

COMMISSION OF THE EUROPEAN COMMUNITIES

COM(78) 355 final

Brussels, 31 July 1978

COOPERATION WITH DEVELOPING COUNTRIES IN THE FIELD OF ENERGY

(Communication from the Commission to the Council)

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INTRODUCTION

During the meeting of the Council of Energy Ministers in Brussels on 20 May 1978 Mr. Brunner announced that the Commission was considering putting forward a paper on the problem of energy cooperation with the developing countries.

Furthermore, the European Council at its meeting in Bremen on the 6th and 7th July 1978 stressed the need for world cooperation in the energy field, and particularly for cooperation between the industrialized and the developing countries.

The western economic summit held at Bonn on the 16th and 17th July 1978 emphasised the need to improve and to coordinate aid to developing countries in the energy sector.

A. PURPOSE OF THE COMMUNICATION

1. Economic context and energy prospects for industrialized and developing countries

1.1. Economic context

Various recent estimates indicate that by 1985 the supply situation for oil, the non-renewable energy source that makes up the bulk of world energy consumption, particularly imported energy, will become increasingly tighter for industrialized and non-oil producing developing countries alike.

The 1973-74 oil price increases were, in this context, only the precursor of a more general upward price movement likely to be resumed during the coming decade, if not before. These oil price rises, together with other factors, contributed towards the general economic difficulties experienced in the middle of the present decade. For the industrialized countries these rises contributed towards putting into question one of the elements on which their rapid economic growth had been based, namely relatively cheap energy prices. They also

contributed to the aggravation of international payments imbalances and added a further element to an already serious trend of inflation. The situation was even more worrying in the case of many non-oil producing developing countries whose growth prospects, already compromised by the world economic crisis, are blocked by rising energy costs.

1.2. Energy prospects

The 4,000 million inhabitants of the world today consume about 6,300 million tonnes of oil equivalent. According to certain estimates, world energy consumption will rise by the beginning of the next century to 17,000 million tonnes of oil equivalent for a population of the order of 6,500 million inhabitants. Of these 6,500 million, about 4,000 million - the equivalent of the present population of the earth - will live in the developing countries (and more than 3,000 million of them in the non-oil producing countries).

Average per capita energy consumption is now 8.2 tonnes of oil equivalent in the USA, 3.5 tonnes in the Community, 3.2 tonnes in Japan and 0.30 tonnes* in the non-oil producing developing countries. Between the first example cited and last the consumption ratio is 27:1. By the year 2000 the energy consumption of the oil-importing developing countries could, according to the growth rate applied, reach 0.5 to 0.7 tonnes of oil equivalent. Even if these figures are still far removed from the present per capita energy consumption of the industrialized countries, satisfaction of this demand will, because of the demographic factor, reach 1,400 to 2,000 million tonnes of oil equivalent compared with 420 million in 1972, an increase of 300-400%. These few figures, which are not unreasonable estimates, underline the importance that energy problems will hold for all countries whether industrialized or developing.

These prospects substantially justify an increased effort of cooperation between industrialized and developing countries in the field of energy - an effort to which the Community must contribute with all the means at its disposal.

* to this figure one should add about 0.20 tonnes annually per capita of non-commercialised energy.

2. Reciprocal advantages of cooperation in the energy field

Whereas industrialized countries, among them the Community, have some prospect of offsetting in the medium term the economic constraints posed now by higher energy bills, particularly through deliberate policies of energy conservation and industrial reconversion, there remains the fact that, in view of the energy prospects sketched above, all non-oil producing countries (both industrialized and developing) risk finding themselves in increasingly tougher competition to obtain a rare but essential resource. The consequences of such a situation could be many. Among others one may note: price increases, growing payments deficits, decline in disposable income for purchasers other than for energy, increased conflict between producers and consumers as well as between consumers. In order to avoid this prejudicial situation, industrialized countries should marshal assistance for the development and exploitation of the potential for producing energy, whether renewable or not, of the developing countries. This would help the developing countries to free themselves to some degree from the constraint that energy imports place upon their economic development. Consequently both industrialized and developing countries have a major interest in promoting energy cooperation for the research and exploitation of additional and/or alternative energy sources, as well as for more rational energy use, and to foster in the long term better supply conditions in the world energy market for both industrialized countries and for developing countries that produce little energy.

3. Energy cooperation in the perspective of world economic growth

Increasingly industrialized countries are becoming conscious of the fact that resumption of their own economic growth can only be durable if their efforts aimed at domestic economic revival are matched by support of external demand, particularly that of the LDCs which can be one of the most dynamic factors of world economic growth in the course of the next few years.

In this perspective discussions in the framework of the OECD have pinpointed energy as one of the priority sectors for application in a resource transfer programme to LDCs: any action initiated on a broad front by the industrialized countries to enhance the growth of developing countries and their demand capacity must contain an important component geared to tackle the energy supply problem of LDCs, thereby helping also to alleviate that of industrialized countries.

An important part of such an international operation of energy resource development must be channelled through international financial institutions, notably the World Bank already engaged in this area. The Community should also marshal its own capacities (research and development, transfer of technology, industrial promotion, etc...), financial means and its working cooperation arrangements using a range of techniques with groups of developing countries. The Community should therefore exploit these factors to undertake its own autonomous effort as well as participating in wider international operations.

B. AREAS OF COOPERATION

1. Inventorising requirements and potential

A major impediment to mobilising a systematic programme of energy cooperation with developing countries is the lack of adequate knowledge of the evolution of developing countries' requirements and of their present and potential energy resources. A priority task therefore is for the Community to help developing countries who so wish, to set up arrangements to create inventories on a continuing basis of present energy resources and establish medium-term supply and demand forecasts for energy.

The process of inventorising energy resources will need to cover several aspects. In the first instance there is the need to collate and bring up to date existing information and data on a systematic basis. Secondly, it will be necessary to intensify geological surveys, prospecting and identification of potential for fossile fuels, uranium, natural gas, wind and solar potential, geothermal sources, hydro-electric potential (including small-scale hydro), and idle land suitable for afforestation biomass cultivation.

Such an inventory should moreover take into consideration the regional aspect of the problem and the interest that there can be in adopting a "grouped" approach to inventorising, particularly for hydro-electric resources.

2. Exploitation of potential resources

2.1. The potential contribution of the industrialized countries in attempting to satisfy the energy requirements of the developing country partners can include:

- the development of conventional energy sources (oil, natural gas, coal, hydro-electric power);
- the encouragement of more rational use of energy in the industrial, commercial and technical fields;
- the application of classical technologies with the adaptations necessary to enable them to be assimilated;
- a particular research effort concentrated on means of transporting energy (e.g. hydrogen) given the prospects that may stem from linking up the industrialisation requirements of countries of low energy potential and the existence in certain sparsely populated areas of the world of considerable possibilities of producing energy which cannot now be transported over long distances;
- the application of nuclear energy in the most advanced developing countries whose energy requirements should correspond to the construction of fairly large plants and which possess the infrastructures required;
- the application of new or renewable energy sources. If the latter's contribution to the Community's energy requirements is unlikely to exceed 5% in the year 2000, it has been estimated that the share will be - and perhaps already is - much higher in the developing countries.

Industrialized countries have therefore an important part to play in perfecting technologies based on these forms of energy, notably solar, geothermal, wind and biomass energy. The degree of technical maturity, however, of these forms of energy is not yet at such a level that it can be immediately applied at acceptable prices allowing easy and widespread insertion into

developing countries' economies. A development effort aiming at specific application to LDCs is therefore indispensable. This effort should concentrate particularly on small and medium scale schemes adapted to the economic and social structures of the countries concerned.

The Joint Research Centre already has certain facilities which could be put at the disposal of developing countries as well as of member states (See Annex).

2.2. Analysis of various renewable resources

2.2.1. Solar energy and its derivation

Solar energy covers processes of direct transformation of the sun's radiation, the products of photosynthesis, known as biomasse, and wind energy.

By dint of its natural distribution, solar energy is of particular relevance to rural development in sectors where conventional processes have shown themselves to be inappropriate or too costly. The interest of this form of energy stems from the fact that it lends itself to small installations spread out over a wide area and that it requires only negligible maintenance and no fuel transport, both of which elements are difficult to implement in countries with sparse infrastructures.

So far only isolated projects and experiments have been attempted with larger scale development still to come.

a) Applications

Generally speaking applications of these sources of energy presently require higher levels of investment but lower operating costs in comparison with classical techniques. Solar energy, in its different forms, lends itself particularly to the following applications:

- water supply by pumping and distillation (village and pastoral water supply and irrigation);

- electrification of towns and villages;
- telecommunications and education (for example educational TV);
- various heating purposes (water heating, drying of farm produce and of meat and fish, domestic cookers, ovens);
- refrigeration (air conditioning, preservation of perishables - such as milk, meat and fish - and of pharmaceuticals).

b) Techniques using direct exposure to the sun

The following techniques are for the most part at a relatively advanced stage of development and have led to the creation and installation of a small number of prototypes in developing countries:

- thermal collectors for purposes of heating, drying, cooking, air-conditioning (notably through absorption or dehumidifying) and for desalination;
- electricity generators driven by steam, gas or organic liquids associated with thermal collectors;
- photovoltaic electric generators with solar batteries using semi-conductor convertors.

c) Production and conversion of organic matter (biomass)

Experience of recent years has led to greater awareness of the possibilities offered by energy-oriented use of biomass, whether in the form of organic residue, in the form of by-products (e.g. molasses), or of systematic cultivation (sugar-cane, cassava) and which can take the form of vegetation cultivated specially for the purpose on soils not otherwise suitable for food production (for example, seaweed farms or rapid cycle forestry).

The following areas of development deserve particular attention:

- use of straw and lumber waste;
- conversion processes such as pyrolysis and fermentation;
- biomass cultivation, for example rapid-cycle afforestation and seaweed farms, sugar-cane, cassava.

The production of energy through biomass may be limited through the scope for collecting sufficient raw material in the form of organic residue and its attendant transport problems.

d) Wind power

This is a form of energy which could be applied in numerous ways in countries experiencing high and constant wind levels. Application of this form of energy would require a development effort in the following areas:

- site prospection;
- more efficient wind powered turbines: development equipment and tests in conditions particular to developing countries;
- use of isolated wind generators for heat and electricity supply of homesteads;
- study of wind generators combined with other systems such as photovoltaic batteries and biomass production installations.

2.2.2. Geothermal energy

Depending on the temperature of the source, geothermal energy can be used for heating (water-heating, distillation, drying, etc...) or for the production of electricity by steam turbines. The best sites for this form of energy are associated with unstable geological conditions and are therefore relatively scarce. An inventory of this potential in LDCs should be the first step prior to promoting the exploitation of these sources of energy which could represent a significant contribution to energy supply in certain regions.

2.2.3. Hydro-electric power

Exploitation of hydro-electric sources, even small ones, appears indispensable for some developing countries if they are significantly to increase their production of electricity. Even waterfalls of modest proportion (5 to 10 metres) and of limited flow, can be economically harnessed for local production of electricity supplying small industries and villages (micro-hydro).

In this context one must not lose sight of the possibility of harnessing energy-intensive industries to exceptionally large energy sources.

It must be stressed that often these various sources of energy are already used, on an artisan basis, in most developing countries to a greater or lesser extent. The task therefore is to put their use on to a more systematic and commercial basis and to develop small-scale projects.

3. Personnel training

Scientific and technical training in general in developing countries is far from satisfactory. Considerable attention must be devoted to this aspect in an energy cooperation programme in that lack of qualified personnel at all levels of skill does and will prove a major barrier to the exploitation by developing countries of whatever energy opportunities can be created, particularly with regard to the judicious introduction and use of equipment.

In particular the intensification of energy provision will require sufficient numbers of suitable qualified mechanics and electricians, particularly in the rural areas. This implies improvement in the equipment of schools and technical training centres in the developing countries themselves with particular attention to training of instructors to carry out the task of training in a manner adapted to the milieu where the skills are to be used and who are fully conversant with energy technology.

C. COMMUNITY ACTION

1. Framework for Community action

Action by the Community as such in the field of energy cooperation with developing countries can be conducted in various frameworks:

- firstly, that of the north-south dialogue pursued in the various fora of the United Nations. The Community will wish to avail itself of various opportunities that arise in the United Nations to make constructive proposals concerning energy cooperation with developing countries.

Among these opportunities one may note the Committee of the Whole established by the 32nd UN General Assembly, preparation of the 33rd General Assembly, the Special Session of the UN General Assembly which will adopt the international development strategy for the 3rd Development Decade, and the Conference on new or renewable energy sources scheduled to be held in 1981 in the framework of the ECOSOC.

In these fora the Community will seek to work closely with interested developing countries and with those with which it has special relationships.

In this context the Commission will make proposals particularly for the drawing up of Community positions for the preparatory work leading up to the adoption of the Development Strategy.

The most effective action which the Community could undertake would be to propose a concrete programme of energy cooperation with LDCs and particularly with those with which the Community already enjoys close relations of development cooperation. In so doing the Community would prepare the ground for re-activating energy cooperation at international level through coordination of its views with those of other industrialized countries undertaking activity in this direction;

- Second, a Community initiative for quick and effective implementation could be taken in the framework of the special relationships already established between the Community and certain countries, particularly at the time of the renewal of the Lomé Convention. Such an initiative could be applied to other developing countries to the extent that they should wish it and where appropriate structures could be set up;(1)

(1) Efforts are already being deployed in the framework of EDF operations to insert an energy element into them. Several projects and studies concerning solar energy and the use of molasses are underway.

- Third, there should be an examination of how energy cooperation could be introduced in the Euro Arab Dialogue. Such cooperation could also be established with the Organization of Arab Petroleum Exporting Countries (OAPEC). In due course there may also be scope for tripartite cooperation programmes in the energy field, involving the Community, the Arab and the developing countries as partners, as in the analogous arrangements already used for co-financing operations in African countries.

Instruments of Community action

2.1. Financial instruments

The development of conventional energy sources for commercial purpose is essentially a matter for private or public investors, either foreign or local. It is in the Community's interest to foster the growth of foreign investment of Community origin in the partner countries by concluding with them agreements for specific protection (*) to cover projects of mutual interest particularly in mineral prospection and exploitation and in encouraging the development of such projects by the means of financial promotion available to the Community.

The implementation of a Community programme for energy cooperation has, however, financial implications going beyond investment support.

The Community already posses financial instruments which can be, and in some respects already are, employed in energy-related actions with developing countries. On aspect of the financial element of energy cooperation with LDCs will be a more systematic use of these instruments in coordination with those of the member states, with due account taken of other priority calls on their sources of finance.

(*) Commission Communication to the Council COM(78)23 of January 26, 1978 on the need for Community action to encourage European investment in developing countries and guidelines for such action.

It should be recalled, however, at this juncture that the use of EDF and EIB funds under the Lomé Convention and of budget resources and EIB funds in the southern Mediterranean agreements cannot be unilaterally determined by the Community or proportionally reserved by it for energy or other sectoral purposes, but that its use is decided in partnership with the ACP countries according to their allocations and programme priorities.

If the Community, however, is to mobilise additional resources for LDCs and to gear part of this additional resource transfer to energy development while preserving for itself a large degree of autonomy in determining the use of such money, then the Community must equip itself with a specific provision in the Community budget for the purpose. This facility will clearly be used in close coordination with the other financial instruments of the Community (e.g. EDF, EIB (*)), with those of the Member States, and with financial instruments engaged in other international institution activity (e.g. IBRD).

In order to be able to respond to requests that might be presented - following statements after the Bremen and Bonn summits - by certain developing countries, notably ACP, the Community should have its own resources; for example, an allocation of 10 million u.s. would permit an early start to such cataloguing of existing and potential resources and of the necessary exploratory work.

- 2.2. Coordination and launching. A series of early opportunities will arise for the Community, using largely existing or planned mechanisms, to initiate the necessary coordination arrangements required at Community level and to launch the practice of cooperation in the energy field with the developing countries concerned.

Under the first heading of Community coordination there are:

- existing structures of intra-Community cooperation such as CREST (1) which could be used for enlarging and intensifying scientific and technical

(*) Note should be taken of the possibility of EIB financing for natural resource development outside the Community (Article 18 of the Bank's Statute).

(1) Committee for Scientific and Technical Research

- cooperation with LDCs thereby meeting the need to launch a more coordinated approach in mobilising the important research and development component of the energy cooperation programme;
- under habitual Council procedures, Commission and member states should undertake an assessment of Community and member states' activities and instruments relevant to energy cooperation with LDCs as a prelude to launching an overall coordination effort in conformity with the November 1976 Council Resolution on the harmonisation and coordination of development policies.

Under the heading of initiating practice with LDCs:

- the negotiations for the renewal of the Lomé Convention. These can provide an opportunity to explore with ACP countries how best to initiate and organise work with them in the energy field, and how to relate it to existing cooperation instruments (e.g. industrial cooperation). Particular emphasis should be given to the exploitation of regional cooperation efforts among the ACP for energy development purposes. Encouragement in this sense comes from the recent initiative of ECOWAS in seeking Community cooperation in the field of energy.
- in early 1979, the Community, together with LDC representatives, is to hold a seminar on the scope and application of solar energy; this will give an opportunity to ascertain priority areas for activity and to establish a working programme. A similar operation could be set up to cover other forms of renewable energy. Other seminars could, at a later stage, be contemplated for other forms of renewable or non-renewable energy.

3. A phased programme

In addition to the operational aspects discussed above and the early arrangements for getting cooperation underway, it would be useful to work out an energy cooperation programme which would include two phases, one based on studies and energy inventories, and the other on operational aspects.

3.1. Studies and energy inventories would include:

- establishment of energy balance sheets, by country and region.
This exercise should also attempt to provide some of the pointers for selecting priorities for action;
- establishment of an inventory of resources (hydrocarbons, coal, bituminous schists, hydro-electric, geothermal, waste generation and cultivation potential for biomass energy, etc.....);
- establishment of an analysis of the technical, economic, geographical, geological and other constraints against the mobilisation of these renewable energy resources;
- identification of various projects drawn up in national or international contexts, be it by Community member states or by LDCs themselves, by the Community as such, by the IBRD, or by regional banks.

3.2. Operational phase

While containing ongoing activities outlined in paragraph 3.1.

(e.g. research and development, improvement of supply and demand evaluation, completion and updating of inventories) this is centered on the drawing up of programmes including financial provision aspects for energy cooperation for a first five-year period. These programmes would consist essentially of:

- execution of priority projects (on both large and small scales) within country and regional frameworks producing additional indigenous power supply, or to promote its rational use;
- establishment of research and development programmes to be carried out in and with the developing countries concerned;
- provisions for industrial cooperation aimed both at providing industry to exploit new energy sources and industrial capacity in the developing countries themselves to provide equipment to harness energy resources;

- resource prospection programmes;
- technical and manpower training adapted to energy development needs.

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The Commission intends to present more detailed proposals on specific aspects (including the matter of management arrangements and personnel requirements) in the light of the discussions which will take place in the Council and the Parliament.

POSSIBLE CONTRIBUTION OF THE JOINT RESEARCH CENTRE (JRC)

The JRC is already able to contribute to the proposed cooperation in 2 ways :

- actions relating to specific subject areas based both on current programmes and existing competences ;
- general actions of a cross subject nature such as training, provision of expertise, and consultant services ;

the type and nature of these actions varying according to the category of developing country concerned.

As for actions on specific subject areas in the nuclear field these could only be readily envisaged in cooperation with the most advanced developing countries or with certain OPEC countries.

Four areas could be considered : reactor safety, treatment and storage of wastes, handling of radio-active materials, radiation protection. These activities could be orientated towards cooperation with member states' services in order to resolve problems in this area.

As for actions in specific subject areas other than nuclear, these would concern :

- solar energy, currently of particular interest for cooperation with all categories of LDCs. A wide variety of actions may be envisaged bearing notably on : exchanges of material for testing in the field and in laboratory conditions as well as inter-gauging campaigns ; studies of complete systems for LDCs ; coordination of measurement of sunlight received with the establishment of a coherent network for collecting and treating data ; studies on specific applications (refrigeration, agricultural needs, solar collectors and systems adapted to local conditions, decentralised power production) ;

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- hydrogen from the point of view of its production by solar energy and its use for the storage of energy in areas of considerable production potential but lacking local outlets ;
- protection of the environment where there are considerable possibilities for LDCs to benefit from experience acquired in the industrialised countries, notably by way of advice and furnishing of expertise, information campaigns, techniques and equipment ;
- remote sensing : cooperation in the field of treatment and interpretation of data obtained from satellites or from aircraft observation. Possibly, at a later stage, in collaboration with the European Space Agency, the supply of complete services including spatial coverage. This would be applied in mining prospection, hydrology, surveillance of thermal pollution, soil utilisation ;
- data processing through making available modelling programmes (EUROCOPI) and access to the JRC's data processing centre).

In the area of general actions of a cross-subject nature one may note particularly :

- training including participation in Ispra Courses to be revised to adapt them to LDC needs and possibly the repetition of such courses in LDCs themselves ; university and technical traineeships for specialists from LDCs ; visits of short duration to JRC establishments ; joint holding of conferences ; technical seminars organised in LDCs with the aid of JRC experts ;
- consultancy and expertise through short missions of JRC experts on specific subjects, carrying out of consultancy bureau type tasks for the benefit of LDCs, and the centralisation at the JRC of various technical problems addressed to the Commission.

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A wide variety of possibilities therefore exists at the JRC. In the context of a new movement towards energy cooperation with LDCs, research activities responding to the needs of LDCs could be envisaged for the new 1980-1983 pluri-annual programme of the JRC. In this way cooperation would no longer be based only on activities decided in the light of strictly European requirements.

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