COUNCIL DECISION

of 8 December 1993

adopting a specific programme of research and training in the field on controlled thermonuclear fusion (1994 to 1998)

(94/799/Euratom)

THE COUNCIL OF THE EUROPEAN UNION,

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

Having regard to the proposal from the Commission [1], which has consulted the Scientific and Technical Committee,

Having regard to the opinion of the European Parliament [2],

Having regard to the opinion of the Economic and Social Committee [3],

Whereas, by Decision 94/268/Euratom [4], the Council adopted a framework programme of Community activities in the field of research and training for the period 1994 to 1998 specifying, *inter alia*, the activities to be carried out in the field of controlled thermonuclear fusion; whereas this Decision takes account of the grounds set out in the preamble to that Decision;

Whereas Article 2 of Devision 94/268/Euratom specifies that the framework programme is to be implemented through specific programmes adopted in accordance with Article 7 of the Treaty; whereas each specific programme is to specify its precise objectives in accordance with the scientific and technological objectives referred to in Annex III to the Decision, define the detailed rules for implementing it, fix its duration and provide for the means deemed necessary;

Whereas the amount deemed necessary for carrying out this programme is ECU 794 million; whereas the appropriations for each financial year shall be laid down by the budgetary authority, subject to the availability of resources within the financial perspectives and to the conditions set out in Article 1 (3) of the framework programme;

Whereas the content of the framework programme of Community activities in the field of research and training was established in accordance with the principle of subsidiarity; whereas this specific programme specifies the content of the activities to be carried out in accordance with this principle in the field of controlled thermonuclear fusion;

Whereas, as is laid down in Annex III to Decision 94/268/Euratom, the Community needs a 'Community fusion' programme the long-term objective of which is the joint creation of safe, environmentally sound prototype reactors which should result in the construction of economically viable power stations; whereas the programme incorporates all the activities undertaken in the Member States in the field of controlled thermonuclear fusion by magnetic confinement;

Whereas Decision 94/268/Euratom (framework programme 1994 to 1998) lays down that Community action is justified if, *inter alia*, the research contributes to the strengthening of the economic and social cohesion of the Community and the promotion of its overall harmonious development while being consistent with the pursuit of scientific and technical quality; whereas this programme is intended to help meet these objectives;

Whereas the Community should support only RTD activities of high quality;

Whereas basic research in the field of controlled thermonuclear fusion must be encouraged within the Community so as to enable innovative concepts to be developed;

Whereas the rules for the participation of undertakings, research centres (including the JRC) and universities, specified in Decision 94/761/Euratom [5], apply to this specific programme;

Whereas this programme will help to strengthen synergy between the research and training activities carried out in the field of controlled thermonuclear fusion by research centres, universities and undertakings established in the Member States and between these and the corresponding Community research and training activities;

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(1) OJ No C 113, 23. 4. 1994, p. 15.
(2) Opinion delivered on 17 November (not yet published in the Official Journal).
(3) Opinion delivered on 15 September 1994 (not yet published in the Official Journal).
(4) OJ No L 115, 6. 5. 1994, p. 31.
(5) OJ No L 306, 30. 11. 1994, p. 1.

Whereas the implementation of the Joint European Torus (JET) project was entrusted to the JET Joint Undertaking, set up by Decision 78/471/Euratom [1];

Whereas the network of Associations plays a major role in the implementation of the Community's controlled thermonuclear fusion activities;

Whereas, by virtue of Article 101 of the Treaty, the Community has concluded cooperation agreements in the field of controlled thermonuclear fusion and plasma physics with the Kingdom of Sweden and the Swiss Confederation; whereas the Community has concluded other international agreements in this field, in particular the Agreement on Cooperation in the Engineering Design Activities for the International Thermonuclear Experimental Reactor (ITER-EDA) with Japan, the Russian Federation and the United States of America; whereas it may be apropriate to engage in further international cooperation activities with international organizations and third countries for the purpose of implementing this programme;

Whereas this programme should comprise also activities for the dissemination and exploitation of research results, in particular *vis-à-vis* small and medium-sized enterprises, as well as activities promoting the mobility and training of researchers within this programme to the extent necessary for the proper implementation of the programme;

Whereas an analysis should be made of the economic, social and environmental viability of controlled thermonuclear fusion and any technological risks associated with the activities carried out under this programme; whereas public concern over safety issues connected with fusion research implies that studies be carried out to assess the social acceptability of such research;

Whereas progress with this programme should be continuously and systematically monitored with a view to adapting it, where appropriate, to scientific and technological developments in this area; whereas, in due course, there should be an independent evaluation of progress with the programme so as to provide all the background information needed in order to determine the objectives of the next framework programme of research and training for the European Atomic Energy Community; whereas, at the end of this programme, there should be a final evaluation of the results obtained compared with the objectives set out in this Decision;

Whereas the JRC may participate in indirect actions covered by this programme;

Whereas the JRC will also contribute, through its own programme, to the attainment of the Community research and training objectives in the areas covered by this programme,

HAS ADOPTED THIS DECISION:

Article 1

A specific programme of research and training for the European Atomic Energy Community in the field of controlled thermonuclear fusion, as set out in Annex I, is hereby adopted for the period 8 December 1994 to 31 December 1998.

Article 2

1. The amount deemed necessary for carrying out the programme is ECU 794 million, including a maximum of 17 % for staff and administrative expenditure.

2. An indicative breakdown of the amount referred to in paragraph 1 is given in Annex II.

3. The budgetary authority shall lay down the appropriations for each financial year, subject to the availability of resources within the financial perspectives and in accordance with the conditions set out in Article 1 (3) of Decision 94/268/Euratom on the framework programme, taking into account the principles of sound management referred to in Article 2 of the Financial Regulation applicable to the general budget of the European Communities.

Article 3

1. The general rules for the Community's financial contribution are laid down in Annex IV to Decision 94/761/Euratom on the framework programme.

2. The rules for the participation of undertakings, research centres and universities are specified in Decision 94/761/Euratom.

3. Annex III sets out the specific rules for implementing this programme, supplementary to those referred to in paragraphs 1 and 2.

Article 4

1. In order to help ensure, *inter alia*, the cost-effective implementation of this programme, the Commission shall continually and systematically monitor, with appropriate assistance from independent, external experts, the progress within the programme in relation to the objectives set out in Annex I. It shall in particular examine whether the objectives, priorities and financial resources are still appropriate to the changing situation.

[1] OJ No L 151, 7. 6. 1978, p. 10. Decision as last amended by Decision 91/677/Euratom (OJ No L 375, 31. 12. 1991, p. 9).

It shall, if necessary, in the light of the results of this monitoring process, submit proposals to adapt or supplement this programme.

2. In order to contribute towards the evaluation of Community activities, as required by Article 4 (2) of Decision 94/268/Euratom concerning the framework programme and in compliance with the timetable laid down in that paragraph, the Commission shall have an external assessment conducted by independent experts of the activities carried out within the fields covered by this programme and their management during the five years preceding this assessment.

3. At the end of this programme, the Commission shall have an independent final evaluation carried out of the results achieved compared with the objectives set out in Annex III to the framework programme and Annex I to this Decision. The final evaluation report shall be forwarded to the European Parliament, the Council and the Economic and Social Committee.

Article 5

1. The Commission shall be responsible for the implementation of the programme.

2. The Commission shall be assisted in the implementation of the programme by the Consultative Committee for the Fusion Programme set up by the Council Decision of 16 December 1980.

Article 6

This Decision is addressed to the Member States.

Done at Brussels, 8 December 1994.

For the Council

The President

G. REXRODT

ANNEX I

SCIENTIFIC AND TECHNICAL OBJECTIVES AND CONTENT

Introduction

This programme fully reflects the approach embodied in the framework programme of Community activities in the field of research and training for the European Atomic Energy Community (1994 to 1998), which is in line with the recommendations of the Colombo Panel. Its content takes account of the conclusions of the seminar on European strategy for energy research and technological development (Venice, November 1993) and fully reflects the results of the assessment and recommendations of the Consultative Committee for the Fusion Programme (CCFP) on the medium-term devices and facilities planning of the programme, elaborated in March 1994 after an in-depth study.

The long-term objective of the Community fusion programme, embracing all activities undertaken in the Member States (plus Sweden and Switzerland) in the field of controlled thermonuclear fusion by magnetic confinement, is the joint creation of safe, environmentally sound prototype reactors, which should result in the construction of economically viable power stations which will meet the needs of potential users; in this context particular attention will be paid to the constraints imposed by the requirements of power utilities (Decision 94/268/Euratom concerning the framework programme 1994 to 1998).

Progress towards this objective, which is shared by the world's four major fusion programmes (Euratom, Japan, Russia and the USA), which are of similar size, has a time-horizon measured in decades. Within Europe, integration of all magnetic fusion research into one Community programme has been essential for optimum use of the available human and financial resources; this integration is fully in line with the coordination of research activities recommended by the Commission in its White Paper (COM(93) 700), which was adopted by the European Council on 10 to 11 December 1993. Individually, none of the Member States could have undertaken a project the size of JET or been recognized as an equal partner in the world-wide collaboration on the ITER experimental reactor. Indeed, the quality of the research and the experience gained through intra-Community collaboration have placed the Community in a strong position in the ITER cooperation.

The long timespan and the large human and financial effort needed to attain this objective call for a concentration of Community action on the objective in hand, the complete cohesion of the network of organizations associated in the Community action and the full exploitation of cooperation with the major fusion programmes outside the Community. Safety and environmental issues will be central to the construction of the following large devices, which, after JET, are included in the strategy leading towards the prototype commercial reactor.

This strategy includes, in particular:

— an experimental reactor (Next Step), the overall objective of which is to demonstrate the scientific and technological feasibility of fusion energy for peaceful purposes,

— a demonstration reactor (DEMO) capable of producing significant quantities of electricity.

For the period 1994 to 1998, the priority objective is to establish the engineering design of the Next Step within the framework of the quadripartite cooperation between Euratom, Japan, Russia and the USA on the engineering design activities for the international thermonuclear experimental reactor (ITER-EDA).

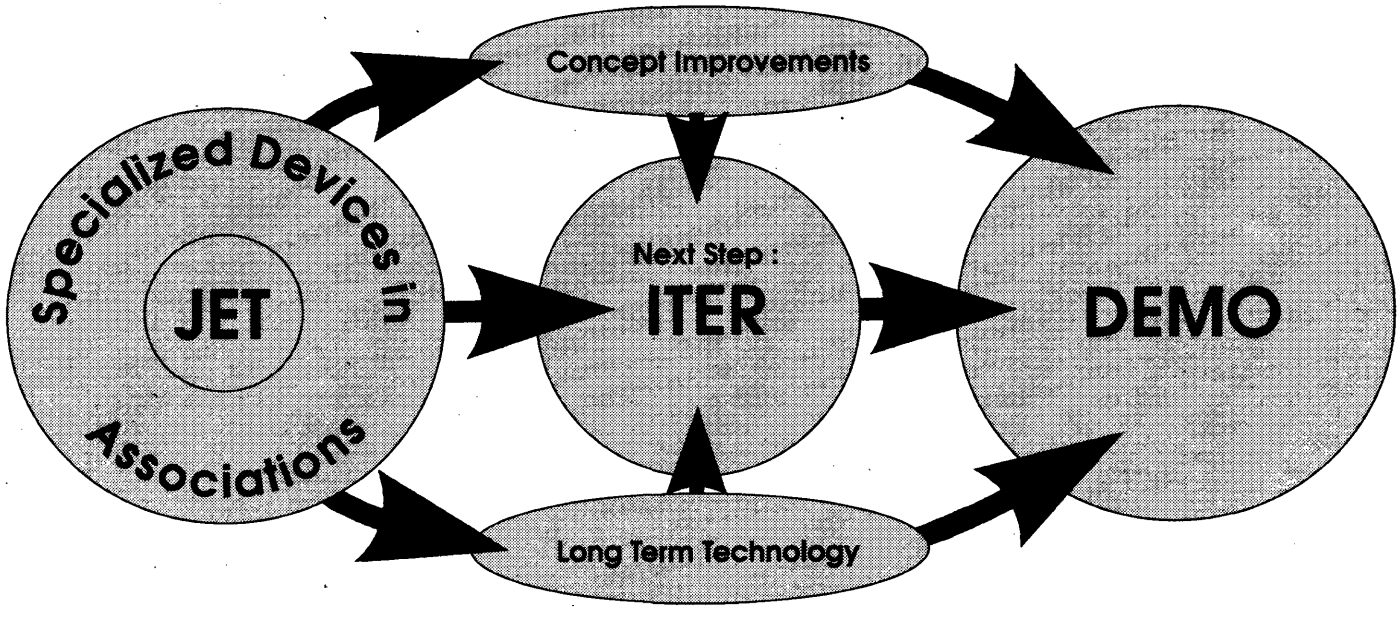
Specialized studies will also be needed to look at possible improvements to concepts in plasma physics and plasma engineering, while assessing their technical feasibility, and to carry out the long-term technology developments required for progressing towards the exploitation of fusion as an energy source. The results of such studies will be of benefit both in the operation of ITER and, in the longer term, in the conceptual definition of DEMO.

In the period 1994 to 1998, therefore, the proposed strategy calls for the simultaneous development of three areas of activity, as represented below, on which efforts will be concentrated mainly by means of shared-cost actions.

— Next Step activities: on the one hand the design proper, and on the other hand the R & D supporting the design, construction and operation of the Next Step.

— Concept improvements: DEMO-oriented R & D on plamsa physics and engineering.

— Long-term technology: DEMO- and reactor-oriented R & D on technology.



Research will continue to focus on controlled thermonuclear fusion by magnetic confinement in toroidal geometry. The present keep-in-touch activity with other approaches to controlled thermonuclear fusion, and in particular inertial confinement, will be continued and if possible carried out mainly within an international framework, as recommended at the Venice seminar.

Criteria concerning environmental impact, safety and potential long-term commercial viability will play an essential role in the progress of the whole fusion programme.

In this programme care will be taken to:

— strengthen further the cooperation between Associations, as well as the mobility of research workers,

— encourage the involvement of industry,

— extend the scope of international collaboration,

— step up the synergy between research and advanced training; in particular access of researchers from the less advanced regions of the Community to large installations will be facilitated,

— strengthen the human resources strategy, taking into account the staff presently available and the future needs of the programme.

Areas of scientific and technical activity

Next Step activities

The ITER-EDA include the design proper by the Joint Central Team and by the Home Teams of the four Parties, plus the supporting R & D in physics and technology by the Home Teams. For the Euratom Party, activities other than the participation in the Joint Central Team will be coordinated by the NET Team and carried out mainly by the Associations, industry (with increasing involvement), JET and the Joint Reserach Centre (JRC).

Plasma physics and plasma engineering R & D in support of the ITER-EDA will be pursued on the JET and on specialized devices in the Associations, with the focus on particle and energy exhaust, the heating, confinement and disruption of plasma, and long plasma pulses. JET's main task is to establish reliable methods of plasma purity control under conditions relevant for the Next Step and to conduct high-performance operations in deuterium-tritium plasmas, whilst limiting the activation of the device to the levels strictly necessary.

The ITER-EDA technology and design tasks allocated to the Community will be performed primarily in the Associations, in the JRC, and in industry. In order both to make the Community more competitive for the construction of ITER and to maintain the option of proceeding towards a European Next Step should cooperation on ITER prove too difficult to continue, the necessary competence will be developed in all key technologies for the Next Step, in particular in the fields of superconducting magnets, plasma facing components, operational and environmental safety, the fuel cycle and highly reliable remote handling for maintenance and decommissioning of the device in its particular environment. The present generation of technology test facilities will be intensively exploited. Specialized laboratories in the JRC, JET, and the Associations will help demonstrate the safe handling of tritium.

A European candidate site for the construction of the Next Step will be identified and qualified.

Protocol 2 to the ITER-EDA Agreement covers the period 21 March 1994 to the scheduled completion of the EDA in July 1998. It is important that decisions about where, when and within what framework to build the Next Step be taken during the period under consideration. Before firm decisions are taken on the construction of a Next Step device and on the funds to be committed to it, an external assessment of the prospects for fusion will be undertaken by independent experts, and its conclusions will be based on evidence of real progress towards the programme's ultimate goal. The result of this assessment, which will be launched in 1996, will be transmitted to the European Parliament, the Council and the Economic and Social Committee.

Concept improvements

Research on concept improvements for the Tokamak and configurations akin to it are essential, in the longer term, for the definition of DEMO; this research should also help finalize the design of the Next Step and prepare its operation.

Improvements will have to be made to the current techniques for tackling certain plasma physics and plasma engineering problems, most of them common to all toroidal magnetic confinement devices. These improvements could require not only the extension of running programmes, but also the upgrading of existing devices and the construction of new ones. More specifically, studies on improved confinement regimes, magneto-hydrodynamic stability, plasma-wall interaction, fuelling and exhaust, heating and current drive, will be carried out on existing devices: TORE-supra, Asdex-U, Textor, FTU, Compass, Start, TCV, RTP, Isttok, TJ-I-U, TJ-II, WVII-AS, RFX and Extrap T-2. New plasma diagnostic methods will be developed in the Associations to support these studies. In synergy with experimental activities, activities in theoretical physics will be focused principally on interpretation of experimental result, modelling of thermonuclear plasmas and the development of innovative concepts. The possibility will also be studied of using advanced fuels such as deuterium-helium3.

Preparatory activities are under way to upgrade existing devices and construct new ones relating, in particular, to:

— the engineering design and prototype development for a possible large stellarator (WVII-X) to demonstrate the advanced performance of that configuration; conceptual studies on the reactor potential of stellarators will be developed; construction of W VII-X could start within the period 1994 to 1998,

— the possible upgrading of some Tokamaks, notably TORE-Supra,

— a possible compact Tokamak, aiming at ignition. A revised proposal may be submitted to the Consultative Committee for the Fusion Programme (CCFP) for in-depth examination.

Long-term technology

The long-term technology effort will be expanded with a view to providing technically and environmentally acceptable solutions to the technical problems of using fusion power as an energy source. Environmental acceptability, safety and economic viablity will ultimately be the keys to the widespread introduction of fusion power. This long-term technology effort will be undertaken in the Associations, in the JRC and in industry, and will include in particular:

— development of tritium breeding blankets, with a view to building DEMO-relevant blanket modules to be tested in ITER,

— development of radiation resistant and low activation materials; testing these materials will require the availability of a high energy neutron source. Participation in the conceptual design of a deutherium-lithium neutron source is being started in the frame of an IEA Implementing Agreement with a view to embarking on the engineering design before 1998,

— further analysis of the safety and social acceptability of fusion power. In particular, analysis and assessment of possible risks associated with fusion power and its future large facilities, and the integration of all possible measures to prevent or minimize these risks will be an important part of the activities.

Implementation

In representing Euratom at the ITER Council, the Commission will ensure that all necessary steps are take to make optimum use of the competence and resources made available for the benefit of the EDA.

Regarding the physics part of the programme, besides the full exploitation of the existing devices, a continuation of JET after 1996 (and the construction of W VII-X) would make the most effective contribution to serving the objectives of the programme; regarding the technology part of the programme, the means of implementation should be further harmonized with physics, e.g. by increasing the volume of basic technology R & D.

According to Council Decision 91/677/Euratom, the period 1994 to 1998 should see the ending of the JET Joint Undertaking, at present the major focus of fusion research in Europe. However, substantial new scientific and technical arguments have been identified, in particular for the benefit of ITER (such as testing a divertor similar to that being designed for ITER), which speak for the continuation of JET's operation beyond 1996. A possible extension of the JET operation and its time horizon will be analyzed from the strategic, programmatical, managerial and financial points of view by the responsible bodies of the programme.

After the end of the Joint Undertaking, the acquired scientific data will be fully exploited. The JET expertise will be transferred to other parts of the fusion programme, in particular to ITER activities. Where appropriate, JET's facilities will continue to be operated, within organizational frameworks to be defined; in particular, research on JET decommissioning could be made part of the programme's activities.

Even before the ending of the JET Joint Undertaking, cooperation between the Associations will be extended further. New forms of cooperation between the Associations will be established to take into account the European nature and the limited duration of research projects. Joint projects carried out by formal groupings of Associations as consortia for integrated actions will be encouraged by the Commission through an adaptation of the existing arrangements. The Associations and the JRC [1] will have to provide a substantial contribution ot the physics and technology programmes of the ITER during its design, construction and operation.

Industry will be encouraged to participate more fully, with the twin aim of introducing industrial expertise into the realization of the Next Step and ensuring that European industry will master all the key

(1) A description of the activities envisaged for the JRC in this area is contained in the proposal for a Council Decision, relating to the activities of the JRC (COM(94) 70 final, 30 March 1994, 94/0074 (CNS)). An extract from this proposal is attached to this Decision.

technologies needed to build future fusion reactors. The measures introduced under the 1990 to 1994 programme to involve European industry in the Community's contribution to the ITER-EDA, in the design proper as well as in the accompanying R & D, will be reviewed and adapted as necessary. In particular, joint 'fusion-industry' seminars will be organized to help develop the dissemination and exploitation of the scientific and technical results of the fusion programme.

The possibility will be explored of extending international cooperation beyond ITER, notably through joint planning with the world's major fusion programmes. Possible areas of cooperation are a material test facility with a powerful high energy neutron source, and specialized devices for concept improvements.

Considering the long-term effort required for the exploitation of fusion power, great importance will be attached to maintaining the excellence and cohesion of the research teams within the Community, developing the mobility of scientists and engineers and fostering the synergy between research and advanced training, by strengthening the links with the wider European scientific community. In particular, Associations will be encouraged to collaborate with universities which are active in hot-plasma physics.

The amount of funding provided for in this Decision will imply that measures aiming at a greater selectivity of the activities to be performed and a stepwise implementation of new actions will be necessary.

An extension of JET would necessarily imply a substantially reduced annual budget of the project; the possible construction of W VII-X could be financed only partly through the present programme Decision.

The decentralized management structure of the fusion programme, inherent to its network structure, has proved to be efficient and will be maintained.

ANNEX II

INDICATIVE BREAKDOWN OF FUNDS

	%	(million ecus)
Area 1: Next Step activities	40 to 46	318 to 363 (1)
Area 2: JET joint undertaking	23 to 32	183 to 254 (2)
Area 3: Concept improvements	22 to 25	175 to 202
Area 4: Long-term technology	5 to 7	40 to 53
Total	100	794 (3) (4) (5)

(1) Including design proper and the necessary R & D support in physics and technology provided in the Associations and by industry.

(2) The activities of the Jet Joint Undertaking, which has its own legal personality, are geared mainly towards support for the Next Step.

(3) Of which a maximum of 15 % for staff expenditure and 2 % for administrative expenditure. For areas, 1, 3 and 4, this includes staff costs (about 10 %, including all Community staff in the ITER Joint Central Team) and administrative costs (about 2 %). For area 2, the budget of the JET Joint Undertaking includes provisions for a maximum of 181 temporary agents assigned to the JET Joint Undertaking whithin the meaning of Article 2 (a) of the Conditions of Empoyment of Other Servants of the European Community; the Community participation in the JET budget is about 75 %.

(4) An amount of ECU 46 million, the difference between the amount deemed necessary for this programme and the amount foreseen in the framework programme for research and training activities in the nuclear field (1994 to 1998) for 'controlled thermonuclear fusion', is earmarked for the specific research and technological, development programme to be implemented by means of direct action by the Joint Research Centre, for the European Atomic Energy Community (1995 to 1998).

(5) Including about 12 % for basic research and training.

The breakdown between different areas does not exclude the possibility that projects could cover several areas. In particular and environmental issues, which will determine the evolution of the fusion programme, will be addressed in all areas; in JET, these issues are an integral part of the exploitation of the device; in areas 1, 3 and 4 approximately 10 % of the total will be allocated to these issues.

ANNEX III

SPECIFIC RULES FOR IMPLEMENTING THE PROGRAMME

1. The specific rules for implementing this programme, referred to in Article 3, encompass research and technological development projects, the JET Joint Undertaking, accompanying measures and concerted actions. These must be selected with regard to the criteria listed in Annex II to Decision 94/268/Euratom and the objectives set out in Annex I to this programme.

   Participation in the programme is envisaged within the framework of the contracts of Association with Member States (plus Sweden and Switzerland) or organizations in the Member States, or within the framework of the Jet Joint Undertaking, the NET Agreement, which takes account of the Community's participation in ITER-EDA, or other contracts of limited duration, in particular with organizations in the Member States which do not possess Associations.

2. This programme will be carried out through indirect action, whereby the Community makes a financial contribution to research and training activities carried out by third parties or by the JRC in association with third parties.

   (a) Shared-cost actions

   Projects will be covered by shared-cost research and technological development contracts. Creation of consortia for integrated projects with a common objective will be stimulated.

   The Community's financial contribution to the current expenditure of the Associations and to contracts of limited duration will, normally, be at an annual uniform rate of approximately 25 %. After consulting the CCFP, the Commission may finance:

   — capital costs of specifically defined projects, at a uniform rate of approximately 45 %,

   — certain tasks which can exclusively be carried out by industry, at a rate of up to 100 %.

   Projects shall be selected on the basis of the ordinary procedures set out in the contracts of Association, the JET Statutes, the NET Agreement, the ITER-EDA Agreement and any other Community-wide agreements that may be concluded following the opinion of the consultative committee referred to in Article 5 (2). For projects that are awarded priority status by the Consultative Committee, all Associations and organizations participating in the programme shall have the right to take part in the experiments carried out on the equipment thus constructed.

   The rules for the participation of the Community in the JET Joint Undertaking are defined in the Joint Undertaking's Statutes, adopted by the Council in Decision 78/471/Euratom as last amended by Decision 91/677/Euratom.

   The rules for the participation of the Community in the ITER design activities (ITER-EDA) are defined in the EDA Agreement [1], Protocol 2 thereto and the accompanying documents [2].

   (b) Concerted actions, which consist in coordinating research and training projects already being financed by public authorities or private bodies. A concerted action may also provide the coordination necessary for the operation of thematic networks which, through shared-cost actions, bring together manufacturers, users, universities and research centres around a single technological or industrial objective.

   The Community participation may cover up to 100 % of the costs of the concertation.

   (c) Preparatory, accompanying and support measures such as:

   — studies in support of this programme and in preparation for future activities,

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[1] OJ No L 244, 26. 8. 1992, p. 14.
[2] OJ No L 114, 5. 5. 1994, p. 25.

— support for exchanges of information, conferences, seminars, workshops or other scientific or technical meetings, including meetings on intersectoral or multidisciplinary coordination,

— use of external expertise, including access to scientific data bases,

— scientific publications and activities for the dissemination, promotion and exploitation of results, in coordination with the activities conducted under the third action of the fourth framework programme of the European Community activities in the field of RTD,

— analysis of the socio-economic consequences and technological risks associated with the programme,

— training actions related to research covered by ths programme and which may facilitate technology transfer,

— independent evaluation of the programme and of the implementation of the activities.

Community funding may cover up to 100 % of the costs of these measures.

Extract from the proposal for a Council Decision for the JRC programme (COM(94)70 final – 94/0074 (CNS)) concerning the activities envisaged for the Joint Research Centre (JRC) in the areas covered by the specific programme of research and training in the field of controlled thermonuclear fusion

This activity forms part of the Community fusion research programme. It is aimed at improving the pool of knowledge and the technology of the 'safety and environment' dimension of future machines intended for the European programme. The bulk of the work will be dedicated to support for the international thermonuclear experimental reactor (ITER) but may also involve any other fusion reactor.

For this purpose, the JRC has designed and constructed the European tritium handling laboratory (Ethel). The aim of this installation is the development of methods of handling tritium, but special attention will be paid to the verification and validation of methods of preventing and reducing tritium and activation product waste in the work area and the environment under both normal and accident conditions.

The laboratory is also able to offer research capability to any other European organization which is a member of the Community fusion programme or is associated with it.

Part of the activities will concern the development and characterization of materials to meet the following requirements: good compatibility with tritium, behaviour as effective barriers against infiltration of tritium with low induced radioactivity. The JRC, which has long experience in this field, will make a significant contribution within the framework of the ITER and for the longer-term requirements of the fusion programme.

In addition to these activities, more general studies, including operational safety during maintenance, will be conducted by the JRC in line with specific demands relating to the ITER project or, more broadly, the fusion programme, in particular studies on low-activation materials and remote handling.