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Supplement 5/83

Prospects for the development of new policies:

**Research and development,
energy and new technologies**

Commission
of the European Communities

Supplements 1983

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**Prospects for the development of
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Introduction

The discussion concerning the expansion of the Community's own resources has tended to emphasize budgetary aspects at the expense of all other considerations.

Moreover, since all Member States face difficult choices as regards budgetary options, a contradiction can sometimes be said to exist between measures taken at national and Community level, involving compression on the one hand and an accelerated growth in expenditure on the other.

As a result, the debate now opening on the future of the Community, and particularly on new areas of Community development, is characterized by an ambiguity which the Commission considers it essential to remove.

The introduction of new policies has, in fact, been impeded not so much by the debate on agricultural expenditure as by the absence of specific objectives and definite priorities.

Consequently, in order to guarantee the harmonious development of the Community, the Council must first define appropriate objectives, and then provide the necessary instruments for their attainment within a given period. Over the years this method, on which the Community's great achievements were based, has given way to empiricism and pragmatism. It is essential to demonstrate the merits of the Community's approach compared with that of national governments. Failure to return to the method will make it impossible to:

- (i) compare the advantages of the Community and national approaches;
- (ii) demonstrate that the expenditure involved is not simply a levy on the economies of the Member States but the means of achieving the jointly defined objective more effectively;
- (iii) make a choice between the different commitments that the Community might enter into;
- (iv) make a genuine assessment of the action taken.

The following examples are provided as an illustration of the foregoing observations.

Research and development: A framework programme, defining the different Community

priorities for a four-year period, has been drawn up by:

- (i) identifying specific objectives,
- (ii) providing a balanced assessment of the relative importance of the projects involved,
- (iii) establishing an operational management structure,
- (iv) providing for independent evaluation.

The Commission must, therefore, accept the consequences of its basic choice by providing, bearing in mind the financial resources available, an estimate of the funds required for the successful execution of the programme adopted. The Commission will enter the specific amounts in each preliminary draft budget for subsequent approval pursuant to the budgetary procedure.

As a result of its overall view the Council will then have all the information it requires to decide on specific programmes: Esprit, the programme of activities of the Joint Research Centre, etc.

Energy: A five-year programme will make possible the creation, within the Community, of appropriate conditions for the changes which are economically essential in the energy sector. This programme:

- (i) defines objectives;
- (ii) lists priorities for action;
- (iii) suggests ways of implementing these priority activities.

Once the parameters have been defined, the Commission will indicate the activities which, in its opinion, can be most effectively, reliably and profitably executed in a Community context. Whereas some simply involve coordination with the Member States, others are more specifically orientated towards joint action.

The increase in expenditure can thus be measured in terms of the expected economic benefit for the Community as a whole.

Telecommunications, biotechnology, development of innovation: Faced with the speed at which changes occur and their magnitude, the Commission proposes to adopt a medium-term approach in each of these areas, all of which are of vital importance for the future and, in particular, industrial competitiveness.

Before the objectives have been defined, there can be no genuine agreement as to the need for, or value of, a Community approach. It will thus be impossible to assess the content and potential benefits of each of the concrete proposals.

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The proposed approach fulfils the objective requirements of Community development, whilst at the same time guaranteeing optimum use of the necessary financial resources.

The rate at which these policies or new projects are implemented will depend on:

(i) actual need;

(ii) the priorities fixed;

(iii) the resources made available: these will be determined on the basis of the task to be accomplished and its expected benefit for the Community both in economic terms and from the point of view of its unification.

A Community cannot live off its past achievements. Opposition to change clearly leads to erosion. Even more serious, however, is the fact that failure to take account of new problems may cast doubt on the Community's ability to exert any favourable influence on our future.



Framework programme for research

1984-87

On 20 May the Commission, further to its December 1982 Communication¹ and in response to the Council's reactions of February,² transmitted a proposal³ for a Decision on the first framework programme for Community scientific and technical activities (1984-87).

In the field of science and technology, the Commission is essentially proposing the following:

(i) five criteria by which to define the specific scientific and technical objectives to be adopted: these criteria relate to both the Community dimension (level of human and financial resources required, size of the potential market, ('transnationality'), and to Community interests (collective needs, support for the Community's major objectives);

(ii) the definition and implementation at Community level of an overall research, development and demonstration strategy;

(iii) the preparation of a general framework programme of Community scientific and technical activities, to serve as an instrument for the implementation of the strategy, which defines the options and objectives to be adopted;

(iv) the priority options to be taken into account:

- (a) agricultural competitiveness;
- (b) industrial competitiveness (with special attention to the new technologies);
- (c) scientific competitiveness;
- (d) stepping-up of aid to the developing countries;
- (e) adaptation of R & D activities already undertaken, by means of their incorporation into the overall strategy: energy, raw materials, environment, health and safety;
- (f) development of analysis and forecasting capacity;
- (g) reorganization of structures and procedures on the basis of the proposed strategy;
- (h) systematic evaluation;

(v) a gradual increase in the Community's financial resources.

After considering the Commission's proposals the Council meeting (Research) of 28 June 1983 approved a resolution⁴ (formally adopted on 25 July) on framework programmes for Community research, development and demonstration activities and a first framework programme 1984 to 1987.

Council resolution of 25 July 1983 on framework programmes for Community research, development and demonstration activities and a first framework programme 1984 to 1987

THE COUNCIL OF THE EUROPEAN COMMUNITIES.

Having regard to the Treaty establishing the European Economic Community, and in particular Article 235 thereof,

Having regard to the Treaty establishing the European Atomic Energy Community, and in particular Article 7 thereof,

Having regard to the Council resolution of 14 January 1974 on the coordination of national policies and the definition of projects of interest to the Community in the field of science and technology,⁵

Having regard to proposals from the Commission in its communications to the Council dated 22 December 1982 and 20 May 1983⁶ on the framework programme 1984 to 1987,

Having regard to the opinion of the European Parliament,⁷

Having regard to the opinion of the Economic and Social Committee,⁸

Having regard to the opinion of the Scientific and Technical Research Committee (Crest),

Whereas Article 2 of the Treaty establishing the European Economic Community assigns to the Community the task, among others, of promoting throughout the Community a harmonious development of economic activities, a continuous and balanced expansion and an accelerated raising of the standard of living;

Whereas it is important to promote balanced scientific and technical development within the Community;

¹ Bull. EC 12-1982, point 2.1.173.

² Bull. EC 2-1983, point 2.1.134.

³ OJ C 169, 29.6.1983; Bull. EC 5-1983, points 1.3.1 to 1.3.6.

⁴ OJ C 208, 4.8.1983.

⁵ OJ C 7, 29.1.1974.

⁶ OJ C 169, 29.6.1983.

⁷ OJ C 184, 11.7.1983.

⁸ OJ C 211, 8.8.1983.

Whereas research, development and demonstration activities (R, D and D) must be accompanied by adequate dissemination of the knowledge acquired by means of these activities and by effective use of the results obtained;

Whereas, at its meetings on 9 November 1981 and 8 March and 30 June 1982, the Council affirmed the need to systemize and optimize Community action in the field of research, development and demonstration, having recognized that the strategic coherence of the Community's activities would be enhanced and the preparation and adoption of decisions in the aforementioned field would be greatly facilitated by the adoption and regular review by the Community institutions of a framework programme containing broad indications for the medium-term development of scientific and technical objectives;

Whereas, as its meeting on 8 February 1983, the Council expressed a large measure of agreement on the need to increase Community expenditure on research and development and on the proportionally larger share which should be allotted to it in the Community's overall budget, subject to further clarification of the budgetary implications;

Whereas, on 18 June 1983, the European Council adopted the Declaration concerning the development of policies and new Community action, budgetary discipline, own resources and particular problems of certain Member States;

Whereas the Commission's proposal concerning a first framework programme 1984 to 1987 seems likely to promote such a development of Community research, development and demonstration policy;

Whereas the Treaty establishing the European Community does not provide the specific powers of action required for the adoption of this resolution.

HEREBY ADOPTS THIS RESOLUTION:

Article 1

The development of a common strategy in the field of science and technology shall take place on the terms laid down in this resolution and in accordance with the Communities' other strategies and policies.

Article 2

The common strategy in the field of science and technology shall be defined in framework programmes setting out the scientific and technical objectives to be pursued at Community level together with selection criteria for Community action, relative priorities and financial indications.

These framework programmes shall be drawn up by the Commission in consultation with the Member States.

On the basis of the framework programmes, the Commission shall prepare proposals for specific research, development and demonstration activities which meet the objectives referred to in the first paragraph.

Article 3

The Council hereby approves the principle of framework programmes for periods of four years which will be reviewed at least every two years and revised if necessary.

On the basis of proposals submitted to this end by the Commission and after receiving the opinion of the European Parliament, the Council shall:

- approve the framework programmes,
- adopt, in accordance with the framework programmes approved and with the procedures instituted by the Treaties, specific decisions on the R, D and D activities of the Communities.

Article 4

The Council hereby approves the scientific and technical objectives for the period 1984 to 1987 and the selection criteria set out in Annexes I and II respectively.

The Council hereby confirms its agreement on the need to increase Community spending on R, D and D. While bearing in mind the need to frame Community policies, but awaiting the outcome of the general discussion on the Communities' resources and policies, for the time being the Council takes note of the financial indications relating to the objectives to be attained in the period 1984 to 1987 (Annex III). These indications are to serve as a guide for Commission

planning and the adoption by the Council of specific R, D and D activities during that period.

These objectives and criteria, on the one hand, and these financial indications, which still have to be defined, on the other, shall constitute the elements on which implementation of the 1984 to 1987 framework programme will be based.

The planning and adoption of programmes will of course take account of financial constraints.

Article 5

In 1985 at the latest, the 1984 to 1987 framework programme will be reviewed on the basis of a Commission proposal and conclusions drawn from the experience gained from this first framework programme, with a view to evaluating its effectiveness and improving its underlying approach.

This review may result in revision of the first framework programme.

Annex I

Scientific and technical objectives (1984 to 1987)

1. Promoting agricultural competitiveness:
 - developing agricultural productivity and improving products:
 - agriculture,
 - fisheries.
2. Promoting industrial competitiveness:
 - removing and reducing barriers,
 - new techniques and products for the traditional industries,
 - new technologies.
3. Improving the management of raw materials.
4. Improving the management of energy resources:
 - developing nuclear fission energy,
 - controlled thermonuclear fusion,
 - developing renewable energy sources,
 - rational use of energy.

5. Stepping up development aid.
6. Improving living and working conditions:
 - improving safety and protecting health,
 - protecting the environment.
7. Improving the effectiveness of the Community's scientific and technical potential:
 - horizontal action.

Annex II

Selection criteria

In general, when selecting Community activities on the basis of the scientific and technical objectives adopted, special attention should be given after assessment of their scientific and technical values to activities which contribute to the definition or implementation of Community policies.

In these fields, Community action can be justified where it presents advantages (added value) in the short, medium or long term from the point of view of efficiency and financing or from the scientific and technical point of view as compared with national activities (public or private).

More specifically, Community action can be justified in the following cases:

- research on a very large scale for which the individual Member States could not, or could only with difficulty, provide the necessary finance and personnel,
- research, the joint execution of which would offer obvious financial benefits, even after taking account of the extra costs inherent in all international cooperation,
- research which, because of the complementary nature of work being done nationally in part of a given field, enables significant results to be obtained in the Community as a whole for the case of problems whose solution requires research on a large scale, particularly geographical,
- research which helps to strengthen the cohesion of the common market and to unify the European scientific and technical area and research leading, where the need is felt, to the establishment of uniform standards.

Annex III

Financial indications by objectives (1984 to 1987)

	<i>(million ECU)¹</i>	<i>(%)</i>
1. Promoting agricultural competitiveness:	130	3.5
• developing agricultural productivity and improving products:		
– agriculture	115	
– fisheries	15	
2. Promoting industrial competitiveness:	1 060	28.2
• removing and reducing barriers	30	
• new techniques and products for the traditional industries	350	
• new technologies	680	
3. Improving the management of raw materials	80	2.1
4. Improving the management of energy resources:	1 770	47.2
• developing nuclear fission energy	460	
• controlled thermonuclear fusion	480	
• developing renewable energy sources	310	
• rational use of energy	520	
5. Stepping up development aid	150	4.0
6. Improving living and working conditions:	385	10.3
• improving safety and protecting health	190	
• protecting the environment	195	
7. Improving the effectiveness of the Community's scientific and technical potential:	85	2.3 ²
• horizontal action	90	2.4
	<u>3 750</u>	<u>100.0</u>

¹ At 1982 constant values.

² Corresponds to 5% by the end of the period.

Energy and energy research in the Community:
a five-year programme of action and its financing

*Commission communication
transmitted to the Council on 7 June 1983*

The need for a different approach

1. The past three years have brought dramatic changes on the world oil market as it adjusts to new and very different market conditions. The price increases of 1979/80 contributed substantially to the damaging depression of economic activity which has been witnessed throughout the industrialized world. But on the positive side they had a direct effect on the demand for oil and on the supply and use of other fuels. They also changed the perceptions and behaviour of governments in oil-consuming and oil-producing countries alike, and those of companies and individuals inside and outside the oil industry.

The combination of these factors pushed world oil demand down by a staggering 20% in three years and with this has come the fall in the price of crude itself.

These changes carry important lessons for energy policy and set a new context for future action. The new situation requires a different response in the Community from that of the past, building on the successes of the past but learning from the mistakes; capitalizing on the opportunities while minimizing the risks; and providing a solid bridge from the present to a more stable and more certain future.

The lessons of the past

2. One key lesson from the past is that energy policy brings clear rewards.

Some of the gains that have been made are due to the efforts of governments to encourage more rational energy use and a less vulnerable and more diversified pattern of energy supply.

Another lesson is that market forces are very much alive and kicking in the energy field, working during the past three years vigorously in support of our energy policy objectives.

Consumers and investors responded to the rise in oil prices in 1979/80 by cutting oil consumption and shifting to other fuels. And in the oil sector itself increased production from non-OPEC sources has added to the impact of falling oil demand in establishing a more market-based level of prices.

A third lesson however, is the importance of sustained effort and continuity of approach. The process of adjustment in the energy sector after the first oil shock of 1973-74 was not sustained as prices began to fall in real terms thereafter. Some of the results are only being felt today in the electricity sector where new oil-fired plant ordered in the mid-1970s is coming into operation. Many of the gains of the past few years will be lost if this cycle is repeated, with short-term market signals setting the process of adjustment in reverse once again and encouraging a return to the earlier uneven balance between oil-producers and oil-consumers in the market place.

The opportunities and the risks

3. The opportunities in the new situation are substantial. The Community's balance-of-payments will be USD 10 000 million better this year than last because oil prices are lower. Economic growth should be higher by 0.5% or more next year as a result and inflation will be down by 1% or more. There will be gains to the public purse as economic activity picks up and there will be gains to industry and to the consumer. The short-term economic outlook for the Community as a whole will therefore be better as a result of the new oil market situation.

4. The longer-term is clearly less secure. The present oil market situation seems most unlikely to change overnight, barring unforeseeable political developments, but some time later in this decade the position could be very different. The industrialized countries have meanwhile a breathing space to consolidate the gains of the past and to put the future on a sounder footing.

But, conversely, the slackening of the oil markets may work against their doing so. Adequate progress towards the Community's long-term energy objectives could not be taken for granted even before the new oil market situation developed. Falling oil prices and changing perceptions about their future evolution will make the realization of those objectives even more difficult.

5. The risks are of two kinds. The first is that governments will put energy policy on a back-burner as the other and more immediately pressing issues of employment and inflation continue to dominate the political debate. The

second is that consumers and investors in both the public and private sectors will see little market incentive to sustain the pace of restructuring when investments outside the energy sector begin to show substantially quicker returns as the relative price of energy falls.

Building a bridge to the future

6. The problem is where to strike the right balance in trading off the short- against the longer-term. The Commission certainly does not want to risk nipping the economic upturn in the bud by unnecessary burdens on economic operators and consumers. Neither do we wish to see the energy sector preempt unduly the investment resources which will be needed also to transform the outlook for some of those new industries on which the future industrial health of the Community will also depend. Nor would we wish to see energy developed just for its own sake. Energy is only one factor of production which, in combination with others, ensures the production of goods and services.

7. But energy is so fundamental to the successful pursuit of the Community's general economic aims that it should have special and priority treatment. If the main objective of energy policy is to prevent a rationing in the growth of goods and services in the years to come, energy investment should be made a major beneficiary rather than a potential casualty of falling oil prices.

By using in the energy sector some of the resources freed by falling oil prices, the risk of a longer-term energy constraint on growth can be reduced.

The optimization of resource use

8. A priority role for energy can be justified only if the additional effort is achieved at least cost and at greatest benefit. Resource use in its widest sense must therefore be optimized. This cannot be achieved at national level.

9. The waste and the rigidities created by uncoordinated and duplicated action in the energy sector are visible throughout the Community. In the electricity sector, for example, there is excessive and underutilized supply capacity in some Community countries while the intercon-

nection system is in places quite inadequate; in the field of solid fuels, stocks have been rising to record levels in the producing countries, reducing the finance available for the investment required to make the Community industry more competitive against imports from outside; and in both primary energy supplies and energy-using equipment the internal market of the Community has hardly been exploited at all. Energy policies have certainly brought their rewards, but they have been far more costly to Member States than they need have been.

10. This situation must now change. The Community cannot continue wasting resources in this way. Better coordination of action at Community level would provide the basis for optimizing the use of physical and financial resources, reducing waste and increasing the flexibility of the energy supply system to everybody's benefit.

Coherence and continuity

11. Optimization cannot be taken for granted, however, as long as Community action is undertaken only in an *ad hoc* and piecemeal fashion. Effective Community action can be assured only through programmes which, where they involve budgetary expenditure, have a minimum level of credibility in terms of the financial resources allotted to them and a framework of continuity over a number of years.

This has not been the case up to now. Community expenditure programmes in the energy field have been restricted largely to technological development which, though of critical importance, is only one element in energy policy. Even some of those programmes, and notably in the demonstration field, have been financed of late on a hand-to-mouth basis.

The result is that many of the gains of Community action have been severely jeopardized.

The same mistakes must not be repeated. Capitalizing on the Community dimension requires setting a stable medium-term framework for a more comprehensive range of activities than in the past.

Guidelines for the programme

12. Four guidelines should be applied in the development of such a programme.

13. The *first* is that specific proposals for expenditure made within it should reflect the results of an assessment of programmes and actions in the fields in question within Member States themselves. The objectives of Community programmes must be to reduce waste and duplication and not risk adding to it, though the existence of high levels of expenditure in some Community countries is not in itself an argument against action at Community level.

National expenditures in the different energy sectors vary a great deal, even taking account of size and geographical factors (Annex 1). The variation in expenditure levels *per capita* and in relation to oil consumption is one further, if imperfect, piece of evidence that equivalence of effort in the pursuit of those objectives is still wanting. Provided that it is accompanied by renewed efforts at national level by those Member States whose vulnerability is the greatest, a medium-term programme of action at Community level would help to encourage greater equivalence of effort, enabling Member States where substantial energy programmes are already in force actually to replace some of their national expenditures with Community finance.

Successful assessment of programmes in Member States requires, however, effective arrangements for a pooling of information about national action at Community level, so that the Commission can perform its monitoring responsibilities with the greatest confidence. Member States have agreed on common objectives for the longer-term. It is only logical that they should facilitate the proper assessment of the adequacy of the instruments which they apply to their pursuit.

14. The *second* guideline is that the Community should not attempt to be a substitute for economic operators themselves. Community action should be directed as a rule at establishing a framework which encourages operators to take the correct long-term decisions in terms of energy supply and use. In many cases that objective can best be achieved by the further development and application of a rational approach to energy pricing, and this must continue to be a fundamental element in Community policy.

But there are cases where pricing policy in itself will clearly be insufficient, particularly at a time of continuing economic difficulty. The pro-

gramme of expenditure should be directed essentially towards them.

15. *Thirdly*, there is no reason why a programme of this kind should be of indefinite duration rolling over from one five-year period to the next; nor of gradually increasing scale or coverage. Quite the contrary. The Commission is proposing a programme intended to build a sound bridge to the medium-term and to avoid the risk of a new energy constraint later in the decade. A successful programme of activities, with expenditure tapering off in real terms towards the end of the five-year period 1984-88, should place the Community in a new situation five years hence where a continued effort through this mechanism may no longer be required.

16. *Fourthly*, while the programme should provide a framework for continuity, it too must avoid rigidity. The Commission intends that there should be regular reviews of progress to decide on the pattern of activities within and between energy sectors and the level of budgetary allocation needed in the later years of the programme. The first of these should take place two years after the programme begins.

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17. The Commission's proposal reflects its desire to see a both more coherent and more professional approach to energy policy at Community level. It means a qualitative change of approach. Without a bold advance of this kind energy policy at Community level will be out of step with the underlying requirements for action.

The content of the programme

18. The medium-term programme will not be based simply on new action. It will be a mixture of measures already approved at Community level, amplified where necessary; measures already proposed and under discussion; and entirely new actions.

The following paragraphs briefly summarize the Commission's suggestions as to the programme's content, under three headings: more rational energy use, prospection, and more balanced development of supplies.

More rational energy use

19. The period following the second oil shock has been marked by a significant improvement in rational energy use, both in the shift from oil to other fuels and in the efficiency of energy use. Some of this improvement reflects the immediate response to the 1979/80 price increases; some the lagged impact of investments made even earlier.

The easy improvements have now largely been made. The outlook for sustained progress in the coming years will depend heavily on the pace of further investment both in immediately applicable technologies and in the development and application of new and more efficient technologies. Such investments are of vital interest to the long-term energy security of the Community. But an acceleration of activity in this wide field would have a more immediate spin-off in terms of employment, economic growth and trade.

20. The scope for such investments is large but there are three main reasons why it may not be adequately exploited. The first is that in difficult economic conditions, where cash is short and profits low, investments in RUE will tend to be displaced by others yielding quicker and higher returns, a problem aggravated by falling oil prices. The second problem is insufficient development and use of new technologies. The third is the low rate of investment in the electricity sector which will reduce the headroom available for solid fuels and nuclear to replace oil and gas.

The Commission believes that Community action should be directed essentially at those three problem areas.

21. In the first (the financial constraints on investment) the Community role should be first of all to identify those investments that should be made in the Community interest but which will not go ahead without support; secondly to identify the most effective and least costly mode of intervention.

The Commission has already begun to perform this role. It made a detailed survey in February 1982 of the barriers to more rational energy use; it encouraged the adoption in July of a Recommendation by the Council to Member States on ways to accelerate the pace of investment; and it subsequently made a highly selective proposal for Community action in the form of interest-rate

subsidies on Community loans for investments in coal conversion, coal preparation, district heating and energy production from waste where there were evidently major problems. Discussions in the Council have demonstrated that the problem sectors are wider than the Commission judged initially. In particular, it is clear that the present approach could usefully be expanded to cover energy saving investment itself and may need further extension later to provide for direct grants as well as interest-reliefs. The Commission believes that the proposed medium-term programme could provide a clearer framework for the early adoption of this proposal, with its necessary changes.

22. As far as technology is concerned, matters are already further advanced. Research and development in this sector (and especially in the fields of energy saving and the use of solid fuels) is already an essential element in the Framework Programme for Science and Technology;¹ it will figure large in the 3rd Energy R & D Programme which the Commission is proposing separately; and it is a key element in the programme for Community demonstration projects which covers energy saving and technologies to increase the outlets for solid fuels in the longer-term (coal gasification and liquefaction), as well as geothermal energy, solar, hydropower and biomass.

Although R, D & D is an area where the importance of the Community dimension has been recognized for some time, in the demonstration field the Council has so far failed to agree on financing for the medium-term despite lengthy discussions since the Commission's proposals² were put forward early last autumn. As in the case of the proposal on interest-rate reliefs discussed above, the Commission considers that consideration by the Council of a pluriannual programme of energy and energy research as a whole should help to provide a better framework for early agreement on a credible level of medium-term financial commitment in the demonstration projects field.

23. Thirdly, the pluriannual programme should provide a framework for elaboration and adoption of measures (e.g. in the technological field) to

¹ Bull. EC 12-1982, point 2.1.173; Bull. EC 5-1983, points 1.3.1 to 1.3.6; OJ C 169, 29.6.1983.

² OJ C 285, 30.10.1982; Bull. EC 9-1982, point 2.1.91.

help expand the markets for solid fuels and nuclear power through greater penetration of electricity from those sources where it is economic and efficient to use it. As a corollary, rational energy use demands the greater integration of the electricity networks in the Community so as to profit from the existence of different patterns of supply and demand in Member States and to minimize the consequences of accidental disruption to supplies. The programme should include measures to that end.

Prospection

24. The Community is now consuming 3 million barrels per day (mbd) less oil than in 1973 and it is importing 5 mbd less, thanks largely to the development of the North Sea. But dependence on imported energy remains high and its economic burden (measured by the net cost of imports in relation to GDP) is the same now (3.8%) as it was in 1974.

It is in the interest of the whole Community to ensure an adequate level of effort in identifying resources at Community level which will help to reduce dependence in the longer-term on more vulnerable and less secure supplies from outside.

25. The companies must clearly be in the lead. They have the expertise and the physical and financial resources. But it is not clear that in the present market conditions they have the motivation to do all that is required.

26. Here too there are three roles for the Community.

The first is a role of analysis and monitoring. The Community's task must be to examine the adequacy of effort and to draw attention to those areas where more should be done.

The second must be to ensure that the gaps are filled in the most economic and effective way. The third is to ensure that the companies have the technology they need.

27. In the hydrocarbons field, exploration by the private sector continues, but is almost wholly confined to areas of established potential such as particular North Sea basins. Because of the current oil market surplus and weakening oil

prices the private sector is not giving priority to investigating new areas of possible future potential within the Community. In the current market climate, they are unwilling and in some cases unable to spend money on higher risk exploration projects; and fiscal changes by Member States would be unlikely of themselves to rectify this. It is however important for the Community's long-term supplies that such areas should be evaluated.

The Commission therefore proposes that a new Community hydrocarbon prospection activity covering both oil and gas (including deep gas) should be included in the pluriannual programme. This would provide both for seismic surveys and for drilling to obtain geological data on a new areas and to identify the presence of hydrocarbon-bearing strata. Its cost, even at its peak, would be modest compared with total oil industry exploration activity in Western Europe (about 7 000 million ECU in 1980).

The Community has been running a programme of assistance to the development of hydrocarbon technology since 1973. The latter has already proved to be of particular value in assisting the exploitation of Community oil and gas reserves in Continental Shelf areas and should clearly continue. New technologies will need to be developed in line with the trend towards smaller discoveries in deeper and hostile waters. Many of the projects financed have been commercially successful and led to substantial reimbursements of Community funds. But there is an increasing number of projects which cannot be assisted or are having to be delayed because of inadequate funds available. The Commission's proposed budget for 1984 therefore includes an expanded allocation of 40 million ECU for this programme.

28. Uranium prospection is another important field where intensified action at Community level could bring large rewards.

Nuclear power will account for over 35% of the Community's electricity supplies by 1990 and that share is likely to grow further. Yet the Community is dependent on the outside world for 80% of its uranium supplies.

The uranium market has shown itself to be highly volatile in the past. At present there is an excess of production capacity world-wide. But this could change quite rapidly as a result of economic factors (closure of high-cost mines) or political factors (notably a change of government in a

major producing country). Community resources must therefore be kept under permanent scrutiny and, when and where justified, developed by *prospecting* efforts. The Commission will therefore continue its review of Member States' proven reserves and estimated resources and extend this action towards more specific targets, making recommendations in addition and as guidance to its direct financial support for specific uranium prospecting campaigns.

At the same time action must be taken to increase the level of exploration activity itself which has fallen to low levels during the last few years. The Commission is proposing 10 million ECU in the 1984 budget to investigate areas already identified as having potential, as a trigger to foster other national and private efforts.

29. The Commission is also considering the possible role for the Community in furthering both hydrocarbon and uranium exploration in areas outside the Community itself, and particularly developing countries. This would have the aim of diversifying the Community's future supply sources and reducing the potential for cartel action by external suppliers.

More balanced development of supplies

30. Action here has to be directed at solid fuels and nuclear as the main alternatives to oil in the medium-term; at gas, where particular questions of flexibility and security arise; and at alternative energy resources as a major contributor to Community supplies in the longer-term.

31. In the field of solid fuels, the present situation is wasteful and incoherent. The penetration by solid fuels has been much weaker than expected in the past, most notably in the industrial sector. Stocks of coal in the coal-producing countries are at record levels (+ / - 60 million tonnes) aggravating the difficult financial circumstances of the industry. At the same time, Member States are importing 70 million tonnes from outside the Community.

32. The right Community approach is outlined in the Commission's separate communication containing proposals for a balanced policy for

solid fuels.¹ Essentially, Community action should be focused on four main areas:

(i) improving technology, especially in developing new, more efficient and cleaner ways of burning solid fuels; in the conversion of solid fuels (gasification and liquefaction) so as to widen the potential market in the longer-term; as well as continuing efforts to improve production technology. Research and development in this sector is an important element in the 3rd Energy R & D Programme; and coal gasification and liquefaction is part of the programme for Community demonstration projects;

(ii) action to deal with environmental problems, notably those arising from solid fuel combustion, which are of a transnational as well as national nature. Specific proposals have recently been submitted to the Council;²

(iii) rationalizing the pattern of supply and demand within the Community by action to encourage the commercialization of stocks and to develop intra-Community trade;

(iv) increasing the economic security of the Community by measures to reduce the costs of Community production and encourage the development of a healthy and more vigorous Community industry. This in itself should help to change attitudes towards the use of coal and other solid fuels.

33. In the nuclear field, there are large expenditures which can only be organized and managed by the operators themselves. But the Community has a role to play in helping to ensure the availability of technology and in addressing some of the major public concerns about this source of energy, notably on the safety side and in the field of nuclear waste.

The Commission believes that pilot schemes should now be undertaken at Community level on storage of radioactive wastes.

This is a good example of a case where expenditure on projects within particular Member States, not likely to be justified by national considerations alone, would provide vital experience and information for the long-term needs of other countries and for the Community as a

¹ Bull. EC 6-1983, points 1.2.16 and 1.2.17.

² OJ C 139, 27.5.1983; Bull. EC 4-1983, point 2.1.85.

whole. In doing so, it will help to clear the way for the increased use of nuclear power.

Similar considerations apply to further efforts in the field of nuclear safety, where Community action is already important, covering such areas as the safety of proven and advanced reactors (fast breeders), health protection, R & D nuclear waste management and storage, and nuclear safeguards.

A further element in Community activity should be some pooling of resources on projects to investigate the problems associated with the decommissioning of nuclear plant. The field of decommissioning is of relevance to the whole Community and not just to Member States with nuclear programmes, because of its implications for electricity tariffs.

34. As far as gas is concerned the role for the Community is to develop a more flexible supply system. Greater flexibility within and between Member States would provide both long-term benefits in reducing the overall cost of deliveries to the consumer and greater protection against disruption. Increased flexibility requires action to encourage greater integration of the delivery systems and stand-by supplies in the form of stocks or surplus production capacity.

The importance of such measures has already been demonstrated in the discussions within the Community about the security of gas supplies (these are summarized in the separate Communication on Community Energy Strategy).¹

This is not at present an area of expenditure in which the Community budget is involved, apart from assistance to some gas storage projects in the UK under line 707 of the 1983 budget (though the Community's loan instruments have of course been heavily involved in financing improvements in infrastructure in the energy sector). But it is one where action coordinated and assisted at Community level through judicious use of budgetary expenditure could bring benefit to the whole of the Community while saving costs incurred by Member States in financing less effective and partial national solutions. The Commission therefore proposes that the pluriannual programme should include measures to promote the greater integration of the Community's gas systems. The Commission is also considering the case for providing assistance for the creation of strategic natural gas stocks which could be used for the benefit of several countries, through a more

flexible and interconnected supply system, but which would not be financially justifiable in the case of a particular Member State looking at national needs alone. Similar considerations may apply to the creation of strategic oil stocks.

35. In the field of *alternative energy resources* the primary Community role is in the fields of R, D & D. But assistance to the financing of investment in large projects involving the application of new technologies in this sector within the Community could be considered where there is a risk that development may be held back by the heavy investment costs in early years and the fact that the economic return would be spread over a very long period of time. One case in point might be tidal energy.

Costs of the programme

36. Taking account of the new activities put forward in the previous section, and possible later proposals, it is likely that the programme would require an expenditure of 1.5-2 000 million ECU a year at its peak in 1986 or 1987, with the higher figure being more likely. The Commission's proposed Chapter 70 energy budget for 1984 of 769 million ECU, together with the proposed energy research budget (excluding fusion) of 177 million ECU, is designed to be a realistic step forward for the first year of the pluriannual programme. A programme on this scale, as already pointed out would help to reduce expenditure by national governments where the activities concerned could be more efficiently carried out at Community level. It would also help to achieve a better overall balance of receipts from the Community budget.

Financing

37. The Commission considers that the achievement of the Community's energy aims requires the introduction of the programme described above. It has examined how such a programme could be financed, taking into account its special characteristics and the difficulties which could

¹ Bull. EC 6-1983, points 1.2.1 to 1.2.4.

arise through recourse to the normal budgetary resources. Given the limited duration of the programme and other possible demands on own resources an alternative – and one which specifically reinforces the Community's policy – would be a tax on energy consumption.

The Commission indicated in paragraph 15 of its proposals on future financing¹ that it was considering the idea of introducing such a tax into the own resources system. Whilst at this stage not wishing to put forward formal proposals to this end, the Commission thinks it appropriate to set out for consideration the outlines of such a tax.

A tax on energy consumption

38. The fundamental objectives of the programme outlined above are improvements in our use of energy and greater security of energy supply. As the achievement of these objectives will benefit all energy consumers, the Commission thinks it appropriate that, if the programme were to be financed by a tax, it should be as broadly based as possible, falling on all energy sources. In addition, in order to reinforce the energy policy objectives, such a tax should ideally fall on all energy consumers (but see the following paragraphs). The Commission would also envisage that the revenue accruing from an energy tax would be hypothecated to the programme, and that its rate would be a function of the expenditures agreed each year by the budgetary authority.

39. Annex 2 attached sets out the estimated value of consumption of the major energy sources – about 230 000 million ECU per year. Clearly, the overall incidence of a tax yielding revenue of between 1.5 and 2 000 million ECU per year on this level of consumption would be very low – well under 1%.

The low incidence of the tax would impose an important constraint on the tax mechanism. If collection costs were to be kept in proportion to the modest revenue targets, the tax should be kept as simple as possible, with the minimum of collection points. The ECSC levy system, applied to less than 500 levy-payers, and which has operated with a minimum of difficulty and cost for 30 years, offers a model of what is possible in this direction. Such a model would imply an energy tax levied on production and on imports.

40. In the interests of simplicity of application, minor energy sources, such as wood, peat, and solar energy would not fall within the scope of the tax, and its coverage would be confined to oil products used as fuels, hard coal and lignite, gas and electricity. Similarly, as electricity is predominantly a secondary energy source, and in order to avoid double taxation, energy sources supplied for the generation of electricity would be exempt from the tax. It is anticipated that exemption for energy sources supplied for electricity generation and for oil products used for non-energy purposes (e.g. naphta, lubricants) could be readily accorded at the point of production, without complicating the tax system.

41. There is, however, a consideration of some importance which seems likely to conflict with the objective of a simple tax. The Commission is conscious of the possible effects of such a tax on the competitiveness of Community industry, particularly in the absence of comparable tax measures amongst our major trading partners. The possible adverse effects should not be overstated. In certain sectors which are particularly heavy consumers of energy (e.g. steel, non-ferrous metals, chemicals) energy costs may in some cases exceed 10% of total costs; but for industry as a whole, energy costs tend to fall between 3-5% of total costs. The impact of a tax of 1% on (say) 5% of total costs is clearly marginal. It could even be argued that, to the limited extent that such a tax did make an adverse impact on industrial costs, it would offer a certain incentive to our industry, over time, to use energy relatively more efficiently than our competitors.

42. Nevertheless, the Commission acknowledges a conflict of objectives between, on the one hand, incentives to more efficient energy use and, in particular, simple and low-cost collection of the tax, and, on the other hand, possible adverse effects on the competitiveness of Community industry and on some sectors in particular.

43. All these considerations are valid, and the Commission feels that it would be unwise to discard from the outset any one in favour or the others. Were it possibly readily to reconcile certain of them – for example to establish a simple

¹ OJ C 145, 3.6.1983; Bull. EC 5-1983, points 1.1.1 to 1.1.6.

tax whilst exempting industrial use – this would be the Commission's preferred solution.

Unfortunately, examination of the possibilities has not so far established any easy means for exempting industrial consumption of energy. Any system dividing consumption into industrial and non-industrial categories, if simple, would be arbitrary, and if equitable, would almost certainly prove complex and difficult to administer.

44. As an alternative, the Commission has considered using the Member States' VAT systems as a means of repaying to VAT tax-payers the energy tax charged to them by producers. One drawback to such a system is that it would extend exemption from the energy tax considerably beyond industrial users – to for example, services and the professions, with a consequential increase in the tax rate (see Annex 3). This effect could of course be limited by refusing the right to claim energy tax against VAT to such categories of VAT taxpayers.

However, such a system would itself be more or less arbitrary. In any case, although the VAT machinery is already to hand, its adaptation to the refunding of energy tax would entail certain costs, both for the national tax administrations and for VAT taxpayers.

Considerable progress has been made in diversifying the Community's energy supplies and in rationalizing energy use. But it would be wrong to suppose that the Community has freed itself from the energy constraint and that the risk of further oil shocks has been averted, with all the damage they would bring to the pursuit of the Community's general economic objectives (growth, employment and balance-of-payments).

The present situation – which is in part at least the result of the efforts of the past – gives us a breathing space in which to consolidate the gains of the past and to protect ourselves for the future. The sensible way to exploit that breathing space is to ensure that energy is a prime beneficiary of the resources freed by the fall in crude oil prices. But an increased effort in the energy sector should be encouraged in such a way as to optimize its results.

A greater role for the Community action would bring this about, enabling an equitable distribution over time between consumer and producers of different energy sources in the Community of the economic rent that has been released by the

fall in oil prices. But this will demand inevitably greater solidarity than in the past.

The proposed programme is focused on areas where the benefits of a transfer of action to the Community are the clearest in present circumstances. But inherent in it is the notion of a *flexible response* to inevitably changing circumstances.

The pluriannual programme has specific aims justifying sizeable expenditure for a limited period of time, with the profile of expenditure rising to a peak and then falling away.

This gives the programme characteristics which have led the Commission to envisage a means of financing that would avoid the difficulties that might be created by recourse to the normal budgetary resources. Those characteristics suggest a means of financing that is flexible but assured for the period in question, such as a special hypothecated tax based on non-industrial energy consumption.

The Commission agrees with the European Parliament in its Resolution¹ of 18 May on the future development of the Community and its financing, that such a tax should not be regarded as a budgetary policy measure. The Commission recognizes that such a tax would constitute an exception to the budgetary principles of the EEC.

The exemption of industrial consumption from a tax of this kind would be possible by recourse to Member States' VAT systems for repayments. But it would be complicated. The simpler alternative of a levy on energy consumption would mean extending the tax-base to industrial consumption, with possible implications for the competitiveness of European industry which need careful consideration.

The concept and method of appropriation of such a receipt would therefore constitute an important innovation in relation to the budgetary techniques at present in force in the Community. The Commission considers that it is important above all to propose the introduction of the pluriannual energy programme. These reasons lead the Commission not to present a formal proposal on the modalities of financing the programme and to continue its work on the concept and mechanics of a tax. The Commission will make appropriate contacts to that end.

¹ OJ C 161, 20.6.1983; Bull. EC 5-1983, point 2.4.11.

National governments' expenditure on energy (25 May 1983)

(million ECU)¹

	B	DK	D	GR	F	IRL	IT	L	NL	UK	EUR-8
1982 :											
Oil	3.6	8.0	77.7			14.4	53.4		1.1	38.9	399.1
Natural gas			32.7		56.4	63.2	49.7				
Solid fuels	192.7	2.0	754.8 ²		934.0	21.0			27.1	718.4 ²	2 650.0
Nuclear	57.6	0.7	732.3		865.5		559.3		35.5	629.8	2 880.7
Electricity, district heating & other	6.2		69.6			..			13.1		88.9
Conservation	56.4	98.0	194.3	17.9 ³	168.2	1.8	430.1	0.01 ³	25.0	256.5	1 230.3
Renewables	7.1	17.0	208.7		62.0	0.4			19.8	42.5	357.5
among which: R & D	52.3 ⁴	30.4 ⁴	1 264.9 ⁴	..	579.5 ⁴	4.0 ⁴	414.6 ⁴	..	60.9 ⁴	392.5 ⁴	2 799.1
Total	323.6	125.7 ⁵	2 070.1		2 086.1 ⁶	100.8 ⁷	1 092.5 ⁶		121.6	1 686.1	7 606.5
id. per toe consumed	7.82	7.48	8.46		12.03	12.71	8.65		2.18	8.99	8.91
per capita	32.8	24.5	33.6		38.6	29.8	19.1		8.6	30.1	29.1
1983 :											
Oil	5.9	0.6	61.0		-	-	-		1.0	27.9	294.0
Natural gas			52.2			31.8	113.6				
Solid fuels	192.7	2.0	(750.0)		1 000.0	53.6			31.1	(700.0)	2 729.4
Nuclear	43.0	0.5	653.1		950.9		416.4		30.8	617.7	2 712.4
Electricity & other	12.8		95.8			..			12.4		121.0
Conservation	126.2	54.0	296.1		174.7	1.0	673.8		23.2	166.3	1 515.3
Renewables	10.9	29.0	222.1			0.4			19.7	27.9	310.0
among which: R & D	89.6										
Total	391.5	86.1 ⁵	2 130.3		2 125.6 ⁶	86.8 ⁷	1 203.8 ⁶		118.2	1 539.8	7 682.1
id. per toe consumed	9.40	5.10	8.7		12.2	10.8	9.5		2.1	8.2	8.9
per capita	39.7	16.8	34.5		39.4	25.2	21.0		8.3	27.5	29.4

Sources: national data, if not otherwise stated.

¹ National currencies converted at January exchange rates.² Memorandum on financial support ... the coal industry in 1982 (COM (82) 817 final).³ Dir. XVII-E: 'National demonstration schemes 1982'.⁴ Statistics published by 'CREST'.⁵ Without investment in exploration and development by concessionaires (1982: 1 853 million ECU; 1983: 1 739 million ECU).⁶ Without 'dotazione' ENEL (1982: 2 475 million ECU; 1983: 2 154 million ECU).⁷ Without investment in the electricity sector (1982: 332 million ECU; 1983: 355 million ECU).⁸ Without investment in the nuclear sector (1982: 3 285 million ECU; 1983: 3 426 million ECU).

Annex 2

Energy consumption (Prices at 1 January 1982)

(Consumption data 1981)

Product	Total value ¹ of consumption (ex tax) '000 million ECU (A)	Value of household consumption (ex tax) '000 million ECU (B)	Value of industrial consumption (ex tax) '000 million ECU (C)	B/A	C/A
1. Gas	40.3	18.2	16.3	45.2%	40.4%
2. Electricity	80.7	27.7	32.2	34.3%	39.9%
3. Coal	11.4	3.9	6.3	34.2%	55.3%
4. Oil	97.3	45.8	27.0	47.1%	27.7%
Total (1 + 2 + 3 + 4)	229.7	95.6	81.8	41.6%	35.6%

¹ Deliveries into consumption for all industrial and non-industrial uses. Non-energy uses are also included except for oil. All deliveries of fuels for transformation into other fuels are excluded.

Annex 3

Incidence of energy consumption tax

	Tax base ³		Assumed tax revenue '000 million ECU	Tax ⁴ incidence
	%	'000 million ECU		
All consumption ¹ of coal, gas, electricity and oil products ²	100	230	1.5	0.65
Industrial consumption exempt	64	147	1.5	1.02
All VAT taxpayers exempt	42	96	1.5	1.56

¹ All deliveries of fuels for transformation into other fuels are excluded.

² Oil products used for non-energy purposes are excluded.

³ Based on prices at 1.1.1982 and on consumption data for 1981.

⁴ On value exclusive of national taxes.

Esprit

First European Strategic Programme for Research and Development in Information Technologies

*Commission communication
transmitted to the Council on 25 May 1983*

Introduction

Eight out of 10 personal computers sold in Europe are imported from the USA: nine out of 10 videotape recorders sold in Europe come from Japan.

European-based integrated circuit manufacturers supply 30% of their own home market and represent 13% of world production, half of which is manufactured in the USA by subsidiaries of European companies.

Large mainframe computer manufacturers in Europe have, without exception, entered agreements with overseas companies in order to benefit from their technological advance.

In the field of electronic data processing, office and factory automation, process control and telecommunications,¹ compared to the limited number of 'niches' in which Europe is performing fairly well, the list of areas in which Europe is struggling to catch up is lengthy.

Since the post war reconstruction period Europe has lagged behind in the industrial application of many high technologies and notably electronics.

Because of the increasing direct or indirect influence of electronics in practically all aspects of industrial life in the western world, what was in the past just technological dependence in a few specialized areas is now threatening to become industrial and economic dependence plain and simple.

In these conditions the identity of Europe and eventually its political independence will be seriously at stake.

At a time when, on the one hand US and Japan are taking new initiatives and increasing their investments² to improve their technological, industrial and commercial predominance, and on the other hand the emerging economies, in Asia and the Americas, are taking over more and more of the traditional manufacturing activities, Europe cannot afford to remain an observer.

The effects of the electronic revolution, that is now taking place, will impact directly on Europe's social and economic structure regardless of whether it has an active or passive role in it.

Changes offer new possibilities, but bring about alterations that are not always without problems:

only those who can control the determining factors of the changes can hope to minimize the problems.

Europe must therefore assume a positive role to be master of its future.

Being first in the line of fire, industry has been aware of this for some time and has tried, often assisted by its respective governments, to remedy the situation.

Measures taken so far, however, have not been sufficient to reverse the trend, and by and large have only managed to slow down the deteriorating process. The situation threatens now to get dramatically worse: our balance of payments in IT products and services, still positive in 1975, suffered a substantial deficit of USD 5 000 million in 1981 and this is believed to have doubled for 1982.

Representatives of the largest European companies active in the information technology field took the initiative in approaching the Commission in order to try to find a solution of a scale matching the problem.

In early 1983 they jointly wrote to Vice-President Davignon depicting the situation as follows:

'The figures of market share, i.e. European industry commanding only 10% of the world market and less than 40% of its own indigeneous market, make stark reading. Not only is the situation in itself of great concern but the low market share means that the volume of sales and profit is inadequate to provide the essential investment needed to safeguard the future. Even worse, all the indications are that the situation is deteriorating rather than improving.

¹ These are the sectors broadly encompassed by the term 'Information Technology'.

² e.g. the Japanese Government is investing USD 500 million on the Fifth Generation Computer Programme; in the USA the largest computer and semiconductor manufacturers are organizing themselves to conduct R & D programmes in joint ventures, for example the Semiconductor Research Cooperative (SRC) and the Computer Aided Manufacturing International (CAMI). These actions are being favoured by the US administration's Economic Recovery Tax Act signed by President Reagan in August 1981, that includes R & D tax credits, accelerated depreciation schedules and other incentives which are expected to stimulate an additional USD 3 000 million in corporate R & D over the next five years.

The situation is not a new one but has been developing over a period of years and many attempts have been made to reverse the trend. These include such things as acquisition of foreign technology and joint business ventures with Japanese and American firms. Whilst these may hold short-term benefits for those involved, they cannot be considered as providing a long-term answer.

In any case their contribution to the European economy as a whole has been slight; in some cases the effect may have been adverse. Some of the nations, recognizing the dangers, have instituted, (or are instituting), their own national programmes – so far the impact has not been great but it is growing. The situation has, however, reached such a state that even programmes on the scale of those now being considered in some of the larger Member States are unlikely in themselves to solve unaided the problem in Europe'.

Confronted with such a situation the companies see merging of efforts at Community level as a fundamental element of any remedial action: 'unless a cooperative industrial programme of a sufficient magnitude can be mounted, most if not all of the current IT industry could disappear in a few years time'.

The Commission shares this view and has formulated a proposal for the promotion of a concrete programme of action.

Long lead-time R & D at precompetitive level, sufficiently upstream of the product development phase, would appear a suitable domain for such cooperative action, and one which could be started without delay.

Further measures would obviously need to be taken to complement this effort and ensure the best conditions for the timely and effective industrial exploitation of the results of R & D in the Community. The aim of such complementary actions would include stimulating the creation of sufficiently large leading edge markets, encouraging investments, promoting the establishment of adequate infrastructure and services, for example in telecommunication.

This will be the subject of further analysis and may lead to new proposals.

The strategic objective of the current action was agreed with industry and Member States to be: 'the achievement of technological parity with, if not superiority over, world competitors within 10 years'.

Consultation with industry and academia has enabled the Commission to identify the technical objectives, define the methods for carrying out the programme and estimate the resources required.

The financial resources that, according to the estimates, would have to be mobilized for a first phase of five years are some 1 500 million ECU of which the Community would have to provide 50% i.e. 750 million ECU.

To sustain the development of the technologies on which most of the European high-added-value transformation economy is going to depend for its efficiency, the proposed Community intervention may appear almost negligible given an overall industrial research and development expenditure in the sector in Europe of some USD 5 000 million per year and given the fact that the largest American companies active in the field invest every year, individually, some USD 2 000 million.

If Community intervention is focused on promoting work of very advanced nature, however, and if a carefully selective approach is taken, the Commission believes that it will be adequate to stimulate strategic thinking, a growth of self-confidence and the joint efforts that are required to provide the European information technology industry with the basis for regeneration.

The Commission is now therefore proposing to launch the first five year phase of the 10-year R & D programme called Esprit: the European Strategic Programme for Research and Development in Information Technologies.

The programme includes the coordination of R & D activities in IT in the Member States and direct financial contribution to cooperative R & D projects to be executed within the Community.

To this end the Commission submitted a draft Council decision with the Communication, specifying the duration, the character and the main modalities of execution of the programme.

Explanatory memorandum

Purpose of the present communication

1. In 1982 three communications were sent to the Council which:

(i) analysed the importance of information technology (IT) and introduced Esprit;¹

(ii) outlined the concept of a pilot phase for Esprit and provided the main lines of an overall programme;²

(iii) provided a basis for a Decision on 16 pilot projects.³

2. A decision was adopted by the Council on 21 December 1982 to fund the pilot phase to a level of 11.5 million ECU, representing 50% of the first year costs.

3. The purpose of the present document is to provide the basis for a Council Decision on the overall Esprit programme. This is designed to be an essential element in the industrial strategy proposed by the Commission³ and is in line with the overall scientific and technical strategy proposed by the Commission in its communication on a framework programme.⁴

Background

4. Technological advance represents an essential ingredient of development particularly for those nations which, like ours, rely essentially on a transformation economy and depend on external sources for the bulk of their raw materials and energy.

5. The new technologies of information (IT) will be one of the dominant sources of technological advance for the rest of the century.

They hold the promise of providing the answer to many pressing problems of today; they will create new products, processes and services and thereby new export opportunities and employment.

IT industry

6. IT is already a major industry in its own right, comparable in size⁵ and value added to the automobile and steel industries. As a manufacturing sector the IT industry has been one of the fastest growing industries world-wide in the last decade, a decade which has seen general recession otherwise.

Growth is expected to continue at about 8%-10% overall until 1990 by which date, with an overall turnover of some USD 500 000 million (at 1980 prices), IT will be one of the world's largest manufacturing sectors.

7. Occupations concerned with information⁶ are becoming the single most important part of employment. The US Bureau of Statistics estimated that in 1980 nearly 50% of the employed civilian workforce were in 'Information', and European figures are similar. IT manufacturing alone employs 5% of the total Community workforce i.e. about 5 million persons.

8. The whole economy is significantly affected in its performance by IT although not always directly: altogether nearly two thirds of Community GNP is in one way or another influenced by IT. Less immediately influenced sectors like agriculture can also greatly benefit from IT, for example, from satellite observation followed by computer analysis for agriculture production monitoring and computation of optimal crop conditions. By the end of the century there will be no significant aspect of the economy that will not be affected by IT.

9. Telecommunications, office automation and factory automation play a key role since they provide crucial infrastructures for the whole economy.

¹ Bull. EC 5-1982, point 2.1.152.

² Bull. EC 7/8-1982, point 2.1.183.

³ Supplement 4/81 - Bull. EC; Bull. EC 6-1982, point 2.1.5.

⁴ Bull. EC 12-1982, point 2.1.173.

⁵ USD 237 billion 1980 annual sales world-wide.

⁶ This includes activities like TV broadcasting and the press that, although not encompassed by the term 'information technology', are heavily dependent on it.

The performance of the Community

10. The Community has not managed to keep pace with developments over the last ten years. Community based industry does not even cover one half of its domestic market that is today 34 % of the world market. In 1975 the Community still had a trade surplus in IT products. By 1980 the trade deficit had reached USD 5 000 million, and according to certain sources, the USD 10 000 million mark was passed in 1982.

11. The problem of the trade deficit is compounded by the fact that Community imports are primarily high technology products – such as central processing units and computer memories – from the United States and Japan, while its exports are the more mature, older technology products that formed its past strength but are now only of interest as a replacement market and for the less developed countries.

Remedies

12. To improve this situation an increased effort in research and development must be the centre-piece of a policy to strengthen Community industry in the mid- to long-term.

European companies, in some cases stimulated and assisted by government actions, have taken up the challenge posed by the subject and by the increasing strength shown by US and Japanese firms. There is however evidence that the scale of resources committed in Community countries to R & D is too small to be effective individually and often not adequately focused towards internationally competitive innovation.

13. In its analysis of the shortcomings of Europe's research potential,¹ the Commission identified, amongst other things: insufficient multi-disciplinary research; large gaps in the research continuum between universities on the one hand regarding work as too applied and industry on the other hand regarding it as too basic; a mismatch between scientific 'supply' (research labs), scientific and technical demand (particularly that arising from industry).

A sufficiently ambitious 'industry driven' long-term R & D work programme, involving univer-

sities and users will have the ability to fill these gaps.

14. The main drive for such a large scale programme has come from industry. Facing the formidable competition of Japan and the USA, Community industry has acknowledged that, in order to reverse the trend of increasing reliance on importing technology, only joint strategic long-term research planning and the concentration of resources through the definition and funding of technology goals of common interest on a Community scale, can have a good chance of redressing the situation gradually but in a lasting manner by:

(i) ensuring that research teams achieve the critical mass to obtain results;

(ii) enabling optimization of resources that will result in reducing duplication and widening the spectrum of research tackled;

(iii) reducing the timelag effect caused by reliance on imported technology.

(iv) paving the way to the definition and adoption of standards of European origin.

15. An R & D action of this character can furthermore be started immediately and will provide new technology that is vital for competitiveness. As it is kept at pre-competitive level, industry can furthermore collaborate without impeding its ability to compete for markets.

Esprit objectives and R & D domains

16. Extensive consultations carried out over more than one year based on the above concepts with the leading IT companies, SMEs, academia and Member States' administrations has resulted in the formulation of a long lead-time R & D programme called Esprit: European Strategic Programme for R & D in Information Technology. The objective: to provide European IT industry with the technology base it will need to become and stay competitive world-wide within the next 10 years.

¹ Bull. EC 12-1982, point 2.1.173.

17. The main criterion used in defining the R & D work was to be highly selective in order to enable the programme to focus on the key technological factors. This was necessary because IT is so R & D intensive and technology becomes so quickly obsolete that trying to cover the whole spectrum is simply not possible, given the relatively scarce human and financial resources that can be made available, without putting at risk the more pressing short term product development activities that are essential to maintain the present industrial and market presence.

18. The particular focus of the programme is a function of two conclusions drawn from the current trends in the development of IT: one is that more and more people will have to learn how to use this technology; the other is that the products of the technology will have to become easier to use and better integrated into the entire pattern of our daily lives.

19. This latter objective can only be achieved through major advances in hardware (components) and software technology and systems architecture (the combination of hardware and software into systems). This is why Esprit places particular emphasis on these three technologies that give the key to any application. In addition, the areas where IT will have the greatest impact on social and economic life will have to be the subject of intensive research activity and technology test-beds. The office and the factory are the two¹ proposed areas, chosen in the light of their growth potential, of their impact on other large industry sectors and of the width of the technology spectrum underpinning their development.

The heavily interrelated areas² that form the object of research and development under Esprit are therefore:

- (a) *Advanced microelectronics* that provides the physical structure for any information system.
- (b) *Software technology* that addresses the medium that controls the behaviour of any IT system.
- (c) *Advanced information processing* that addresses the optimization of functional behaviour through the architectural combination of hardware and software.
- (d) *Office systems* that can be viewed as an archetype of the whole service sector. Furthermore, they require a very wide spectrum of

technologies and represent possibly the best tested for the outcome of R & D in the three key technological areas above.

(e) *Computer integrated manufacturing* that has a major strategic importance for the whole of the hard-pressed manufacturing sector in the Community.³ In addition to this the nature of this application has many technological requirements that are complementary to those of office systems.

Esprit actions and resources

20. Mounting a 'technology push' across the Community capable of achieving technical parity with, if not superiority over, our main competitors within the next 10 years represents an ambitious objective that will require for its achievement a joint effort drawing on all in the Community who can make an effective contribution to the R & D and to its exploitation: large and small industrial firms, research institutions, universities and individuals.

Only in this way will it be possible to obtain a concentration of human and financial resources of a scale proportionate to the goals.

21. To this end Esprit is designed to be a programme through which:

(i) Funds will be made available to launch in the Community cooperative projects of precompetitive industrial R & D falling within agreed strategic technological lines.

(ii) Systematic consultation will be promoted between Member States administrations, academe-

¹ As noted in paragraph 9 telecommunications are equally fundamental to the development and application of Information Technology. The R & D domains that are proposed for Esprit must and do therefore cover all their main technological needs as well. The nature and organization of telecommunication services however make them a particular application case requiring separate analysis. This is currently in hand and the Commission will present specific proposals shortly.

² For the purpose of presentation and discussion it appears more practical to group the various activities identified into reasonably homogeneous sectors. It has to be stressed however that this division is incidental and not intrinsic to the nature of the work; it would be wrong, indeed disastrous, for the whole programme, to try and treat them as separate domains.

³ In particular the small batch manufacturers of discrete parts since 70% of goods manufactured in the Community are small series.

mic institutions, industry and the Community on the definition, appraisal and adjustment of R & D activities, with a view to achieving the best coordination of efforts and utilization of resources amongst all the actors in IT throughout the Community.

(iii) Infrastructural and organizational facilities will be available to ensure careful selection, effective execution, proper monitoring and management and adequate dissemination of results of the actions.

22. In order to create the conditions for the gradual and effective build up and development of these activities, the Esprit programme is designed to span a period of 10 years. The first five-year phase is now proposed. The main outlines of the R & D work, for this first phase in the areas indicated above, are given in the technical annex to the draft Council decision. In this framework a more specific programme of work, necessary for the day-to-day implementation of the programme, will be established, as a rule every year, and updated as required.

This structure of programme will guarantee long-term perspective to the larger projects, flexibility to the smaller, and the possibility whenever required of timely adjustments in the light of results and technology evolution.

23. To this end it will be necessary to establish a close consultation between the Commission and the Member States as well as continuous monitoring of the sector to provide early identification of technology objectives and trends; the organization of the administrative infrastructure to ensure the updating of the operational work programme and its matching to real needs; objective and accurate appraisal of work; contract administration; coordination of the various projects, and the dissemination of results.

24. These activities will be carried out by the Commission with the advice of the Management and Consultative Committee (MCC) established by Council decision and whose members will be nominated by the Commission in agreement with the Member States' governments. The composition and main tasks of such Management and Coordination Committee are spelt out in the draft Council decision establishing such Committees that is the subject of a recent proposal of the Commission.¹

25. The definition and verification of the strategic technical objectives will be based on industrial inputs taking into account wider national and Community interests and will be supported by systematic analysis of the sectors. As for the projects for which a financial contribution is to be provided industrial R & D is acknowledged to rest essentially on two broad classes of projects:²

(i) Projects that require large infrastructure and resources, both human and financial, as well as clear and constant strategic perspective to ensure continuity of actions and the breadth necessary to reap the long-term benefits. Such medium to long term 'system driven' R & D activities, that will be referred to in this document as type A projects, will represent the strategic backbone of Esprit. The share of the overall Esprit effort represented by this type of project will reflect the contribution of organizations involved in basic R & D in the information technologies in the Community.

(ii) Projects that rely mainly on flexible infrastructure and on individual thinking rather than on a system approach, and require relatively much smaller resources. Such activities, that will be referred to as type B projects, could range from very long term, very speculative R & D to relatively shorter term very specifically oriented R & D, and are expected to account for a significant share of the overall effort under Esprit.

Financial support

26. Given the different size and requirements of the projects involved, different considerations for their inclusion in the Esprit programme would appear to be required.

(a) For projects of strategic character (type A projects) the Commission proposes that the degree of financial contribution by the Community shall

¹ OJ C 113, 27.4.1983; Bull. EC 3-1983, point 2.1.167, COM 83 (143) of 16 March 1983, communication from the Commission to the Council on Structures and Procedures for Common Policy in the field of Science and Technology.

² The response to the call for proposals for the pilot phase with 195 proposals involving 638 submissioners, including very many small to medium IT companies as well as IT users, gave clear indications on the level of interest as well as on the size and quality of contributions that can be expected from industry, universities and other research institutions.

be 50% in form of a subsidy. The remaining 50% should normally be provided by the industry itself.¹

(b) The smaller projects (type B) raise different issues, but in principle the Commission considers that whereas the norm should also be a 50% contribution by the Community, certain exceptions should nevertheless be provided for. For example:

(i) Where a request for industrial support comes from SMEs, or others with very limited finance available, Community support beyond 50% may be considered. In such cases particular arrangements concerning the access to or the exploitation of the results are also envisaged.

(ii) Where a research proposal is submitted by academic institutions which fail to secure an industrial partner or sponsor, if the Commission is satisfied that the technical features of the work are so outstanding that it should be supported despite the lack of industrial support, the proposal can be initially funded up to the level of 100%. However in this case a phased approach would be envisaged by which the project could be launched with the understanding that industry would take over a reasonable part of the financing after the project has achieved agreed milestones proving the validity of the chosen approach.

Project selection

27. In order to be eligible for aid, projects will have to be proposed by undertakings, including small and medium sized enterprises, universities and other bodies established and, as a rule, currently carrying out R & D work in the Community and the projects will have to be carried out in the Community.

Proposals will be submitted to the Commission in reply to an open invitation published in the *Official Journal of the European Communities*.

28. The following main criteria would as a rule be applied to the evaluation of all projects:

- (i) technical soundness,
- (ii) industrial strategy contribution in the light of Esprit objectives,
- (iii) Community dimension,

(iv) technical and scientific, as well as managerial capability to carry out the proposed programme of work,

(v) measures envisaged and approach to accessibility and exploitation of results.

29. Furthermore:

(a) For larger projects (type A) the participation of at least two companies not effective subsidiaries of each other and not established in the same Member State will be a mandatory requisite of eligibility.

(b) For the smaller projects (type B) such multinational participation, although not mandatory, shall be considered a major factor of preference all other things being equal.

Programme management

30. The overall responsibility for the execution of the programme will rest with the Commission. Advice and consultation of the Member States will be provided by a Management and Consultative Committee (MCC) nominated by the Commission in agreement with the Member States' governments.

31. In parallel with this formal advisory structure, the Commission will establish consultations with industry and where appropriate with academic and research institutions. It will organize them in such a way that large and small IT firms as well as users and academic and research institutions will have the opportunity of expressing their views and suggestions to the Commission on all major matters related to the content, structure and execution of the programme.

To this end the Commission has the intention of setting up appropriate industrial as well as scientific advisory boards.

¹ The degree of financial participation by industry is considered to be a test of the degree to which industry believes in the need for the work and will be one of the evaluation criteria. Whenever therefore there are direct financial interventions from national authorities, given the variation from country to country in the ways in which governments support industry, the Commission will examine the situation on a case by case basis bearing in mind the general principle.

Dissemination of information, access to and exploitation of results

32. A primary justification for Esprit is in the synergetic effect that it will have through focusing a 'critical mass' of research efforts on selected key strategic technological objectives. To meet this requirement adequate dissemination of information on work that is being planned or under way as well as on its possible results and their exploitation is going to be of fundamental importance. This will take into account the different kinds of information, the various groups to be served and their vested interests.

33. Apart from technical solutions designed for the main participants in research (like workshops for particular research topics, secondment of researchers etc.), a wider clearing house infrastructure is going to be established by which systematic information on work in progress, and information on the results that will have to be notified by the contractors to the Commission, would be collected and made available to an appropriate extent, e.g. through special conferences or over the Information Exchange System that will be set up to serve the needs of all participants in Esprit.

34. As for access to and exploitation of results, the general guidelines are, in principle, the same that apply to other projects financed by the Community, i.e. that ownership and the right to exploit any information and industrial property rights resulting from the work under any contract (foreground information) will normally reside with the contractors.

35. A number of principles must furthermore be obeyed:

(i) For cooperation to be meaningful arrangements between contractors must ensure that each participant in the same project, for the whole duration of the project and for the purpose of fulfilling its share of the work, has guaranteed and privileged access to the results of the work done by the others.

(ii) For the expected overall synergetic effect to take place, access for a project team to foreground knowledge generated by another team working on a different project within the Esprit framework shall also be arranged under privileged

conditions in as far as such information enables better or quicker results to be obtained from the project which needs it.

(iii) To promote improved competitiveness in the Community, companies in the Community which did not participate in a specific project but which have the ability to use its results and wish to do so, should have the opportunity to acquire the rights. The terms should be negotiated on a commercial basis taking into account the contributions of the originating parties as well as those of the Community.

Overall resources

36. The size of the overall programme is the function of the strategic impact that this is designed to achieve.

Such an impact can be broadly measured in terms of market and actual current level of expenditure. The total amount of industrial investment in research and development on IT in the Community can be estimated at some 5 000 million ECU/year: of this a negligible fraction is spent in Europe on long term precompetitive R & D activities as compared with the 5 to 10% of our main competitors.

37. To be meaningful and to stimulate the new strategic thinking that must underly the definition and execution of the R & D programme, a Community intervention would have to stimulate a joint long-term effort in precompetitive R & D of the same order of magnitude (i.e. of at least 5 to 10% of the current overall industrial effort). The conclusions that were reached after consulting with industry, governments and academia, taking into account the physical limitation of a realistic and gradual build-up of capacity, indicated that an initial effort of precompetitive long term R & D reaching some 2 000 man-years/year from the third year onwards could confidently and effectively be aimed at. The following table illustrates how resources for activities started during the first phase will build up during the first five years (1984/88) and tail off during the subsequent years. When the second phase of the programme will be planned a similar pattern of distribution of resources is expected for years 1983/93 that will maintain at least for the first three to four years of

the second phase (or possibly slightly increase in real terms) the yearly deployment of resources.

38. The conversion of these figures into budget estimates, according to current industry practice, leads to an estimated overall investment for the first five-year phase of some 1 500 million ECU. This would broadly correspond to 6 % of the total

industrial R & D investment in IT in the Community; very much in line with that of our main competitors and well within our possibilities. On the basis of an average 50 % contribution the budgetary load for the Community would be 750 million ECU, including the costs of the management of the programme and access to and use of the Information Exchange System.

Table 1

Esprit programme: resource summary (man/years)

Activities started during first phase 1984-88

Pilot projects	0	1984 1	1985 2	1986 3	1987 4	1988 5	1989 6	1990 7	1991 8	1992 9	1993 10	Total
Projects starting in Year 0	230	325	327	192	125	30						999
in Year 1		420	551	629	540	519	20					2 679
in Year 2			547	766	670	545	140					2 668
in Year 3				328	428	450	256	68				1 530
in Year 4					204	276	180	85	45			790
in Year 5						92	140	125	105	80	60	602
Total: Man/years	230	745	1 425	1 915	1 967	1 912	736	278	150	80	60	9 268

Telecommunications

*Commission communication
transmitted to the Council on 8 June 1983*

1. In its study on the information technologies, the Commission pinpointed telecommunications as one of the strengths of European industry, a fact which is borne out by Europe's share of world production in this field, which is disproportionate to the importance of the Community market in general.

A more thorough analysis of the sector indicates, however, that unless national and Community policies undergo a change of direction, there will be cause for concern. On the other hand, it shows that there is considerable potential for growth if the necessary decisions are adopted in time and at the appropriate level.

2. These concerns spring from a number of observations:

(a) in the first place, the volume of Community exports is undoubtedly high; nevertheless, they involve an increasing proportion of traditional types of equipment, frequently supplied on markets which were saturated several years ago;

(b) in the second place, the European telecommunications industry runs the risk of being in a weak position when it comes to tackling the technical changes characteristic of the information technologies, which are occurring on an ever larger scale and at an ever increasing rate: whereas such changes can be regarded as an asset by Europe's competitors, for European industry itself they are becoming a handicap. In fact, the enormous input, in terms of investment and R & D, needed to cope with this situation, calls for economies on the scale of the American and Japanese markets, which are impossible, however, given the compartmentalized nature of the European market, divided as it is into separate national entities.

(c) lastly, at user level, i.e. at that of the terminals and services in what will be the most dynamic segment of the market over the coming decade, the potential for growth remains largely untapped as a result both of the uncertainties as to future networks and the constraints of national regulations, and of the excessive costs engendered by the inherent compartmentalization, which have the effect of curbing a growth in demand.

3. Against these weaknesses – the common denominator of which is the inadequacy, even the lack of cooperation between the various countries, at both industry and State level – can be set the truly considerable growth prospects: the

world market in telecommunications equipment will increase at a rate of 8.1 % in volume over the decade 1980-90, from USD 44 000 million to USD 95 000 million. The Community market, characterized essentially by an increase in quality rather than quantity, will experience a slower growth rate, from USD 8 000 million to USD 14 000 million, i.e. 5 % per year, unless something is done to alter the current course of events.

The Commission takes the view that a stimulus can be provided and that the existing situation can serve as a springboard for a new impetus for European industry and for the telecommunications services.

4. Traditionally, the telecommunications sector has been dominated by decisions taken at government level: network configuration and performance, regulations governing access, obligatory standards, costs of services to the user – all that has largely been decided by the State, which is, moreover, the biggest customer of the telecommunications industry as such.

Most of the States have thus attempted to reconcile within a national framework:

(i) the development – in terms of both volume and technology – of the national industry, the supplier favoured by the posts and telecommunications authorities;

(ii) user requirements;

(iii) the financial constraints of the posts and telecommunications authorities (policies governing investments and tariff-fixing).

Since, when all is said and done, any telecommunications network is international, if not to say, universal, in character, national regulations and standards must be coordinated and harmonized at international level: two bodies are concerned with these aspects, on an advisory basis and without any legislative power – the European Conference of Postal and Telecommunications Administrations (CEPT) and the International Telegraph and Telephone Consultative Committee (CCITT). In addition, the development of the new telecommunications networks has involved increased international cooperation, either in the form of bi- or multilateral agreements, or within wider specialized frameworks (e.g. in the case of satellites with Eutelsat).

The Community has kept in the background of these developments. It has on the one hand,

exercised its general competence¹ with regard to telecommunications in the same way it would have done in relation to any other sector without reference to any precise political orientation; on the other hand, its attempts to intervene on a pragmatic, specific basis, for instance in the case of opening up the public telecommunications markets, have fallen short of the mark for the same reason: they lacked a consistent sense of direction, a suitable framework and provision for gradual development over a period of time.

5. The efforts made with regard to harmonization at international level have indeed led gradually to a very high degree of reliability and compatibility throughout the telephone system, without any intervention by the Community. However, when it comes to ensuring thorough compatibility of far more complex and varied services and equipment, a more systematic, more effective approach is required.

A. The telecommunications sector is faced with a range of technical changes occurring in combination and at a growing rate:

(i) *digitization* which is replacing the analog signal of the telephone by the encoded language of the computer, thereby facilitating the introduction of new computerized telecommunications services, whilst at the same time creating new requirements from the point of view of standardization.

(ii) *optical fibres and communications satellites* offer far greater transmission capacities.

Digitization and new means of transmission radically affect the economic and technical data involved in long-distance transmission and should make it possible to introduce new services dependent on the availability of wide transmission bands at low cost.

(iii) *microelectronics* which allows production in miniature and reduces costs, whilst calling for fundamental changes in industrial processes, at both design and production level.

B. This technical progress opens the way for new services and equipment: remote printing of texts (teletex), exchange of files between computers, interrogation of databases (videotex), electronic payments, remote surveillance of buildings, assistance for the isolated, digital television (high definition in the interactive mode), teleconferencing, radio-telephony and satellite-link aerials.

6. This technical progress in telecommunications and the new services and equipment which it makes possible have certain common characteristics:

(a) They require much investment and R & D expenditure. Consequently, their implementation in economic terms, that is to say what brings about prices which are attractive for the user, requires them to be produced in large series. These are made possible by a vast market and by increased cooperation between companies.

One example we can cite is the development of a new family of time-division switches: their development cost varies between USD 700 million and USD 1 300 million according to the manufacturer. Knowing that to provide a reasonable return on development costs of USD 1 000 million, sales of USD 14 000 million are necessary, one wonders how such a return could be obtained on a telephone switch of this sort given that the British market is worth USD 7 200 million, the French market USD 10 900 million and the German market USD 11 700 million (forecasts for the current decade)? The lack of size of the national markets remains a fundamental handicap especially when the whole of the national market is always reserved for a 'national champion', which prevents the posts and telecommunications authorities from having the advantages of competition for their supplies.

¹ This competence primarily relates to:

(i) *a common commercial policy*: registrations concerned with the application of the GATT code in the public procurement of telecommunications equipment, agreement on standards and on technical barriers to interchange (TBT agreement), and the international commercial aspects of services;

(ii) *a policy on competition*: including public expenditure on R & D, cooperation between companies and unfair practice between State-owned and private companies;

(iii) *a policy for internal markets*: problems of standardization and free trade;

(iv) *the development of the Community market for informatics*: access to all data banks of Euronet/Diane and its future extensions, particularly Apollo;

(v) *the specific needs of institutions*:

- the Inter-Institutional Information System (Insis);
- statistical control of customs and agricultural transactions (Caddia);

(vi) *more recent initiative*: co-financing of precompetitive R & D (Esprit) and financing of a telecommunications infrastructure (New Community Instrument (NCI) and European Regional Development Fund (ERDF)).

(b) They require medium-term programming: the period which separates the decision to develop new equipment and its appearance on the market at a reasonable price and with a reasonable degree of reliability is extremely long. These periods are extended even further by the complexity of current harmonization procedures.

It has been calculated that approximately 60 months are required to develop equipment based on new specifications in Europe while a similar process requires only 24 months in North America.

(c) They are of no economic value unless they can be installed in international networks which are sufficiently extensive and uniform to allow them to be used to the maximum; there is a risk today that telecommunications in Europe will be made up for some time to come of a heterogeneous assembly of incomplete and incompatible networks for different services which will remain circumscribed about national or regional sectors. If the interfaces are not available as soon as the new services are launched, the changes necessary later on will be both laborious and costly.

7. The requirements of dimension, time and international compatibility of the new networks and the new services in themselves require a Community approach.

To these can be added four types of grounds:

(a) From being European, the competition is becoming more and more international, including that on the European market itself.

This is being stirred up by:

(i) the battle of the giants which is being fought between ATT and IBM on a 'deregulated' American market and which will be continued on non-American markets and including Europe;

(ii) the penetration due to its progress in micro-electronics which will be afforded to the Japanese industry which, on the initiative of the Japanese posts and telecommunications authorities, will be installing full-scale networks and services which are still at the stage of laboratory tests in Europe.

Only the mobilization of our resources and in particular in R & D and better cooperation between companies – combined with increased competition between groups – can enable the European industry to face up to outside competition in a properly internationally competitive state;

(b) Telecommunications today have an economic, social, cultural and naturally strategic importance which mark them out for a large-scale European initiative.

They represent a typical example of a sector for which new impetus to productive investment to such an extent that a proper economic cost/benefit calculation should be carried out for them to the exclusion of the posts and telecommunications authority's operating accounts; what must be taken into account with regard to investments by the posts and telecommunications authorities and the R & D expenditure of companies is all the indirect economic fall-out which will accompany a major programme of development in telecommunications in Europe: jobs, industrial innovation, improvements of the productivity of services, the creation of highly productive small and medium enterprises, etc.

(c) In addition to the economic factor, telecommunications represent a stake in society for Europe. From the moment that telecommunications have a critical role in the overall performance of our economy – it should be remembered that with a value added equivalent of hardly 1% of the Community GNP, they have a direct effect on 55% of the total value added and 62% of employment – telecommunications will condition the whole of our future: it is our way of life and our social organization, even our culture, which are involved. The Community must therefore establish a design for Europe in a sector which is truly of vital interest for it.

(d) By virtue of its specific responsibilities towards the developing countries and, particularly, to its partners in the Lomé Convention, the Commission should also consider all aspects of how these countries can draw upon a European initiative in telecommunications. By making available to them the most recent technological developments which are particularly adapted to their needs (user dispersion, distance, robustness of equipment and simplified operation), they would be able to economize at the intermediate stages of progress in telecommunications through the experience already gained by the Member States.

Telecommunications is therefore indispensable as a tool for the developing countries and opens up new channels by which the considerable effort in R & D and the investment made by the Community can be redeemed.

8. To establish the importance and the necessity of the European dimension is one thing. To turn it to proper account is another. Telecommunications has not been a sector in which the role of government and of regulations has been critical so far, and the actions of industry itself would suffice; with a few additional Community initiatives here and there; for the unity and fluidity of the European market to be achieved progressively, as has been the case for so many other sectors since 1958.

But the problem is precisely that it is up to the 10 Member States, through their posts and telecommunications authorities, to determine in very direct fashion what should be on offer in the field of telecommunications: what networks and what services? In what quantity? At what cost? How soon?

If the Community were to limit itself this time to intervening in a pragmatic and *ad hoc* way, there would be strong fears that it would be completely ineffectual as has been the case in the past.

The Community must first fix an objective which must take full account of the European dimension. This must include:

(i) stimulating the production of telecommunications equipment and telecommunications services in Europe so as to create the conditions for Community industry to maintain its strong position on the European market and preserve its place as the leading world exporter;

(ii) making available to the users the most advanced telecommunications equipment and services and the conditions which ensure their international competitiveness.

The recourse to the European dimension, which is recognized as a condition of success, implies a gradual transfer of powers and means to the Community. Such a transfer in no way implies any modification to the statute or responsibilities of the national PTTs. Neither does it affect the way in which each Member State organizes the transfer of financial resources between PTT and governmental budgets.¹

A Community political and legal framework, which is clear and precise, thus becomes indispensable.

The Community must be able to indicate the target for joint action, to select the objectives, to decide the ways and means, to fix the procedures

and deadlines in a framework which will guarantee a capacity to decide.

Telecommunications, which constitute a basis for information technologies and, through the latter, support an entire European economy based on services, are no less essential for the future of Europe than coal and steel were at the beginning of the 1950s.

Without the salutary discipline of a suitable legal framework, the necessary progress will not be realized within the tight schedules imposed by technology and international competition.

A legal framework does not imply, however, additional constraints and bureaucracy; on the contrary, it will quickly become apparent that the gradual transfer of power and resources to the Community, if brought about as the Commission envisages, will be counterbalanced by a reduction in regulations and, moreover, a more rational utilization of the public resources allocated to this sector.

Being aware of the complex nature of the subject, the Commission does not expect the European Council to be able to draw up final guidelines at this stage; on the other hand, it requests it clearly to acknowledge the need for a European approach to telecommunications and to approve the objective proposal earlier. The Commission would like to set up a panel of senior officials, appointed by Heads of State and Government, who would be able to commit their governments, to be chaired by the Commission, with the task of studying the problem according to terms of reference and schedule below.

An initial set of questions relate to specific activities to be conducted:

(a) How can the following most strategic technological options in the telecommunications field be decided at Community level:

- (i) network configuration and performance;
- (ii) end-to-end compatibility of networks;
- (iii) the range of services offered;
- (iv) their cost;
- (v) general pricing principles.

¹ This later aspect is linked to the more general problem of financing the networks and telecommunications services which is not considered in the present document.

(b) How can European industry be enabled to cooperate at the precompetitive R & D stage, as the electronics industry is doing under the Esprit programme, and how can it be lead to mutual reflection on trends in the sector and the problems posed by international competition?

(c) How can we ensure that the post and telecommunications administrations be given a free choice of suppliers and the enlarged markets for the latter?

(d) How can we prevent the stimulus given to the industry from being impeded by over-regulation, and how can terminals and services be given free access to the network?

This would mainly imply:

(i) enabling industrialists freely to connect a wide range of terminals and local systems to these networks;

(ii) carrying out the standardization that is strictly necessary in order to make this free access effective and economic;

(iii) ensuring that the equipment to be connected to the network is approved under strict conditions as regards objectivity, deadline and cost.

(e) How can space telecommunications policy be made the subject of reflection at Community level aimed at:

(i) exploiting what Europe has achieved in terms of space systems;

(ii) making optimum use, through the adoption of joint standards, of space telecommunications systems;

(iii) identifying ways of enabling the industry concerned more effectively to take up the challenge of world competition;

(iv) facilitating a joint position within the competent international organizations that gives due regard to the Community's interests.

The second area of thought to be assigned to the panel of senior officials relates to the setting-up of a European telecommunications body.

Since the Commission does not itself possess the necessary skills for bringing these tasks to a satisfactory conclusion, a specialized Community body could provide a suitable structure for:

(i) taking Community decisions;

(ii) negotiating in international organizations on the basis of a joint position;

(iii) facilitating cooperation within the Community and even with neighbouring countries.

Consequently, for the powers conferred on the Community to be exercised with the necessary expertise, efficiency and speed and so that the search for a consensus does not prevent questions from being settled when required, it would be appropriate to consider setting up, in accordance with the rules of the Treaty, a specialized Community body placed under the authority of the Commission, to which the Council would delegate the necessary powers. The operating expenses for such a body would be allocated to the general budget and its responsibilities would increase as the European telecommunications policy is developed.

The panel of senior officials would be instructed to submit an initial policy report by December 1983 and its final conclusions by March 1984.

9. The Commission will for its part continue, with the aid of consultants and in close cooperation with the industry, users and trade unions, to study the European telecommunications problem and will thus fuel the discussions of the high-level think tank.

10. Lastly, the Commission will ensure that the Community's present powers are exercised in the light of the objective assigned by the European Council to the Community's action in the telecommunications sector.

**Biotechnology:
the Community's role**

*Commission communication
transmitted to the Council on 7 June 1983*

Introduction

The life sciences have made great progress in the past thirty years. Thanks to his increasingly thorough knowledge of biological structures and functions, man is now in a position, at the molecular and cellular levels, to embark on a rational and systematic approach to the exploitation of the properties of living things. The new biotechnologies lead to applications of importance for agriculture, health care, numerous branches of the chemical industry, the agri-food industries, the use of biomass, protection of the environment and waste recycling. Even though their objectives remain clearly discernible, these biotechnologies are multidisciplinary and complex in approach. They call for a high level of expertise and, although some spectacular successes have been achieved very rapidly, cannot really help to solve the major social, economic and industrial problems other than through medium- and long-term projects.

The biotechnology-related market is substantial since almost 40% of the products manufactured by the industrial countries are of biological origin. The most recent estimates speak of a market of USD 50-100 000 million for biotechnology by the year 2000. For recombinant DNA alone, the Genex Corporation predicts a volume of about USD 40 000 million.

Aware of the importance of the issue and the resources needed, many countries have spent large amounts to speed up the development of modern biotechnology by transferring basic information to industry and agriculture. From the outset the leaders have been the United States, because of the vast resources at its disposal, and Japan, which has set up well-integrated systems going from training through research and development to applications.

In the Member States, a considerable amount¹ has also been spent by governments and some large industrial firms. An initial appraisal based on the Community's degree of dependence in products stemming from biotechnology shows that, although these activities are far from negligible, they have not allowed the Member States to make up the ground they lost by their late start. This situation is all the more paradoxical in that Europe has outstanding capacities for the study of

the life sciences and can claim remarkable achievements in basic research.

The relative weakness of biotechnology in the Member States is mainly due to the lack of coherence in R & D policies and the absence of structures on Community scale. These shortcomings were not apparent when biological applications in industry and agriculture were spread over long periods of time and were carried out within specific disciplines that each country could master fully.

The headlong development and multidisciplinary complexity of modern biotechnology combined with the scale of its markets now make it essential to rethink the problem.

In the United States many small high-risk companies set up in the past 10 years to promote the commercial applications of breakthroughs in genetic engineering have gone bankrupt, showing how easily R & D ventures in biology can fail if they are on an inadequate scale. Only by a sustained joint effort can Europe achieve the critical mass needed in modern biotechnology for each of the phases in the training-research-development-application system.

Once this critical mass is achieved it will allow:

- (i) the establishment on a significant scale, i.e. the European market, of the environment essential for the expansion of European biotechnology;
- (ii) the speeding-up, by making use of the expertise and laboratories of a very high scientific level scattered throughout Europe, of the training of qualified research scientists in the complex and diverse disciplines of biotechnology;
- (iii) the joint implementation of specific R & D projects useful to all Member States that could not be undertaken satisfactorily by any individual country: it is above all important to derive optimum benefit from research investment by integrating activities as this is the only way to allow rapid development of a large number of

¹ Government research spending:

- Community: USD 160 million a year for biotechnology in the strict sense of the word (USD 360 million for the main life sciences);
- USA: USD 200 million a year (USD 550 million);
- Japan: USD 50 million a year.

See information memo 'National initiatives for the support of biotechnology'.

different solutions applicable to a whole range of different problems.¹

The Community's role

The main social, economic and industrial sectors concerned by the development of modern biotechnology coincide with several of the major fields of current or planned Community policies. The promotion of agricultural and industrial competitiveness, the harmonization of markets and the removal of barriers can only be fully achieved if the means of action, i.e. in this case the strengthening of European biotechnology, fit into a specific framework. As it is a medium-term project, a Community framework will provide the necessary security and stability. The Community's responsibilities are all the more obvious in that the applications of biotechnology may lead to the implementation of new techniques and consequently the reduction of national or Community support in the two fields of vital importance for the Community, the agri-food industry and the health industry. In these fields the relations between biotechnology and Community strategies are reciprocal and can be negative or positive:

(i) in the former case, national go-it-alone approaches to R & D and to laws and standards and sometimes even the different repercussions that Community provisions can have from one country to another in this field create situations that are not conducive to the developments of certain industrial applications of biotechnology.

(ii) in the latter case, support for training and research, harmonization of regulations and the widening of the market speed up the scientific and commercial breakthroughs of biotechnology.

If it sets itself precise targets relevant to the planned measures to diminish agricultural surpluses and deficits or reduce health costs, biotechnology can help towards the development of Community policy.

1. With regard to the agri-food and certain chemical industries (starch, bio-polymers, conversion of cellulose, etc.) biotechnology is necessary to the development of European agriculture. It opens up prospects for the upgrading of agricultural products and to some degree the reduction of support for these products from the Community

budget. While observing certain economic conditions, it can also allow improved land use, and, in particular, the replacement of surplus production by products of which there is now a shortage such as wood.² Closely dependent on the common agricultural policy, these prospects cannot be exploited to the full without R & D ventures and without the reforms that only the Community can propose and carry through.

2. The same can be said of the solutions that the Community development of biotechnology could provide in the medium term for health care problems, the growing cost of which is threatening the stability of social security systems in the Member States. A joint research and development effort to improve methods of diagnosing, preventing and treating costly diseases could bring about a significant reduction in health expenditure.

If all the prospects opened up by what is known as the second pharmaceutical revolution are to be exploited, resources both for training and for long lead time research must be considerably stepped up. The problems are common to all the Member States and the Community's objectives should be:

(i) to promote the essential training and research efforts;

(ii) to contribute towards the opening-up of the market by adopting systematic approaches, planning and harmonizing regulations, renovating production circuits and innovating in the areas of detection and care.

Priority objectives

The Commission's proposals in this specific field are in line with its general approach³ to the

¹ There are very many examples of numerous applications of the results of basic research. For example, it was largely because of the discovery in the course of radiation protection work of the enzymes (polymerases, endonucleases, terminal-transferase, ligases, etc.) involved in the repair of radiation-induced damage that it became possible to develop modern genetic engineering techniques.

In agricultural research, work to increase the lysin contents of feed barley led to the discovery of lines, very valuable for brewing, that had a particularly low content of polyphenols and anthocyanogens which cause turbidity in beer.

² Biotechnology could, for example, speed up the exploitation of plantations and extend the range of market outlets.

³ Bull. EC 12-1982, point 2.1.173.

problems of scientific, technical and industrial development in the Community.

The numerous studies carried out by the Commission on the situation of research and development in the world and in the Member States have identified the contextual conditions necessary for the development of Community biotechnology and the shortcomings, sometimes of a limited but often of an essential nature, in R & D in the Member States.

The Commission considers that the following objectives merit priority.

Development of the basic biotechnologies through training and research

An initial training and research programme in biomolecular engineering was launched on 1 April 1982. Although it is a significant and constructive step forward, this programme is on too small a scale to serve as a basis for any real expansion of European biotechnology. However, it may be regarded as a starting point for the more ambitious action recommended by the 1984-86 framework programme for Community R & D. The objectives are as follows:

Training and mobility of scientists and technicians capable of developing biotechnology R & D in Europe

Modern biotechnology consists of a number of complex and interdependent disciplines and is not normally taught as such in European universities.

Experts capable of giving the required instruction are scattered throughout all the Community countries. The bases for scientific training must be built up around them through mobility of research scientists and exchanges of information. This aim could be achieved by training contracts giving European scientists access to all the advanced laboratories identified in the Community and by organizing specialized courses in strategic subjects.

At a different level, action to increase the efficacy of Member State efforts to put biotechnology across to the general public and to inform industry of the principles and aims of modern biotechnology could also be envisaged.

Strengthening of basic biotechnology

The aim here is to develop the basic knowledge and skills needed by European industry.

The Commission's studies and talks show that there are still large gaps in the Member State programmes designed to promote new biotechnologies.

It is particularly necessary to encourage Community projects on genetics, biochemistry, microbiology and physiology that come half-way between basic research and applications proper, the lead time for which is too long to justify adequate investment by private industry in the immediate future. The ground to be covered both in training and in research and the improvement of its context (data banks,¹ cell collections, etc.) is so vast that it cannot be explored without pooling the expertise and resources of all the Member States. In this way well-integrated research programmes could be defined and the results obtained could be put to optimum use through systematic analysis of all the possibilities.

Establishment of the factors necessary for the development of Community biotechnology

Even if it is supported by training and research activities, biotechnology will be unable to develop fully in the Community unless a favourable context is provided to encourage it. Here the Community has identified three necessary factors:

Access to raw materials of agricultural origin

In many cases biotechnology is dependent on agriculture for its supplies of raw materials. The market systems applicable in the Community to non-food products produced from these raw materials do not always encourage the setting up of industries within the Community. For selected products, the system in force will have to be

¹ Modern biology provides such a vast volume of information concerning techniques, materials and instrumentation and in the form of results and their interpretation that conventional methods of disseminating information are no longer adequate. It is therefore essential to make use of the resources offered by modern data processing for the centralization, classification and exploitation of biological research data. The use of a network such as Euronet-Diane to set up a European data bank should be envisaged.

adjusted so as to ensure that the Community industry benefits from the same conditions of competition as its outside rivals.¹

Rules and regulations

It is because they see no prospect of a sizeable internal market and are increasingly hampered by rules and regulations that the Community's biotechnology industries are tending to postpone the investment needed for industrial and commercial exploitation of scientific know-how.

The health industries are suffering more than most from the current situation affecting the whole of biotechnology. The Commission has already drawn the Council's attention to the need to harmonize the market for these industries, which are also faced with inevitable measures to curb social security spending, and to stimulate their growth.

The rules and regulations must therefore be in keeping with the prospects for a large internal market. It is above all necessary to take steps to prevent the appearance of specific national standards which would have the effect of confining the development of bioindustry within a narrow framework, thereby ruling out the possibilities of planning and expansion available only on a large single market. The advisability of introducing new regulations should be examined from the outset at Community level, as far as possible using the various instruments already available to the Community. The Community must make use of its powers and avoid the long-winded tiresome procedures from which non-member countries have often managed to profit in the past.

These Community standards would also imply an efficient inspection of their implementation throughout the Community.

Adaptation of industrial, commercial and intellectual property systems

Developing a competitive biotechnology industry and defending its commercial interests depend to a large extent on the effectiveness and adequacy of the instruments for protecting industrial, commercial and intellectual property.

Because of the special nature of biotechnological products and processes, the current legal situation

is complicated by differences between national laws which are in any case ill equipped to deal with the new problems arising, for example, in connection with the protection of micro-organisms and recombinant DNA.

The Community Member States are signatories to the European Patent Convention, already in force, and the Convention on the Community Patent. The entry into force of the latter has been delayed because it has not yet been ratified by all the parties; this is particularly harmful to the development of biotechnology.

In an area of such vital importance for the future of our industry, the Community will have to decide to tackle these problems in order to forestall any difficulties rather than having to cope with them after they arise by some long and complex procedure.

The lack of any effective protection of intellectual property at Community level might well deter innovating firms from embarking on the necessary cooperation, forcing them to fall back on a system of secrecy harmful to industrial development.

The priority issues here are:

- (i) the protection of biotechnological inventions as such;
- (ii) the implications and conditions concerning the practical implementation of rules and procedures providing protection;
- (iii) the legal problems concerning patents which are comparable to the issues already raised concerning the protection of new plant varieties.

Support for Community policies in the agricultural and health industries by specific R & D projects

The priorities here are as follow:

- (i) Improvement of the economic conditions for the agricultural industry. The main aims are to reduce the cost of producing basic foodstuffs so as to facilitate their marketing, to upgrade them by

¹ In the non-food products sector it is already clear that investment is tending to shift to countries outside the Community. Some starch manufacturers have left the Community and set up in non-member countries where they have access to basic farm-produced materials at world prices.

means of new processing methods and to develop alternative crops.¹

(ii) The matching of health industry supply to a market in which the main clients are social security institutions that are finding it increasingly difficult to keep operating. This means developing new toxicological and pharmacological tests that will help to harmonize regulations and thus avoid duplication while offering a Community-wide assurance of the efficacy and harmlessness of medicinal products; it also means encouraging the development of methods for manufacturing new products for the diagnosis, prevention and treatment of diseases that are heavy on the public purse. These activities will help to develop the health industries and to improve the financial situation of social security systems in our countries. They are therefore in line with the macro-economic policy recommended by the European Council. They are also relevant to the whole Community environmental protection policy which requires efficient methods common to all the Member States for the systematic detection and evaluation of factors harmful to man and his environment caused by industrial expansion and the development of new manufacturing processes.

(iii) The development of biotechnology for and in the Third World countries; the Community has formulated a policy towards these countries that focuses on the search for solutions to nutrition, health and agricultural development problems. To varying degrees, biotechnology has a contribution to make to these solutions. The Community has

already launched a programme intended to mobilize research resources in the Member States for the developing countries. This type of activity must be reinforced by giving greater attention to the potential offered by biotechnology in the promotion of agricultural and medical research conducted in the developing countries.

*

The Commission asks the European Council to approve the priority objectives it recommends for Community action.

Because of the scale of the problems and the need to ensure that the Community action has the continuity it requires if it is to be effective, a programme with clearly identified targets must be set up and the stages for its execution defined. Community action in this area also calls for suitable R & D structures and an appropriate legal framework.

In close consultation with the scientific laboratories and industries concerned, the Commission will put forward precise and detailed proposals in the course of 1983.

¹ For example, genetic engineering methods should make it possible to reduce the cost of producing grain by increasing resistance to disease and establishing symbiotic relations with soil micro-organisms. The development of highly productive barley varieties with a high lysin content could help to reduce imports of cattle feed. The use of enzyme and cell technology should make it possible to convert the starch of certain species grown in Europe into high value-added products such as organic and amino acids.

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