where they are economic) and to recognize that renewable technologies need to be assessed on an economic basis. Implementation of an efficient renewable energy program on a large scale is almost impossible without domestic energy being priced at economic cost.

#### Investment Decision Making

4.09 Abundant examples of inappropriate energy investment decisions and poorly implemented projects exist in EMENA countries. These include poorly directed investment in exploration by state oil companies; overcapacity in oil refining; investment in uneconomic coal and lignite projects; overinvestment in hydroelectric projects of doubtful economic viability; overinvestment in power generation; underinvestment in electricity distribution; and inadequate investment in spare parts and efficiency improvements.

4.10 The following shortcomings in energy investment planning and financing are evident and need to be addressed:

- (a) lack of analysis of the impact of macroeconomic developments on the sector and vice versa, both when planning sector investments and when identifying financial and foreign exchange constraints;
- (b) inadequate consideration of subsectoral linkages; for example, development of gas before undertaking market analysis and firming up options for gas utilization by, e.g., the power or fertilizer subsectors; planning power generation without considering the impact of demand changes on supply; lack of attention to the institutional aspects of linkages between individual energy enterprises, and between enterprises and governments.
- (c) planning weaknesses arising from inadequate data, inadequate market analysis, insufficient system analysis, unfamiliarity with or lack of expertise in the preparation of least cost power development programs and insufficient use of risk analysis in evaluating alternative strategies; and
- (d) inattention to practical implementation issues, e.g., lack of realistic schedules, adequate staffing, firming up of financing options, availability of local funds; need for cost accounting and management information systems, project management, etc.

### Role of Private Sector

4.11 A greater role for the private sector would reduce the burden of energy investment on public expenditure, ease manpower and implementation constraints, and raise operational efficiency. The prospects for private sector energy financing vary from country to country, depending on a number of constraining factors--ideology; perception of country risk and longevity of economic stability; the level of appropriate financial incentives, including pricing; the extent to which there exists an appropriate legislative framework; and the problem of resource mobilization for large lumpy investments. Although participation of foreign oil companies in the petroleum subsector is relatively common in the region, there is comparatively little local or foreign private participation in other subsectors. Turkey is in the process of introducing an innovative concept - build, operate and turn over - for steam and nuclear plant in the power subsector and the experience with this concept should be of interest to other countries.

4.12 Investments in refining, coal and gas subsectors continue to be exclusively public sector responsibilities, mainly because of inadequate investment incentives, inadequate infrastructure to facilitate investments (natural gas, coal), the poor quality of resources (coal) and the effective limitation of markets to domestic consumption (natural gas, coal). However, the case for further public sector involvement in refining is weak. Countries need to continue to improve the economic policies and financial incentives needed to attract domestic and foreign private investment in the energy sector. They should also seek to mobilize other forms of external financing, such as export credits, or loans from bilateral and multilateral development agencies. Finally, explicit strategies to improve the institutional strengths of energy enterprises in EMENA countries would facilitate the mobilization of investment financing (whether public or private, domestic or external) and improve the efficiency with which it is used.

### Institutions

4.13 Institutional weaknesses pervade the EMENA energy sector and arise from shortages of skilled manpower, blurred links between enterprise and government which lead to interference in day to day affairs, limited financial autonomy and conflicting objectives, and operational inefficiencies. New initiatives are required to improve management information systems, strengthen financial autonomy, reduce financial arrears, coordinate the activities of sector entities, liberalize and privatise some activities--e.g. remove barriers to cogeneration, free oil imports, divest functions such as meter reading and billing--revise petroleum taxing and licensing regimes, and in particular, to reform the regulatory framework for public utilities (especially by removing investment, pricing and financial objectives from the political arena and placing more emphasis on operational efficiency).

### Impact of Lower Oil Prices

4.14 The fall in oil prices in 1986 was a reminder that projecting future price trends is extremely hazardous. The uncertainty about energy prices not only directly affects the choice of project and depletion policy at the

margin, but also would have an impact indirectly on basic national income and energy demand issues.

4.15 Lower and more uncertain oil prices have the following implications for energy sector strategy:

- (a) energy conservation and interfuel substitution still remain priorities in all countries, although some projects will become marginal;
- (b) exploration and development of indigenous oil, gas, coal and hydro resources should continue, but some projects (offshore petroleum, underground coal mining, new technologies and renewables) will need to be examined case by case and possibly delayed;
- (c) issues of petroleum depletion policy arise from the uncertainties of future oil prices and the higher discount rates and perceptions of risk of international oil companies; (e.g. whether to deplete more slowly in the expectation of higher future prices given macro-economic constraints);
- (d) investment planning techniques, which are weak in any case, need strengthening (e.g. impact of uncertain prices on choice of fuel for power generation) and new institutional and technical options need examining (e.g. decentralized combined heat and power production) to respond to the much more uncertain "state of the world";
- (e) increased economic activity in the oil importers could lead to an upward revision in both energy demand forecasts and investment, most markedly in the power subsector (where income elasticities are higher than in other subsectors), but greater uncertainty about investment needs; and
- (f) countries should respond to greater uncertainty over international energy prices by diversifying their fuel use, responding flexibly to movements in spot prices and sharing excess capacity through expanded trade (e.g. by power system interconnections) rather than isolating themselves from international markets at great cost.

## V. THE ROLE OF THE WORLD BANK

5.01 The World Bank's role in the energy sector has evolved from its traditional focus on project lending and financial and engineering assistance in the electric power subsector, towards broader objectives of efficiency and resource allocation, and operations in other subsectors (petroleum, coal, energy conservation). Energy lending in fiscal years 81-85 1/ accounted for about 16% of lending to EMENA countries, compared to 25% for all Bank borrowers. Regional power lending was 54% of energy lending, compared to 65% Bank wide. The shift towards more policy based lending was accompanied by a fivefold increase in staffing allocated to energy sector work in the Region since 1980, together with an upsurge in technical assistance in lending operations.

5.02 The Bank's assistance objectives parallel the policy issues in para. 4.02, viz: (a) promoting efficient energy use, investment and operations; (b) continuing to support, where economic, the ongoing process of adjustment to the higher energy prices of the mid-1970s (demand management, indigenous resource development, fuel substitution, low cost fuel importation); (c) strengthening institutional relations in the interests of greater efficiency; (d) mobilizing private resources; and (e) promoting technology transfer.

### Lending

5.03 The Bank has responded to the needs of its client countries, especially the greater emphasis which now has to be placed on policy and institutional reform and economic efficiency, by developing new lending instruments. These include:

- (a) structural adjustment and sector adjustment loans. These focus on improving major macroeconomic or sectoral issues and programs, such as pricing, taxation and investment selection. These can be supported by Bank finance for sectoral imports or by general imports subject to a negative list; and
- (b) sector investment loans, aimed at bringing investments in line with economic priorities and or ensuring they are efficiently operated and maintained. These can be supported by finance for broad categories of equipment, materials, services and civil works related to the whole or a time slice of the sectoral program.

Specific investment, or project loans, aimed at creating new investment, restoring existing capacity to full utilization or ensuring its maintenance, with finance provided for pre-identified equipment, materials, services and civil works, remain the traditional instrument for providing World Bank assistance.

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1/ The World Bank's fiscal year runs from July 1st of the previous year to June 30 of the current year.

5.04 Although investment projects will probably continue to account for most energy lending, sector lending (adjustment and investment) should be increased in order to: (a) address policy weaknesses (e.g. investment administration, pricing) which constrain energy development at least as much as a shortage of capital; (b) improve the framework for project lending by the Bank and other lenders; (c) address interrelated subsectoral issues that are not easily dealt with in project lending (e.g. energy pricing); (e) address policy issues that need to be resolved at the subsector (power utility coordination) or sectoral level (fuel substitution) and (f) cover small items in several subsectors that would be cumbersome in a project loan. In addition, constraints related to difficulties in following World Bank procurement guidelines in countries with well developed engineering industries can be more easily addressed by timeslice or sector operations that finance many small parts of several large projects.

#### Technical Assistance

5.05 The success of technical assistance in the past has depended on the degree of government commitment. For example, energy pricing studies in one country had little impact because the government was not prepared to raise prices, but probably would have been necessary if the government had decided to act. On the other hand, studies on demand management and planning in two borrowing countries contributed considerably to successful implementation.

5.06 Success with technical assistance has also been affected by problems with its provision (or providers) as well as with its reception by borrowers. For example, the quality of consultants' reports leaves much to be desired in terms of focus, analytical depth, policy orientation and attention to implementation issues. Much technical assistance has emphasized activities of relatively low priority, e.g., renewable or unconventional energy. There is a clear need for the Bank to put more effort into designing and supervising project-related TA and to assist in the coordination of technical assistance.

#### Sector Work

5.07 The World Bank undertakes its own studies to support its lending and promote assistance objectives. Such work in the EMENA countries is now more oriented towards sector strategy and deeper analysis of policy issues. Future sector work should continue to focus on sector policies (e.g. investment, resource depletion, pricing, financing) and their links to macroeconomic strategy (e.g. as part of investment reviews or other country economic work), together with deeper studies that address difficult policy issues (e.g. investment strategy and pricing under uncertain international prices, sector finance, institutional reform).

#### Subsectoral Issues and Actions

5.08 Electricity supply. Power sector investments appear likely to expand in most EMENA countries. The priorities for Bank activity should continue to center on the interrelated issues of institutional relations, investment planning and pricing. Lower oil prices have generally helped reduce the problem of underpricing electricity but better institutional processes for setting tariffs are needed for when oil prices increase. The need to

concentrate resources on addressing directly the policy issues that constrain subsector efficiency and difficulties in procurement suggest a move from project lending towards time slice and sector operations. In addition, financial uncertainties increase the attractiveness for borrowers of flexible loans that can help fill gaps in sectoral financing plans. There will also be an increasing need for projects aimed at extending the life, restoring the output and improving the efficiency of existing plant, although Bank finance for traditional generation, transmission and distribution projects would still be needed. Nuclear power is unlikely to be economic in EMENA countries, but countries should finance suitable projects that were economically justified, met high safety and environmental standards and were subject to adequate international safeguards. However, Bank finance for nuclear projects is unlikely in practice, since other sources of finance are usually available and Bank funds can normally be used more beneficially elsewhere in the power subsector. Regional power system interconnection would lead to cost savings and risk avoidance among the EMENA countries and should be promoted by the Bank through project lending.

5.09 The Bank's role in the coal and lignite subsector is constrained by limited reserves in the Region and the unwillingness of governments to let the Bank become involved in the subsector. The coal subsector in EMENA countries is affected by political sensitivity, operational inefficiency and difficult labor issues. There are clear needs for pricing reforms, productivity improvements and industrywide restructuring of operations. Coal subsector issues should be addressed in sector loans, programs, supported by sector loans. In view of the major role of coal in the sector in Eastern Europe and Turkey, rehabilitation projects in these countries are high priority.

5.10 The role of the Bank in the petroleum subsector is potentially most affected by lower oil prices, not only because individual projects are less justified, but also because the international oil companies are cutting back on investments in developing countries. At the same time, the cost of exploration and development services is falling due to the decrease in worldwide activity in the subsector. World Bank lending for petroleum has generally supported technology transfer, foreign participation and institutional strengthening. These activities should be intensified and a greater range of policy issues addressed, (e.g. price structure, depletion policy and gas development and utilization). There is a role for the Bank in technical assistance and sector lending to promote private sector involvement and policy reforms, as well as project lending (e.g. for gas distribution).

5.11 The Bank has not been active in the refinery subsector. The main issues involve excess distillation capacity surplus fuel oil and shortages of middle distillates, refineries that cannot maximize gains from foreign trade, low operational efficiency and institutional problems. Moreover, the emergence of integrated crude and product markets in the 1970s means that in economic terms, EMENA refineries compete with the large efficient refineries in the capital surplus oil producers and Western Europe. In practice, domestic refining in EMENA countries is usually protected from international trade, so that consumers bear the cost of inefficiency, inappropriate technology and excess capacity. Narrow and volatile margins between international crude and product prices, together with large initial

investments, make refining inherently risky. Furthermore, the economics of residual fuel oil upgrading (cracking, visbreaking and coking) look uncertain given the fall in oil prices and possible narrowing of the spread between light and heavy products. It is questionable whether EMENA governments should become further involved in refining. Instead, a case can be made for liberalizing petroleum trade, encouraging foreign investment and divesting existing refineries if buyers could be found. The World Bank would be prepared to promote the institutional and technical restructuring of the industry and improve efficiency. In this case, technical assistance and sector and subsector lending would be the Bank's main instruments in the subsector.

5.12 Energy demand rationalization is a priority in EMENA. Action is required at a number of levels, including macroeconomic policy, energy sector policy, industrial strategy (sector or subsector restructuring); and at the enterprise level. The greatest energy savings could be made through wholesale restructuring of heavy industry, rather than tinkering with existing processes. Energy efficiency is only one part of overall efficiency and there is a need for countries to give more attention to industrial strategy and the place of energy efficiency within it. Falling oil prices will lead to the deferral of some capital intensive energy rationalization projects, and may also shift the emphasis of such projects towards general industrial restructuring. In addition to programs of restructuring for heavy industry, financial intermediaries (e.g. commercial and development banks) could promote energy efficiency among small and medium industries. Although the greatest energy savings can probably be made in industry, the transport and urban sectors also afford the possibilities for energy conservation as a part of overall efficiency improvement.

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