

**COUNCIL DECISION****of 30 September 2002****adopting a specific programme (Euratom) for research and training on nuclear energy (2002–2006)**

(2002/837/Euratom)

THE COUNCIL OF THE EUROPEAN UNION,

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

Having regard to the proposal from the Commission <sup>(1)</sup>,

Having regard to the Opinion of the European Parliament <sup>(2)</sup>,

Having regard to the Opinion of the Economic and Social Committee <sup>(3)</sup>,

Whereas:

- (1) By Decision No. 2002/668/Euratom <sup>(4)</sup> the Council adopted the Sixth Framework Programme of the European Atomic Energy Community (Euratom) for nuclear research and training activities, also contributing to the creation of the European Research Area (2002-2006) (hereinafter referred to as 'the framework programme') to be implemented by means of research and training programme(s) drawn up in accordance with Article 7 of the Treaty, which define the detailed rules for their implementation, fix their duration and provide for the means deemed necessary.
- (2) The rules for the participation of undertakings, research centres and universities for the implementation of the framework programme, (hereinafter referred to as 'the rules for participation') should apply to this programme.
- (3) The Commission's administrative expenditure for the implementation of this programme reflects the high number of staff seconded to laboratories in the members States and to the ITER project.
- (4) Pending the conclusion of international negotiations on ITER and a possible decision on its joint implementation, European Community leadership in fusion research should be maintained.
- (5) This programme is open to the participation of countries having concluded the necessary agreements to this effect, and is also, except in the case of fusion research, open on the project level, and on the basis of mutual benefit, to the participation of entities from third countries and of international organisations for scientific cooperation.
- (6) In implementing this programme, emphasis should be given to promoting mobility of researchers, and innovation, in the Community as well as international cooperation activities with third countries and international organisations. Special attention should be paid to the candidate countries.
- (7) Research activities carried out within this programme should respect fundamental ethical principles, including those reflected in Article 6 of the Treaty on the European Union and in the Charter of Fundamental Rights of the European Union, as well as the need to take into account public acceptability of these activities.
- (8) Following the Commission Communication 'Women and Science' and the Resolutions of the Council of 20 May 1999 <sup>(5)</sup> and 26 June 2000 <sup>(6)</sup> and the Resolution of 3 February 2000 of the European Parliament <sup>(7)</sup> on this theme, an action plan is being implemented in order to reinforce and increase the place and role of women in science and research, which should ensure the respect of equality of opportunity, irrespective of gender.
- (9) This programme should be implemented in a flexible, efficient and transparent manner, taking account of relevant interests, in particular of the scientific, industrial, user and policy communities. The research activities carried out under it should be adapted where appropriate to the needs of Community policies and to scientific and technological developments.

<sup>(1)</sup> OJ C 181 E, 30.7.2002, p. 112.

<sup>(2)</sup> Opinion delivered on 13 June 2002 (not yet published in the Official Journal).

<sup>(3)</sup> OJ C 221, 17.9.2002, p. 97.

<sup>(4)</sup> OJ L 232, 29.8.2002, p. 34.

<sup>(5)</sup> OJ C 201, 16.7.1999, p. 1.

<sup>(6)</sup> OJ C 199, 14.7.2001, p. 1.

<sup>(7)</sup> OJ C 309, 27.10.2000, p. 57.

(10) Participation in the activities of this programme should be encouraged through publication of the necessary information on content, conditions and procedures, to be made available in a timely and thorough manner to potential participants, including those from the associated candidate countries and other associated countries.

*Article 4*

1. The detailed rules for financial participation by the Community in the specific programme shall be those referred to in Article 2(2) of the framework programme.

(11) The Commission should in due course arrange for an independent assessment to be conducted concerning the activities carried out in the fields covered by this programme. Such an assessment should be carried out in a spirit of openness with respect to all the relevant actors.

2. The specific programme shall be implemented by means of instruments defined in Annex III.

3. The rules for participation shall apply to the specific programme.

(12) The Scientific and Technical Committee has been consulted,

*Article 5*

HAS ADOPTED THIS DECISION:

1. The Commission shall draw up a work programme for the implementation of the specific programme, setting out in greater detail the objectives and scientific and technological priorities set out in Annex I, the timetable for implementation and the instruments to be used.

*Article 1*

1. In accordance with the framework programme, a specific programme for research and training on nuclear energy (hereinafter referred to as 'the specific programme') is hereby adopted for the period from 30 September 2002 to 31 December 2006.

2. The work programme shall take account of relevant research activities carried out by the Member States, Associated States, European and international organisations. It shall be updated where appropriate.

2. The objectives and scientific and technological priorities for the specific programme are set out in Annex I.

*Article 6*

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

*Article 2*

In accordance with Annex II to the framework programme, the amount deemed necessary for the execution of the specific programme is EUR 940 million, including a maximum of 16,5 % for the Commission's administrative expenditure. An indicative breakdown of this amount is given in Annex II to this decision.

2. For the purposes of implementing the specific programme the Commission shall be assisted by a consultative committee. The members of this committee can vary according to the different subjects on the committee's agenda. For fission-related aspects, the composition of this committee and the detailed operational rules and procedures applicable to it shall be as laid down in Council Decision 84/338/Euratom, ECSC, EEC of 29 June 1984 dealing with structures and procedures for the management and coordination of Community research, development and demonstration activities<sup>(1)</sup>. For the fusion-related aspects they shall be as laid down in the Commission Decision of 16 December 1980 dealing with the consultative committee for the fusion programme.

*Article 3*

All research activities carried out under the specific programme shall be carried out in compliance with fundamental ethical principles.

<sup>(1)</sup> OJ L 177, 4.7.1984, p. 25.

*Article 7*

1. The Commission shall regularly report on the overall progress of the implementation of the specific programme, in accordance with Article 5(2) of the framework programme, information on financial aspects shall be included.

2. The Commission shall arrange for the independent monitoring and assessment provided for in Articles 5 and 6 of the framework programme to be conducted concerning the activities carried out in the fields covered by the specific programme.

*Article 8*

This Decision is addressed to the Member States.

Done at Brussels, 30 September 2002.

*For the Council*

B. BENDTSEN

*The President*

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## ANNEX I

**SCIENTIFIC AND TECHNOLOGICAL OBJECTIVES AND BROAD LINES OF THE ACTIVITIES****1. Introduction**

As the source of 35 % of the electricity produced in the European Union, nuclear energy is an element of the debate on how to combat climate change and reduce the energy dependency of the European Union. However significant challenges need to be faced. Controlled thermonuclear fusion is one of the long term options for energy supply, in particular for the centralised supply of base-load electricity. The priority is to make progress towards demonstrating the scientific and technological feasibility of fusion energy and assessing its sustainable qualities. In the short term, ways of dealing with nuclear waste that are both safe and acceptable to society need to be found, and more particularly the implementation of technical solutions for the management of long-lived waste. Innovative concepts for the safer exploitation of nuclear fission should also be studied as possible contributions to meeting European energy needs in the decades ahead. The high standards of radiation protection in the Community must be maintained through focused and coordinated research, in particular into the effects of low levels of exposure.

Cooperation at European level, including the exchange of scientists and common research programmes, is already well established in this field. In respect of nuclear waste, radiation protection and other activities, this will be intensified and deepened at programme and project level in order to make better use of resources (both human resources and experimental facilities) and promote a common European view on key problems and approaches, in accordance with the needs of the European research area. Links will be established with national programmes and networking will be promoted with third countries, in particular, USA, the Newly Independent States of the Former Soviet Union (NIS), Canada and Japan. In the case of fusion, the Community, the Member States and Countries Associated with the activities covered by the Euratom Framework Programme will continue to work within the framework of an integrated programme of activities.

Coordination will be assured with the JRC programme on 'nuclear safety and safeguards'.

**2. Priority thematic areas****2.1. Fusion energy research****Objectives**

Fusion energy could contribute in the second half of the century to the emission-free large-scale production of base-load electricity. The advances made in fusion energy research justify further pursuing a vigorous effort towards the long-term objective of a fusion power plant. Theoretical work and experimental studies on the existing devices world-wide, in particular on JET, have established the scientific and technical readiness for the construction of a project of the next generation after JET with the objective of demonstrating the scientific and technological feasibility of fusion energy. World wide collaboration on fusion energy research has progressed to the detailed engineering design of such a Next Step device, ITER, with the objectives of extended burn in inductive operation with power amplification  $Q > 10$ , demonstrating generation of 400 MW of fusion power over about 400 seconds, that could allow burning plasmas to be studied in conditions relevant to energy production.

The successful completion of the ITER Engineering Design Activities makes it possible, in line with the reactor orientation of the Community activities on fusion energy research, to take a decision about the realisation of the Next Step. Subject to a positive outcome of the international negotiations on the legal and institutional conditions of the establishment of an ITER Legal Entity and negotiations for its joint implementation (construction, operation, exploitation and decommissioning), a specific decision could be sought in the period 2003-2004, so that construction could effectively start during the period 2005-2006. The period 2003-2006 has therefore to be seen as a transition period marked by the need to rationalise European activities due to the strong orientation of the programme towards the Next Step.

If and when decided, the realisation of the Next Step will mobilise significant human and financial resources. Once a decision is taken to go ahead with the project, adaptations to the current efforts of the European partners of Euratom in the field of fusion and organisational changes will be required, in particular to steer jointly the European contribution to ITER. The continuation of a meaningful R&D programme will be ensured, including the transition between the activities currently carried out in the framework of the Associations <sup>(1)</sup> and JET, and what would become the 'accompanying programme' in physics and technology for fusion once the construction of the Next Step/ITER device, if decided, has reached its steady state after 2006.

#### Priorities

##### (i) *Associations' programme in physics and technology*

The Associations' programme will include:

- R&D in fusion physics and plasma engineering, focusing on the preparation of ITER operation and the study and evaluation of toroidal magnetic confinement formulas, with in particular the continuation of the construction of the Wendelstein 7-X 'stellarator' and operation of the existing installations in the Euratom Associations.
- Structured R&D activities in fusion technology in particular research on fusion materials and participation in the R&D activities for the decommissioning of JET, which is foreseen at the end of its operations.
- Investigations of socio-economic aspects, focusing on evaluation of economic costs and social acceptability of fusion energy, by way of complement to the further studies on safety and environmental aspects; coordination, in the context of a keep-in-touch activity, of the Member States' civil research activities on inertial confinement and possible alternative concepts; dissemination of results and the diffusion of information to the public; mobility and training.

In contributing to the Associations' programme, priority will be given to multilateral actions to focalise activities on common projects such as those directly related to operation on JET and to the Next Step/ITER and/or staff training. Depending on a decision on the realisation of ITER and its timing, the current Community support to the Associations activities will be adjusted, and the phasing out of the exploitation of a number of facilities will be considered. Adequate means shall be ensured to maintain a strong European coordination of the fusion activities, which has demonstrated its usefulness over the years.

The extent of the accompanying domestic programme in fusion physics and technology which is required in the Associations and European industry to take full benefit from ITER, will depend (a) on the level of the European share in ITER and (b) on where would be sited. This could entail investments aiming at maintaining experimentation on fusion devices at world-class level in Europe beyond the start of operation of ITER and an adequate programme of technological development.

##### (ii) *Exploitation of the JET facilities*

The JET facilities will continue to be exploited in the framework of the European Fusion Development Agreement (EFDA), in view of preparing the ITER operation by completing the exploitation of the performance enhancements currently under way. The use of the JET facilities should be phased out progressively according to the schedule of the ITER realisation and to the availability of the necessary financial resources.

##### (iii) *Next Step/ITER*

The Proposal for the Euratom framework programme (2002-2006) includes the continuation of Next Step activities with a view to participating in its construction in the second half of the period. However, since decisions on ITER do not depend only upon European Union Institutions but also on the European Union international partners, the proposed programme of activities must be open regarding the eventual siting and framework of the Next Step/ITER and the precise content of the accompanying domestic programme. The studies performed in preparation of possible European site(s) will be completed.

<sup>(1)</sup> Established under contracts of associations between the Community and entities in the Member States and in countries associated to the EURATOM framework programme.

The European Union participation in ITER would include contributions to the construction of equipment and installations, which are within the perimeter of the ITER site and necessary for its exploitation, as well as to the costs associated with the staffing and management of, and the support to be given to, the project during construction. The level and nature of this participation will depend on the outcome of the negotiations with the European Union international partners, and in turn on the location of the ITER site. If ITER was located in Europe, the European Union participation would also include contribution to the costs to be borne by Europe as a Host Party.

## 2.2. *Management of radioactive waste*

### Objectives

The absence of a broadly agreed approach to waste management and disposal is one of the main impediments to the continued and future use of nuclear energy. In particular, this applies to the management and disposal of long-lived waste components in geological repositories, which will be required no matter what treatment method is chosen for the spent fuel and high level waste. Research alone cannot ensure societal acceptance; however, it is needed in order to develop and test the repository technologies, investigate suitable sites, promote basic scientific understanding relating to safety and safety assessment methods, and to develop decision processes that are perceived as fair and equitable by the stakeholders involved.

Research is also needed to explore the technical and economic potential of concepts for nuclear energy generation able to make better use of fissile material and generate less waste and of partitioning and transmutation to reduce the hazard of the waste, on an industrial scale.

### Research Priorities

#### (i) *Research on geological disposal*

The aims are to establish a sound technical basis for demonstrating the safety of disposing spent fuel and long lived radioactive wastes in geological formations and underpin the development of a common European view on the main issues related to the management and disposal of waste.

- Improvement of fundamental knowledge, developing and testing technologies: research will focus on key physical, chemical and biological processes; interaction between the different natural and engineered barriers, their long-term stability and means of implementing disposal technologies in underground research laboratories.
- New and improved tools: research will focus on models for performance, and safety assessment, and methodologies to demonstrate long term safety, including sensitivity and uncertainty analyses, and development and evaluation of alternative measures of performance and of better governance processes that properly address public concerns on waste disposal.

#### (ii) *Partitioning and transmutation and other concepts to produce less waste in nuclear energy generation*

The aims are to determine practical ways of reducing the amount and/or hazard of the waste to be disposed of by partitioning and transmutation and to explore the potential of concepts for nuclear energy to produce less waste.

- Partitioning and transmutation: research will focus on fundamental assessments of the overall concept; demonstration at small scale of the most promising partitioning technologies; further development of technologies for transmutation; and evaluation of their industrial practicability.
- Concepts to produce less waste: research will focus on exploring the potential for the more efficient use of fissile material in existing reactors and of other concepts to produce less waste in nuclear energy generation.

### 2.3. **Radiation protection**

#### Objectives

Radiation is used extensively in medicine and industry (including the generation of nuclear energy) and its safety is predicated on a sound radiation protection policy and its effective implementation. Community research underpins European policy and has contributed to the high levels of protection achieved in practice. These standards must be maintained and, in some cases, improved and research has a key role in this process. The main objective is to resolve uncertainties in the risk from exposures to radiation at low and protracted doses (ie, at levels typically encountered by the population and in workplaces) which remains a controversial scientific and policy issue, and has important implications for the use of radiation in both medicine and industry. Community research in other areas will focus on making better use of national efforts, principally through their more effective integration by networking and targeted research where this would either be complementary to, or provide synergy with, national programmes.

#### Research priorities

- Quantification of risks associated with low and protracted exposure: research will focus on epidemiological studies of suitable exposed populations, and on cellular and molecular biology research on the interaction between radiation and the DNA, cells, organs and the body.
- Medical exposure and natural sources of radiation: enhancing the safety and efficacy of medical uses of radiation; better understanding, assessment and management of natural sources, in particular, naturally occurring radioactive materials.
- Protection of the environment and radioecology: conceptual and methodological basis for protection of the environment; better assessment and management of the impact of natural and artificial sources of radiation on man and the environment.
- Risk and emergency management: better approaches for risk governance; more effective and coherent emergency management in Europe, including rehabilitation of contaminated areas.
- Protection of the workplace: improved monitoring and management of occupational exposure in industries involving exposure to radiation.

### 3. **Other activities in the field of nuclear technologies and safety**

#### Objectives

The objectives are to support European Union policies in the fields of health, energy and the environment, to ensure that European capability is maintained at a high level in relevant fields not covered by the thematic priorities and to contribute towards the creation of the European Research Area.

#### Research priorities

##### (i) *Innovative concepts*

The aims are to evaluate the potential of innovative concepts and develop improved and safer processes in the field of nuclear energy. Research will focus on:

- Evaluation of the potential of innovative concepts and development of improved and safer processes for the generation and exploitation of nuclear energy that have been identified as offering longer term benefits in terms of safety, environmental impact, resource utilisation, proliferation resistance or diversity of application.

(ii) *Education and training*

The aim is to better integrate European education and training in nuclear safety and radiation protection to combat the decline in both student numbers and teaching establishments, thus providing the necessary competence and expertise for the continued safe use of nuclear energy and other uses of radiation in industry and medicine. Support will focus on:

- development of a more harmonised approach for education in the nuclear sciences and engineering in Europe and its implementation, including better integration of national resources and capabilities.

This will be complemented by support for fellowships, special training courses, training networks, grants for young research workers from the NIS and CEE countries, and transnational access to infrastructure. As regards infrastructures, transnational access to installations will be promoted. A further step will be to initiate a common analysis of the future European Union needs in human resources and competencies and experimental tools in the mid-term.

(iii) *Safety of existing nuclear installations*

The aim is to improve safety in existing nuclear installations in Member States and candidate countries during their remaining operational lifetimes and subsequent decommissioning, making use of the considerable knowledge and experience gained internationally from experimental and theoretical research. Research will focus on:

- plant management including effects of ageing and fuel performance; severe accident management, including the development of advanced numerical simulation codes; integration of European capabilities and knowledge from practical decommissioning; developing scientific bases for safety and best practice, at a European level.
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## ANNEX II

## INDICATIVE BREAKDOWN OF THE AMOUNT

Types of activities		Amount (EUR million)
1.	Priority thematic areas of research	890
1.1.	Controlled thermonuclear fusion <sup>(1)</sup>	750
1.2.	Management of radioactive waste	90
1.3.	Radiation protection	50
2.	Other activities in the field of nuclear technologies and safety	50
<b>Total</b>		<b>940</b>

<sup>(1)</sup> Including up to a maximum of EUR 200 million for ITER.

## ANNEX III

**MEANS FOR IMPLEMENTING THE PROGRAMME**

In order to implement the specific programme, and in accordance with Decision 2002/668/Euratom, and with the rules for participation, the Commission will use various instruments.

The Commission will evaluate the proposals in accordance with the evaluation criteria set out in the above mentioned Decisions.

The indirect RTD actions implemented in the area of thermonuclear fusion and in the framework of contracts, agreements or legal entities to which the Community is a party or of which it is a member, conform to the rules which have been established for them, in conformity with the Regulation on the rules of participation.

In carrying out the programme, the Commission may have recourse to technical assistance.

The instruments for implementing the programme will be as follows:

**1. Instruments in fusion energy**

In the field of fusion energy research under heading 1.1 of Annex I, the particular nature of the activities in this area necessitates the implementation of specific arrangements. The projects undertaken will be carried out on the basis of procedures set out in:

- contracts of association,
- the European Fusion Development Agreement (EFDA),
- any other multilateral agreement concluded between the Community and associated organisations and/or legal entities which may be set up, after the competent consultative committee has given its opinion,
- other contracts of limited duration, in particular with bodies in the Member States or the States associated with the Euratom Framework Programme,
- international agreements covering projects carried out in the framework of cooperation with third countries, such as the ITER.

The activities to coordinate and support fusion energy research may concern studies in support of these activities, support for information exchange, recourse to external expertise capacities, including for the independent evaluation of activities, fellowships and training schemes, publications and other actions to promote technology transfer.

**2. Instruments in Other Fields**

In the fields of management of radioactive waste and radiation protection of the priority thematic areas of research under headings 1.2 and 1.3 of Annex I as well in other activities under heading 2, the Community, subject to the rules for participation, will contribute:

- to networks of excellence, aimed at strengthening and developing Community scientific and technological excellence by means of the integration, at European level, of research capacities currently existing or emerging at both national and regional level,

- to integrated projects, designed to give increased impetus to the Community's competitiveness or to address major societal needs by mobilising a critical mass of research and technological development resources and competences,
- specific targeted research or training projects, designed to gain new knowledge either to improve considerably or to develop new products, processes or services or to meet other needs of society and Community policies or to demonstrate the viability of new technologies offering potential economic advantage but which cannot be commercialised directly, or to facilitate the timely diffusion of new knowledge on a European scale and better integrate national activities,
- actions to promote and develop human resources and mobility,
- coordination actions, intended to promote and support coordinated initiatives of a range of research and innovation operators aiming at improved integration,
- specific support actions, such as actions aimed at exploiting the results of research and transfer of knowledge and actions in support of research infrastructure relating to, for instance, transnational access or preparatory technical work (including feasibility studies),
- integrated infrastructure initiatives, combining in a single action several activities essential to reinforce and develop research infrastructures in order to provide services at the European level.

The Community's budgetary intervention in indirect actions is aimed at research centres, universities, businesses and national or international bodies situated in the Member States and the European Associated States which carry out research activities. The latter may also act as intermediaries for Community budgetary intervention. Where this proves necessary to achieve the objectives of the programme, bodies in the Newly Independent States (NIS) and international organisations may exceptionally receive Community funding. The Community financial contribution according to type of instrument is set out in the table below.

#### RTDT activities and Community financial contribution according to type of instrument <sup>(1)</sup>

Type of instrument	Community contribution <sup>(*)</sup> <sup>(?)</sup>
Networks of Excellence	Grant for integration: maximum of 25 % of the value of the capacity and resources proposed for integration by participants as a fixed amount to support the joint programme of activities <sup>(?)</sup>
Integrated Projects	Grant to the budget of a maximum of: <ul style="list-style-type: none"> <li>— 50 % for research</li> <li>— 35 % for demonstration</li> <li>— 100 % for certain other activities such as training of researchers and consortium management <sup>(5)</sup> <sup>(6)</sup></li> </ul>
Specific targeted research or training projects	Grant to the budget of a maximum of 50 % of the budget <sup>(4)</sup> <sup>(5)</sup>
Actions to promote and develop human resources and mobility	Grant to the budget of a maximum of 100 % of the budget <sup>(4)</sup> if necessary as a lump sum
Coordination actions	Grant to the budget of a maximum of 100 % of the budget <sup>(4)</sup>

Type of instrument	Community contribution <sup>(*)</sup> <sup>(?)</sup>
Specific support actions	Grant to the budget of a maximum of 100 % of the budget <sup>(4)</sup> <sup>(7)</sup> if necessary as a lump sum
Integrated initiatives relating to infrastructure	Grant to the budget: depending on the type of activity, of 50 to 100 % of the budget <sup>(4)</sup> <sup>(5)</sup> <sup>(6)</sup>

(\*) In this column budget means a financial plan estimating all the resources and expenditure needed to carry out the action.

(1) The indirect RTD actions implemented in the area of thermonuclear fusion and in the framework of contracts, agreements or legal entities to which the Community is a party or of which it is a member, conform to the rules which have been established for them, in conformity with the Regulation on the Rules for participation.

(2) As a general principle, the Community financial contribution cannot cover 100 % of the expenditure of an indirect action with the exception of proposals covering a purchase price governed by the terms applicable to public procurement procedures or taking the form of a pre-defined lump sum pre-set by the Commission.

However, the Community financial contribution may bear up to 100 % of the expenditure of an indirect action if they complement those otherwise borne by the participants. Also, in the specific case of coordination actions, it covers up to 100 % of the budget necessary for the coordination of activities funded by the participants themselves.

(3) This rate varies for different areas.

(4) Subject to specific conditions specific legal entities, particularly public bodies, will receive funding of up to 100 % of their marginal/additional cost.

(5) The rates of assistance may be differentiated in accordance with the rules of the Community framework for State aid for research and development depending on whether activities relate to research (maximum 50 %) or demonstration (maximum 35 %) or to other activities implemented, such as training of researchers (maximum 100 %) or the management of the consortium (maximum 100 %).

(6) The activities of an integrated initiative relating to infrastructure must include one networking activity (Coordination Action: maximum 100 % of the budget) and at least one of the following activities: research activities (maximum 50 % of the budget) or specific service activities (Specific Support Action, for example, transnational access to research infrastructures: maximum 100 % of the budget).

(7) For actions in support of research infrastructure relating to preparatory technical work (including feasibility studies) and the development of new infrastructure, Community participation is restricted to maximum of 50 % and 10 % of the budget respectively.