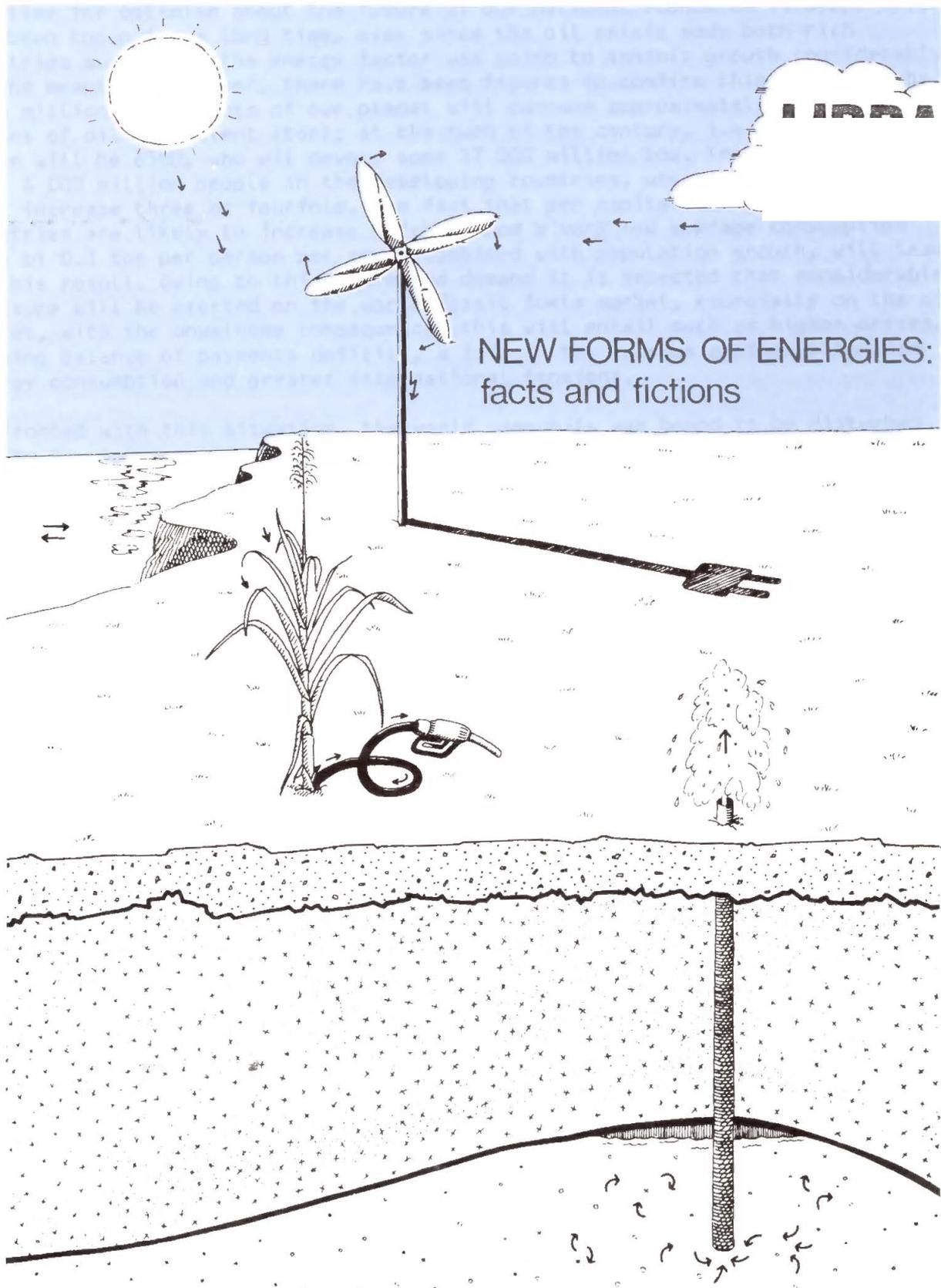




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NEW FORMS OF ENERGY: MYTHS AND REALITIES

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The time for optimism about the future of our national economies is over. This has been known for a long time, ever since the oil crisis made both rich countries aware that the energy factor was going to inhibit growth considerably. In the meantime, however, there have been figures to confirm this: in 1981 the 4000 million inhabitants of our planet will consume approximately 6400 million tonnes of oil equivalent (toe); at the turn of the century, i.e. within 20 years, there will be 6500, who will devour some 17 000 million toe. There will be almost 4 000 million people in the developing countries, where energy consumption will increase three or fourfold. The fact that per capita requirements in these countries are likely to increase quickly from a very low average consumption base of 0.3 toe per person per annum combined with population growth, will lead to this result. Owing to this increased demand it is expected that considerable pressure will be exerted on the world fossil fuels market, especially on the oil market, with the unwelcome consequences this will entail such as higher prices, growing balance of payments deficits, a fall in the revenue available for non-energy consumption and greater international tensions.

Confronted with this situation, the world community was bound to be disturbed and to try to meet this fresh challenge. And so it was in its interest to help the developing countries harness their energy potential. This has been done through more or less random initiatives, the test being the convening by the United Nations of a Conference on New and Renewable Sources of Energy, to be held in Nairobi in August 1981.

New sources of energy a magical phrase with vaguely mythical overtones, regarded by many as just another gimmick. To what extent will the new and renewable sources of energy, which, according to average forecasts, will cover 6 % of the developing countries commercial energy requirements, constitute a meaningful response to the crisis? There is in fact no satisfactory reply to this question because of the general confusion as to the terms and concepts used combined with uncertainty regarding the forecasts. The most that can be done is to put the problem in its true economic and sociogeographical context.

Above all there is a problem of terminology. For the Community, new and renewable sources of energy are confined to solar energy in the wide sense of the term (direct radiation of course, but also wind power, biomass energy and water power) and geothermal energy. In the context of the Nairobi Conference, the United Nations has added to this list oil shale, peat and draught animals. Others will speak about alternative clean or replacement forms of energy and it is therefore extremely difficult to talk the same language and hence to make comparisons. Secondly, there is the problem of the social, geographical and economic dimensions.

Take Africa for example, where the rural population generally accounts for between 60 % and 90 % of the overall population, depending on the country concerned. The fact that the population is scattered over such wide areas in many cases preclude the use of conventional energy distribution networks such as transmission lines. However (and this is the only possible solution), small or medium-sized power units at particular points are suitable for

supplying a village or a region. So solar energy projects in all their various forms can be applied. Before forecasting the contribution which new forms of energy and in particular solar energy, will make to the developing countries' energy supplies by the year 2000, it would of course be desirable to take stock of those countries' energy resources and utilization. For some time now, the OECD has been undertaking this difficult exercise, but of the developing countries linked to the Community by association agreements, such inventories have been made only in respect of some of the more highly developed ones such as Algeria, Egypt, Kenya and Nigeria; even in these cases it has been possible only to take "commercial" forms of energy into consideration, which where the developing countries are concerned totally distorts the picture for, in most of them, wood gathered free of charge by the rural population for their domestic needs, especially cooking, accounts for between 40% and 80% of their sources of energy.

According to the most conservative estimates, the fact that wood is used means that renewable forms of energy already account for an average at least 50 % of the developing countries' energy resources and are still likely to provide at least an equivalent share of their total energy in the year 2000. What is not known yet is the proportion which will come from the renewable forms of energy derived from the new techniques currently being perfected (solar energy collection proper, biomass, etc.). It would be desirable for this proportion to be as high as possible, otherwise the rural population's growing requirements as a result of the population explosion, would lead to the irreversible desertification of certain regions, as has happened in the Sahel for instance.

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ELECTRICITY, THE OUTWARD SIGN OF DEVELOPMENT
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Development cooperation? But, what exactly is meant by that? Above all it means not falling into the traps of the past, which often consisted in grafting unsuitable Western technocratic solutions on to attitudes which spontaneously reject them.

We shall see later that this is one of the golden rules of the Community's development cooperation policy. Above all the people concerned must be listed to, with enough modesty and realism to identify their needs and the way in which they intend to satisfy these needs. This is what has become obvious over the last 20 years to all those working in the field of development; people only agree to a scheme, however small, if the proposed project is - and has been felt to be - in keeping with their aspirations. And it seems that, where energy is concerned for rural Africans the idea of progress is undeniably tied up with electricity. It offers them the possibility of a flexible water supply, on which the survival of the whole of the African "sunbelt" depends, but also access to the trappings of development, such as refrigerators, radios, television, lighting for villages, etc. The likelihood of industrialisation getting under way in the rural areas of developing countries also depends on whether those areas can be supplied with electricity.

While electricity is the form of energy aspired to by the inhabitants of rural areas in the developing countries, the immediate basic problem is still that of water supplies for both the villagers themselves and their animals. Here we touch on the whole variety of situations bound up with the circumstances

in which water is available: shallow or deep aquifers from which the water has to be pumped up, the need to remove the salt from brackish water, the problem of disinfecting polluted water, and so on. The success of development aid where new forms of energy are concerned will be judged according to how those who have the technology are able to satisfy the arid regions' need for water, the key to all future growth.

Another important requirement in the developing countries, especially those in Africa, is for energy for cooking. At present wood is the fuel used almost universally for this purpose, at the cost of the desertification of certain regions. Alternative methods have been enthusiastically tried but ended in bitter disillusion owing to failure to take such an important factor as people's attitudes into account. In the case of solar ovens designed for cooking by concentrating the sun's rays, it was quite simply forgotten that most African women prepare meals in the shade, preferably in the evening, while the few attempts to use gas obtained from biomass also ended in relative failure. It was thought that the success obtained in China in producing gas from the fermentation of human, animal and vegetable waste could be repeated in Africa, but that technique requires the waste to be handled, which is scarcely compatible with certain attitudes and, there again, the experiment has not yet proved to be entirely satisfactory. Moreover, cooking on wood fires, as practised in many developing countries, gives the food a taste which the inhabitants of those countries greatly appreciate. The proposed modern techniques do not produce the same result and it will probably take a long time to overcome this drawback.

Electricity production, water supplies, cooking - in a nutshell these are the areas where the developing countries' immediate energy-related needs lie.

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THE FUTURE OF SOLAR ENERGY LIES IN THE SOUTH
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Solar energy will play an important role in the developing countries for the following two reasons:

1. the lack of infrastructure in these countries;
2. their present very low consumption and the vast areas to be supplied.

There are 1.500 million people in the world without electricity. It is now accepted that, in spite of the technological development efforts made in the industrialized countries themselves, the future of new forms of energy, and in particular of solar energy, lies in the developing countries. Now according to the experts of the Commission of the European Communities, we are practically still at square one in this field. Some people would go further and add that the Europeans have no reason to be particularly proud of the practical experiments they have conducted in Africa as the failures easily outnumber the successes, particularly in the field of bilateral cooperation between the Member States and the developing countries. In other words, everything still remains to be done in this field and, according to the same experts, any action in depth implies systematic development of research operations dealing specifically with conditions in the developing countries. That is one of the hopes cherished by the Commission, which, as will be seen later, intends to submit proposals to this effect to the Council in 1981-82. Initiatives have, however, already been taken at Community level in recent years to promote exchanges of information on new forms of energy. They have chiefly taken

the form of the organization of international conferences attended by the top specialists on the subject. This was the case in March 1979 for instance, when a conference was held in Varese on "Solar energy in the service of development", to discuss problems connected with water, power generators, the use of solar heat, international and regional cooperation and the social implications of this source of energy. There have been three other, more general conferences, parts of which were systematically devoted to development problems: the conference on photovoltaic conversion of solar energy held in Cannes in October 1980, the conference on energy obtained from the biomass held in Brighton in November 1980 and the Brussels conference on non-technical obstacles to the use of solar energy held in May 1980.

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TECHNIQUES AND FIGURES

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A few lessons can in fact be drawn from the Varese conference on the problems of solar energy in the developing countries and be used to attempt to pinpoint, in summary fashion, the technical aspects of the matter.

The general conditions are particularly favourable in terms of the resources available (direct solar radiation, biomass, wind etc.). Almost all the developing countries are located within the "sunbelt", that part of the world straddling the equator, where the sun shines for over 2 500 hours a year.

With regard to the electrification of rural areas it would clearly be out of the question to set up conventional distribution networks, which are restricted to towns and their immediate vicinity. The drawback with small-scale conventional power plants is often that it is difficult to obtain gas oil supplies. The price per kilowatt-hour produced by this type of power plant is CFAF 30 to CFAF 120, at which level alternative forms of energy become competitive.

A number of thermomechanical solar generators with an output exceeding 1 kW have been installed, notably in Africa, but there have often been problems to do with the reliability of the equipment and especially with maintenance. These generators were chiefly intended to pump water and the excessive sophistication of the technology used, which was ill-suited to rural conditions has in most cases led to abject failure.

The photovoltaic method holds out good prospects of reducing the cost of cells. It is suitable for use at low power ratings (1W - 1kW), which are sufficient for lighting, communication systems, battery chargers and pumping water and this does not rule out higher output applications in the future. In the context of the developing countries, photovoltaic generators offer the enormous advantage of requiring little maintenance. Answers must, however, be found to the dangers such as sandstorms, peculiar to certain regions.

Biomass can be used to generate electricity by employing combustion engines. This technique is attractive both for stationary plant and vehicles. Apart from traditional or modified heat engines, the highly developed, inexpensive vehicle engine can also be used. Agricultural waste is a cheap raw material for conversion into fuel and provides short-term economic solutions. One of the schemes envisaged for some regions of Africa would involve certain rich countries, such as Ivory Coast, shipping in concentrated form waste from their crops

to other, neighbouring countries which lack resources. With regard to the biomass method it is, however, quite out of the question to turn over to the cultivation of energy-producing crops land to produce food crops. In the case of the developing countries, only human, animal or vegetable wastes or vegetation from uncultivated areas may be used.

The use of windpower, another form of solar energy, may answer the call for low-power energy sources in rural areas, especially as simple, sturdy and inexpensive types of equipment have been employed for many years now, particularly small wind-engines, not to mention the traditional windmill or the technologically very simple "savonius" wind pump. More sophisticated exploitation of wind power - and it is quite conceivable that this system may be developed further - would require wind charts to be drawn up. Collaboration with the World Meteorological Organization would then be desirable and could also involve the production of insolation maps.

The storage of electrical energy deserves particular attention especially in connexion with photovoltaic generators and aerogenerators. The batteries available need to be improved from the angles of capacity, service and cost. Since the availability of solar radiation and winds are often complementary, the combination of an aerogenerator with a photovoltaic generator is an attractive proposition for reducing storage requirements and costs, provided that local conditions are favourable as far as wind and sunshine are concerned.

However, there remains the problem of supplying energy during the night. This is a matter of prime importance given that people in rural areas consider the need for lighting at night to be a priority.

Micro-hydro power, a term employed by the Community for plants of an output not exceeding 500 kW, obviously does not have the same disadvantages, but interruptions of supply may occur when water levels are low. Nevertheless, where feasible, this remains the most attractive solution, owing to the high output levels and the capital cost per installed kW, which is lower than with the purely solar alternatives.

To sum up, the future of many solar techniques depends on reducing the cost of the products and making them more reliable and easy to maintain. It is also influenced by the possibility of storing energy, to avoid interruptions in the supply.

Lastly, two aspects which are very important, but which have often been neglected in the past, have to do with the structure set up to accommodate a project and the training of the persons responsible for maintenance.

Organization is essential at the level of the administrative and commercial management of the project. The need to train staff at all levels, but above all at technician level, is now unanimously acknowledged. This means that competent teaching staff must be available on the spot.

The future impact of geothermal energy, the second aspect of what the Community considers to be new forms of energy, depends on the existence of a number of site-related conditions. Here again, a careful census of the sites will be necessary, as will studies of the effects which the use of this form of energy which sometimes pollutes to a dangerous degree may have on the environment. In the longer term, the problems connected with the use of dry, hot rocks should be solved in order to meet the requirements of exploiting high-temperature geothermal energy.

Need it be stressed again that solar technologies will be useful only if they are socially and culturally acceptable. At the same time they must not give rise to any major environmental problems.

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INTERNATIONAL COOPERATION IN THE ENERGY SECTOR: STILL ON THE SUBJECT OF
ELECTRICITY

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The EEC is of course only one of the bodies contributing to the development aid accorded by the international community in the energy sector. It can, however, be said that all the operations have been carried out belatedly and in a haphazard fashion. The scarcity of resources and existence of a large number of public and private organizations and institutions make concerted action very difficult.

This is why the Commission of the European Communities has confined itself to establishing an initial series of technical contacts concerning energy cooperation matters with certain big international organizations (United Nations, World Bank, OECD / IEA and OPEC Secretariat) and with the relevant government departments in the United States and Japan.

It has thus been possible to take stock of international aid in 1979 for the energy sector in the developing countries. In that year the organizations and countries in question, together with the European Community, distributed aid of about 2 300 million ECU (1 ECU = approximately US \$ 1.25) in the energy sector, which accounts for 85% of total official assistance (grants and loans) for cooperation on energy policy.

The table on following page shows the individual contributions and the trend for 1980 compared with 1979.

The total of 2 300 million ECU committed in 1979 for energy cooperation projects mostly took the form of loans (1 800 million ECU, i.e. 78%), whereas grants amounted to only 500 million ECU, i.e. 22%. Forecasts for 1980 showed that this grant/loan breakdown was being accentuated (84% compared with 16%). World Bank operations are solely in the form of loans while the European Community and its Member States lead the field in terms of grants, which, at 300 million ECU, represent approximately 60% of all grants. The Community's pre-eminence in development aid is thus confirmed.

In 1979 the proportion of this aid to the energy sectors in the developing countries accounted for by new forms of energy was still extremely small (2% of total funds committed) and climbed slightly to 3% in 1980. In the years ahead, however, this percentage is likely to increase substantially on account of the general commitment to solar-based techniques.

The bulk of the aid went on electricity-related projects, which received 1 833 million ECU in 1979, i.e. almost 80%. Only 10% of the aid was devoted to crude oil and natural gas and 8% to coal.

In 1980 a better balance was achieved: electricity's share declined (64%) to the benefit of the other three sectors, whose shares increased to 16% (oil, gas), 15% (coal) and 3% (new forms of energy).

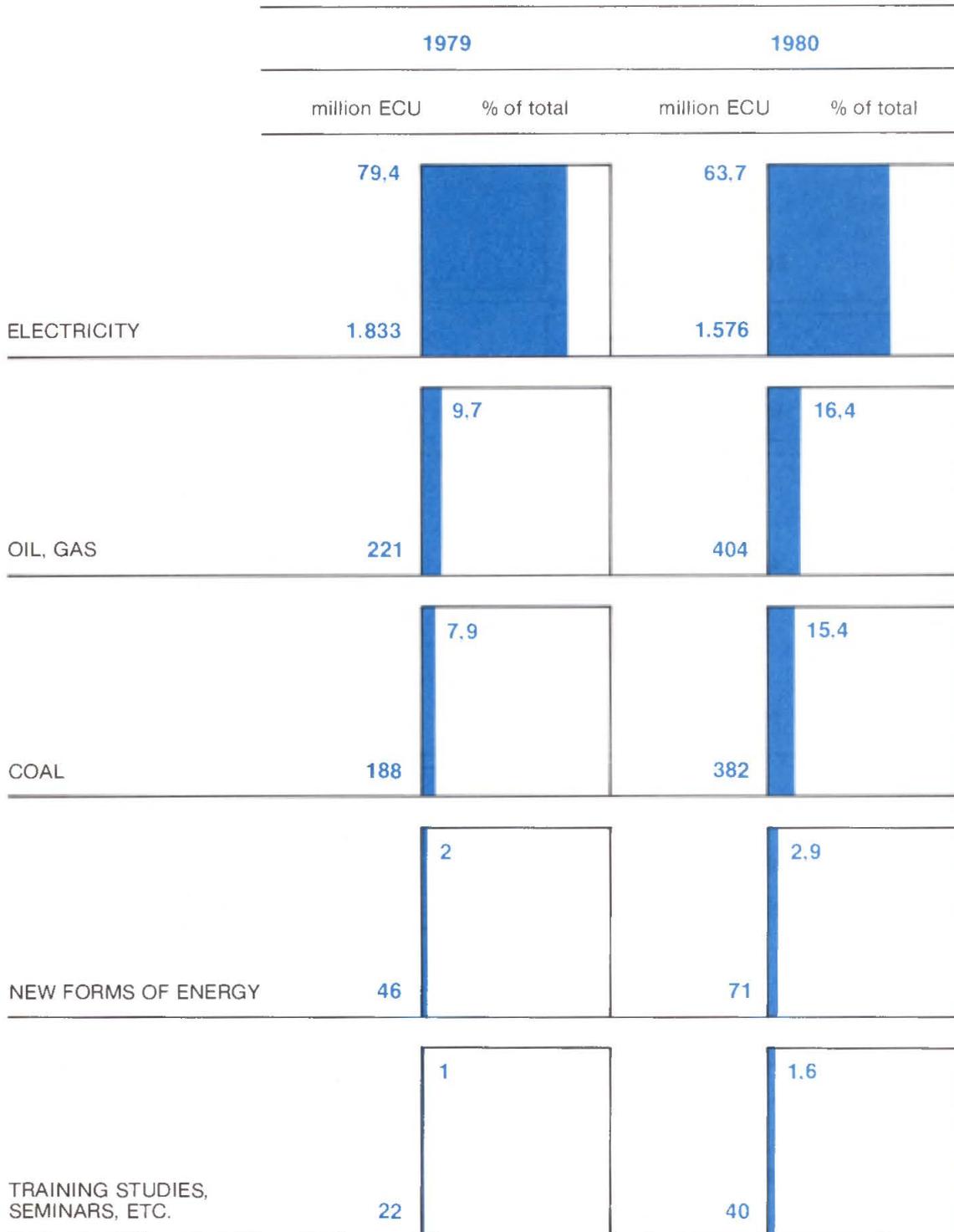
Technical assistance projects in the fields of training, research and development, energy programming, studies and the provision of experts accounted for only 1% of the resources employed for cooperation in 1979, i.e. 20 million ECU. However, this figure has been doubled in the 1980 commitment forecasts

(see page 8).

1979/1980 VARIATION IN MILLIONS ECU

| | 1979 in millions ECU | 1980 | |
|---|-------------------------|-------|-------|
| WORLD BANK | 1.565 | 1.639 | + 74 |
| EEC (bilateral plus community aid) | 503 | 703 | + 200 |
| UNITED STATES | 180 | 47 | -133 |
| OPEC SPECIAL FUND | 45 | 55 | + 10 |
| JAPAN | 14 | 15 | + 1 |
| UNDP | 3 | 14 | + 11 |
| | 2.310 | 2.473 | + 163 |
| Other states (Saudi Arabia, Kuwait, Gulf Emirates, Canada, Australia, Scandinavian Countries) | ± 400 | ± 500 | + 100 |

Structure of international aid



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THE COMMUNITY'S DOCTRINE: PRAGMATISM AND RATIONAL USE OF RESOURCES

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In the past the energy sector had been somewhat neglected in the Community's development cooperation plans. Admittedly the low cost of oil provided no incentive to undertake special projects in this field and the level of development of the developing countries was not such as to involve the large-scale use of energy. However, under the second Lomé Convention, which is the main channel of Community development aid, special attention is paid to energy, particularly the new forms of energy. Even under Lomé I, though, this aspect was not totally neglected since almost 30 million ECU were committed for projects in this field. The Community's projects were moulded by an approach which was to become standard in its development cooperation schemes and was characterized by considerable pragmatism and the careful use of resources. Furthermore, it may even be claimed that, in view of the early stage of development of many solar techniques, the EEC showed even greater prudence in this connection and thus avoided very many disappointments such as those which certain Member States experienced with their development cooperation schemes involving solar projects.

The approach adhered to in the past was based on the following fundamental considerations:

1. The new techniques employed had already been sufficiently developed for the risk of failure to be limited. The Community refused to regard the developing countries as a laboratory for testing new techniques that could subsequently be used in Europe. The opposite approach was followed, i.e. techniques already developed were adapted to local requirements.
2. The investments in this field were employed to the best advantage in order to minimize risks, as the financial resources available for development allow of no wastage.
3. The "new energy" components were, as far as possible, combined with larger projects not designed to produce energy (e.g. solar pumping of a small area forming part of a major irrigation scheme).
4. Problems of adaptation to the social context were carefully studied in order to avoid psychological difficulties which could lead to outright rejection for example, the study of the use of molasses to produce ethyl alcohol in Upper Volta made the maximum allowance for traditional cooking methods.
5. The projects financed by the Community relied, as far as possible, on the existing, and implementing bodies already to be found in the developing countries. In this connection it should be noted that a very considerable body of experience and knowledge has already been built up by certain national research centres.
6. Concern to combine the projects with the training measures indispensable for their success.

It may be thought that, in future, a seventh guideline will be added to the above. Community circles are more and more convinced that development aid in certain sectors, especially that of energy and new forms of energy, calls for a specific research and development scheme to be implemented by European bodies in cooperation with developing countries' research institutes and directed towards the employment of techniques adapted specifically to the conditions of those countries.

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COOPERATION BETWEEN THE EEC AND THE DEVELOPING COUNTRIES: TAKE-OFF FOR NEW FORMS OF ENERGY

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The Community and its Member States top the list of donors of grant aid for energy cooperation with the developing countries, whereas the World Bank is in first place as far as loans are concerned. With regard to the special sector of new forms of energy, the EEC and the Member States account for some 80% of all operations carried out in the developing countries. Activity by the Community as such has mainly taken the form of financial aid for projects chosen by the recipient countries themselves and implemented through various procedures. The oldest and most wide-ranging aid channel is the European Development Fund (EDF), the financial instrument of the Lomé Convention, which links more than sixty African, Caribbean and Pacific countries (ACP) with the EEC. Thus, under Lomé I financing for new forms of energy amounted to nearly 30 million ECU (1 ECU = approximately \$ 1.25), which is all the more remarkable in view of the fact that the part which new forms of energy, particularly solar energy, will play in the energy supply of the developing countries is only just beginning to be realized. Similarly, the financial and scientific cooperation aspects of the bilateral agreements concluded by the Community with certain Mediterranean countries provide for the funding of projects or research schemes relating to new forms of energy. The Community also supports the particularly effective aid from the non-governmental organizations (NGOs) to the developing countries, by earmarking financial appropriations for the NGOs from the Community's own budget. Lastly, the Community grants aids to the "non-associated" Asian and Latin American countries, part of which is devoted to energy insofar as it contributes to rural development in these countries.

One aspect of cooperation has, however, been hitherto neglected by the Community, i.e. research and development projects specifically intended for the developing countries. Proposals concerning this matter will be submitted in 1981 to the Council of the "Ten" by the Commission, which sets great store by this aspect of cooperation.

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THE LOME CONVENTION, THE FOREMOST INSTRUMENT OF EEC-ACP COOPERATION

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Sixty countries are associated with the Community in the attempt to find a common solution to development problems in a context of responsibility and mutual independence. This sums up in a few words the essence of the Lomé Conventions which, since 1976, have provided the framework for cooperation between the EEC and the African, Caribbean and Pacific countries. In this cooperation which - in spite of its imperfections - is universally acknowledged to be a success because of the originality and realism of the machinery it deploys, full consideration is now being given to new forms of energy: in the second Lomé Convention, which is now in force for a five-year period terminating on 28 February 1985, one article (Article 76) lays down that one of the aims of cooperation is to develop "the conventional and non-conventional energy potential and the self-sufficiency of the ACP States". The importance of new forms of energy is now clearly acknowledged and it is virtually certain that the number of projects in this field will increase considerably. Under the previous Convention, the ACP States'

original requests for projects concerning new forms of energy scarcely amounted to one million ECU, but in the event the schemes actually implemented were worth nearly 30 million ECU in all, or 16% of the aid devoted to energy projects. Without wishing to hazard any conjecture on the basis of these figures, Commission experts think the "new forms of energy" projects which will emerge from Lomé II will involve a total of 100 million ECU at least. The preliminary signs are there: many ACP States have included projects of this type in the forward programmes they have submitted to the EEC; they range from micro-hydro projects through biomass programmes to solar pumps.

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LOME I: THE BALANCE SHEET

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By the end of 1980, 25 projects concerning new or renewable forms of energy had been financed in the ACP States. To this series of developments should be added under the heading of regional cooperation (projects of common interest to several ACP States) a scheme to establish a centre for research into new forms of energy. The total aid committed in order to implement these projects is around 30 million ECU.

All sectors relating to new or renewable forms of energy have been tackled but it must be admitted that a high percentage of the funds has been used to finance either studies or demonstration projects. This illustrates perfectly the prudence with which the Community has approached the question of solar energy in the developing countries, so as to avoid any waste of resources. The almost complete absence of any micro-hydro projects is also worth noting. This gap should be filled under Lomé II; according to one Community expert, the generation of power using small dams will be one of the main themes of EEC-ACP cooperation relating to new forms of energy. Details of the projects which have been financed under the fourth EDF will be found in the Annex.

The regional project financed concerns the establishment in West Africa of a solar energy research centre within the framework of the West African Economic Community (CEAO) and the Permanent Interstate Committee for Drought Control in the Sahel (CILSS). The purpose of this centre would be to carry out feasibility studies and provide technical assistance for the parties concerned, but it would also be to promote cooperation with local industrial undertakings. Its work is also planned to include the construction of prototypes.

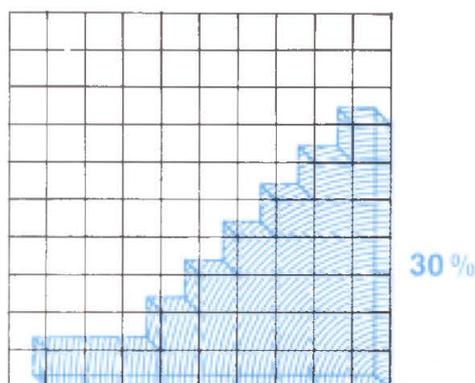
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LOME II: THE PROGRAMMES

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Under the fifth EDF of the new Convention 100 million ECU will be spent on projects involving new forms of energy. This is the "reasonable" estimate of the Community's experts in the light of the first programmes submitted for the approval of Brussels by the ACP countries, which means that new and renewable forms of energy would account for 30% of the total financings for energy projects under Lome II. Cooperation in this sector should therefore really be taking off.

LOME II



According to the same experts, the breakthrough should occur in three fields:

1. micro-hydro power, i.e. plants with an output of less than 500 kw;
2. gasification of wastes. The treatment of wastes alone is contemplated so as not to misuse land that is fit for producing food crops and to limit the risks of deforestation;
3. photovoltaic cells.

A fourth dimension, viz. research, could be given to the cooperation.

It is quite clear in the minds of the EEC officials responsible that the setting up of any plant will have to be accompanied by the training of the staff required to run and maintain it.

While, at the time of the previous round of programming under Lomé I, only one country - Niger - formally expressed from the start its interest in a project concerning new forms of energy, the programmes submitted by the ACP countries to the Commission under the new Convention contain a large number of references to operations of this kind.

The most ambitious projects include the harnessing of power from the sea in the Bay of Abidjan, in Ivory Coast; the building of hydro-electric dams in Niger and solar energy and micro-hydro power schemes in Senegal. Generally speaking, micro-hydro power schemes are to be found in several of the indicative programmes submitted to the Community authorities.

The Pacific and Caribbean group of countries gives higher priority to wind power and wave and tidal power but, above all, to the utilization of waste by means of the processes of biomass breakdown. These choices can be explained by the geographical location of the countries and the types of crops grown there.

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MEDITERRANEAN COUNTRIES: HIGH-LEVEL SCIENTIFIC COOPERATION

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In 1976 the Community concluded cooperation agreements with seven southern Mediterranean countries, namely the Maghreb (Algeria, Morocco, Tunisia) and Mashreq (Egypt, Jordan, Lebanon and Syria) countries.

These agreements, which contain considerable trade preferences, provide for cooperation at all levels, especially in the matter of scientific research. While the cooperation has not led to any specific projects in the field, there have, however, been many schemes involving research into new forms of energy. With regard to Syria, a 763 000 ECU scientific cooperation project has been successfully completed by the EEC and the Syrian CERS.

Likewise, in Tunisia, assistance for the national research programmes involved a budget of 930 000 ECU.

The Jordan Royal Scientific Society (RSS) is benefitting from a cooperation programme costing 987 000 ECU.

In Egypt it has been planned to use the financial assistance provided for in the agreement to set up EREDO, a centre for the application of renewable forms of energy. This is an ambitious project since it is costing 8 million ECU.

Lastly, in Algeria 1.3 million ECU is budgeted for cooperation with the agency specializing in solar research (ONRS).

Cooperation on new forms of energy between the Community and the Maghreb and Mashreq countries promises to be particularly fruitful owing to the high quality of these countries' scientists and the high level of research attained in their centres. In particular, close cooperation has been established between the EEC's Joint Research Centre (JRC) and these countries.

Further Community funds should soon be decided upon in connection with the financial aspect of the Mediterranean agreements, when the first financial protocols expire. Doubtless, some of the money will then be earmarked for new forms of energy.

Lastly, there is a third group of developing countries, namely the non-associated countries, especially those in Asia and Latin America. The Community has begun cooperation on new forms of energy with two of these countries, entailing a total amount of 2.1 million ECU within the framework of rural development. The first operation is a solar energy demonstration project in Pakistan, costing 1.5 million ECU, and the second a 600 000 ECU study carried out in geothermal energy in collaboration with OLADE (Latin American Energy Organization).

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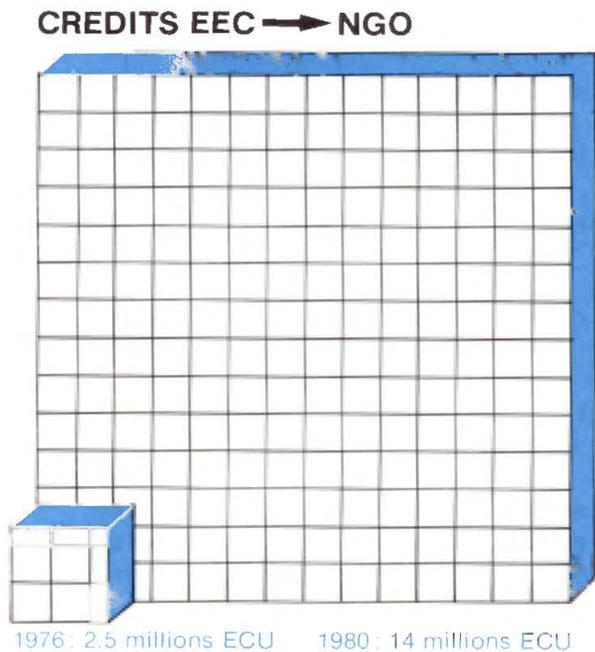
THE NGOs, THE COMMUNITY'S FOREMOST ASSOCIATES IN DEVELOPMENT AID

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The Non-Governmental Organizations (NGOs) are non-profit-making bodies set up to assist the poorest communities. Naturally, an ideal field for their activities is provided by the developing countries, where NGO action may take any form and be applied to all kinds of objectives. However, many NGO operations are concerned with the implementation of projects to improve the physical plight of the people concerned, especially as regards the fight against hunger. Most of the time this campaign involves supplying water to rural areas, a prerequisite for developing agricultural food resources.

The NGOs thus came to be interested in solar energy for pumping water and they can be credited with many schemes of this kind.

The Community has recognized that NGO projects are in keeping with its own philosophy and in 1976 this enabled it to introduce an innovation into its development policy consisting in the creation of a special budget heading which now enables the Commission to cofinance microprojects carried out in developing countries, irrespective of whether they are associated with the Community or not, by NGOs originating in the Member States. The funds made over to the NGOs rose from 2.5 million ECU in 1976 to 14 million ECU in 1980. This increase is implicit recognition of the effectiveness of this form of cooperation, for the efficacy of NGO operations is unanimously acknowledged and appreciated. The disinterested nature of their operations and the humanitarian element underlying them mean that this work rarely meets with failure or is wasted.



Having said this, the allocation of Community funds to the NGOs is subject to a number of conditions. As a general rule the EEC's financial contribution may not exceed 50% of the project cost, with a ceiling of 100 000 ECU per annum for each project. Nevertheless, if a project is located in one of the poorest countries

according to the United Nations' classification, the contribution may be increased to as much as 75% of the overall cost. A very high proportion of the ACP countries moreover, fall into this category.

Multiannual projects which can be carried out over three years are also possible. In this case the Community contribution may not exceed 300 000 ECU.

At the end of 1980 thirteen solar projects totalling 623 000 ECU had been co-financed by the Community and the NGOs. These figures are likely to increase considerably in the years ahead. In this connexion, it should be noted that in 1981 a conference was held that enabled over 500 NGO delegates to confer together and exchange ideas and experiences on the subject of new forms of energy. Its chief aim was to take stock of the world energy situation and study ways of developing, via the NGOs, the use of new forms of energy.

Of the thirteen projects carried out the majority were in the Sahel countries as six of them concerned Mali and two Senegal. Almost exclusively they dealt with water extraction, whether by photovoltaic or thermodynamic solar pumps. The other financing operations involved Burundi/Rwanda, Tunisia and Upper Volta (three projects).

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SPECIFIC DEVELOPING-COUNTRY RESEARCH PROGRAMMES: A GREAT HOPE FOR THE FUTURE OF COOPERATION

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Project aid remains the traditional instrument employed by the industrialized countries in their development cooperation. Besides, to a large extent it provides them with spin-offs since a considerable proportion of the sums earmarked for aid returns to their firms, be they consultancy firms responsible for the project, suppliers of equipment or contractors who install it in situ.

In the face of this situation, the recipients of aid rightly demand greater participation for their own businesses. Here, the key to the problem, it was thought, was the transfer of technology. Now it is quite obvious that holders of patents are not inclined to give them away, even to support a noble cause, especially, as the development of technologies has often cost them heavy financial sacrifices.

Why not appeal then to the research institutions of the Community itself? The latter has implemented two multiannual research programmes in the energy sector, a considerable part of which was reserved for solar energy. From the summary of the current programme, which covers the period until 1983, it will be noted that 46 million ECU has been earmarked for joint research with official bodies or private firms, to deal with the following matter:

- application of solar energy in housing;
- thermomechanical solar power stations;
- production of electricity by means of photovoltaic conversion;
- photochemical, photo-electrochemical and photobiological processes;
- energy obtained from biomass;
- data regarding solar radiation;
- windpower;
- application of solar energy to agriculture and industry.

Furthermore, the Community possesses its own research structure, with establishments in several Member States, in the shape of the Joint Research Centre (JRC) one of whose tasks is to improve the knowledge available on new sources of energy.

It would therefore appear that the EEC could transfer the results of the research work it finances for the developing countries when the techniques perfected are likely to promote progress in those countries.

This overlooks two vital aspects of the problem, however.

Firstly, there are legal obstacles to the transfer of research results for the benefit of third countries. In cases where research is cofinanced by the Community and a private firm, Community law stipulates that ownership of the processes shall be reserved for the latter. Contracts concluded by the EEC with private firms are, moreover, always more restrictive in this respect than the law itself. If the Community's partner is unable to work the patents, the Community can in theory dispose of them to the benefit of third parties who must, however, be members of the EEC. As for the Joint Research Centre, its results can be communicated only to firms in the Community itself if the research work has been financed from Community funds. We find ourselves in a complete dilemma with everyone proclaiming the need for transfers of technology while the legal provisions do not authorize any such transfers to the developing countries.

The second type of obstacle to the use in the developing countries of technologies developed in the industrialized countries has to do with the very nature of the research. Moreover, this is especially evident where solar energy is concerned: on the one hand there is a group of countries in which, as a general rule, sunshine is a scarce commodity and where its use will make it possible to save the few per cent required for the maintenance of economic independence; on the other, a large number of countries with abundant solar "resources" which, if harnessed, will eventually contribute towards the survival of the people concerned. Research done in the interests of one of these groups of countries will not therefore necessarily be applicable to the other.

The Community has therefore recognized the need to set up a new research structure which geared exclusively to the specific needs of the developing countries and whose legal framework will allow the transfer of technologies to those countries.

It should work in collaboration with the research establishments and other bodies set up by the developing countries under the cooperation agreements or the Lomé Convention, to result in joint work by the developing countries' establishments and European research institutes, the latter contributing their scientific experience. It is therefore hoped that fruitful links will be forged between research workers and that, at the same time, the beneficiaries will be made aware of new techniques, especially those pertaining to solar energy.

In order to get this new form of cooperation off the ground, the Commission should submit proposals to the Council of the European Communities in 1981 and 1982. The first proposals - on research into tropical agronomy and medicine - should precede the proposals on energy research, which would arrive on the ministers' desks at the beginning of 1982.

The Commission's Directorate-General for Development is already working to determine the broad lines of such a programme of research specific to the developing countries. They may be summarized as follows:

THE PROBLEM OF WATER

Study of all sizes of pumps of satisfactory performance, requiring but little maintenance and able to resist the climatic conditions peculiar to each region.

Development of desalination techniques. Very little has been done so far on this subject. It would be tackled from the point of view not only of the techniques involving distillation but also of those involving the use of electricity.

Water disinfection. This is a particularly serious problem since the international organizations estimate at 10 million the annual number of deaths in the developing countries resulting from diseases transmitted by polluted water.

ELECTRICITY SUPPLIES

We have seen the importance which the rural population in the developing countries attaches to electricity as an energy carrier.

The Commission's proposals will probably relate to research on "tower" power stations, the first of which has been designed by the Community in Sicily. This 1 MW prototype needs too much maintenance for the design to be transposed to the developing countries and its cost is still too high. Information should therefore be disseminated regarding the principle on which it works.

The second field of application for research on electricity would be that of telecommunications, which are particularly important in territories where distances are great and population densities low.

Research could then be related to the conditions under which small-scale distribution networks could be established.

In the wind-power sector, improvement of materials and techniques, to reduce maintenance requirements and component wear and tear, would be needed if this method of generating electricity is to be developed.

Finally, research work could be directed towards the use of radiation for heating and refrigeration. The question of drying crops deserves special attention as certain products, such as fruit, are attacked by insects and rapid drying is one way of preserving them.

BIOMASS

In the biomass field it would be a matter of finding systems consonant with the plant life and human possibilities of the countries concerned and of Africa in particular, as it is difficult to envisage wide spread application of the Chinese method, the requirements of which are not very consistent with certain mental attitudes. It would be by making use of vegetable wastes that the most immediate solutions could be obtained.

OTHER PUBLICATIONS RELATED TO 'DEVELOPMENT'

Other EEC publications about the Community's relations with the Third World can be obtained from the following address:

Spokesman's Group and Directorate-General for Information
Publications distribution service, Room 2/84
Commission of the European Communities
Rue de la Loi, 200
B - 1049 Brussels (Belgium)

1. Dossiers

- The European Community and the Third World, Bruxelles, September 1977
- Europe and the Third World
A study on interdependence (by M. Noelke)
- Europe - Third World : The challenge of Interdependence (M. Nölke)
Edition 1980
- Lomé II - Special edition from the 'Courier' n° 58

2. "Information Series" and "Europe Information": (generally all Community languages)

- The European Community and the Textile-Agreements
special edition (June 1978)
- The European Community and the Arab World n° 169/79
- Europe-Tiers Monde: Rural Development
- Solar Energy: A new area of ACP-EEC Cooperation
- The EEC and the developing countries: Outside the Lome Convention and the
Southern Mediterranean
- Community Wine Imports
- Lomé II - Analysis chapter by chapter of the EEC-ACP Convention
- The development of trade between the European Community and the Arab League
Countries
- Implications for the Southern Mediterranean countries of the second enlargement
of the European Community (R. Taylor)
- Implications of the second enlargement for the Mediterranean and "ACP" policies
of the European Community (E. Guth)
- The Question of Commodities in the North-South Dialogue
- Photovoltaic Energy as a Development Aid
- Tanzania - EEC Relations