

Corrigendum to Council Decision 2006/976/Euratom of 19 December 2006 concerning the specific programme implementing the Seventh Framework Programme of the European Atomic Energy Community (Euratom) for nuclear research and training activities (2007 to 2011)

(Official Journal of the European Union L 400 of 30 December 2006)

Decision 2006/976/Euratom should read as follows:

COUNCIL DECISION

of 19 December 2006

concerning the specific programme implementing the Seventh Framework Programme of the European Atomic Energy Community (Euratom) for nuclear research and training activities (2007 to 2011)

(2006/976/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,

Having regard to the opinion of the European Parliament ⁽¹⁾,

Having regard to the opinion of the European Economic and Social Committee ⁽²⁾,

Having consulted the Scientific and Technical Committee,

Whereas:

- (1) In accordance with Council Decision 2006/970/2006/Euratom of 18 December 2006 concerning the Seventh Framework Programme of the European Atomic Energy Community (Euratom) for nuclear research and training activities, (2007 to 2011) ⁽³⁾ (hereinafter referred to as the Framework Programme), the Framework Programme is to be implemented through specific programmes that define detailed rules for their implementation, fix their duration and provide for the means deemed necessary.
- (2) The Framework Programme is structured in two types of activities: (i) indirect actions in fusion energy research and research on nuclear fission and radiation protection, and (ii) direct actions for activities of the Joint Research Centre in the field of nuclear energy. The activities under (i) should be implemented by this specific programme.
- (3) The rules for the participation of undertakings, research centres and universities and for the dissemination of research results, for the Framework Programme (hereinafter

referred to as 'the rules for participation and dissemination') should apply to this programme.

- (4) The Framework Programme should complement other EU actions in the area of the research policy that are necessary for the overall strategic effort for the implementation of the Lisbon strategy, alongside in particular those on education, training, culture, competitiveness and innovation, industry, health, consumer protection, employment, energy, transport and environment.
- (5) With reference to the Council Decision of 26 November 2004 amending the directives of negotiations on ITER, the realisation of ITER in Europe, in a broader approach to fusion energy, will be the central feature of the activities on fusion research carried out under the Framework Programme.
- (6) The EU activities to contribute to the realisation of ITER, and in particular those necessary for starting the construction of ITER at Cadarache and executing the ITER Technology R & D during the Framework Programme should be steered by a joint undertaking within the meaning of Title II, Chapter 5 of the Treaty.
- (7) Aspects of research and technological development in the field of nuclear fission science and technology may also be amenable to implementation through Joint Undertakings established under Title II, Chapter 5 of the Treaty.
- (8) In accordance with Article 101 of the Treaty, the Community has concluded a number of international agreements in the field of nuclear research, and efforts should be made to strengthen international research cooperation with a view to further integrating the Community into the world-wide research community.

⁽¹⁾ Opinion delivered on 30 November 2006 (not yet published in the Official Journal).

⁽²⁾ OJ C 185, 8.8. 2006, p. 10.

⁽³⁾ OJ L 400, 30.12.2006, p. 60. Decision as corrected on p. 21 of this Official Journal.

Therefore, this specific programme should be open to the participation of countries having concluded agreements to this effect and should be also 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.

- (9) Research activities carried out within this programme should respect fundamental ethical principles, including those which are reflected in the Charter of Fundamental Rights of the European Union.
- (10) The Framework Programme should contribute towards promoting sustainable development.
- (11) Sound financial management of the Framework Programme and its implementation should be ensured in the most effective and user-friendly manner possible, while ensuring legal certainty and the accessibility of the programme for all participants, in accordance with Council Regulation (EC, Euratom) No 1605/2002 of 25 June 2002 on the Financial Regulation applicable to the general budget of the European Communities ⁽¹⁾ and Commission Regulation (EC, Euratom) 2342/2002 ⁽²⁾ laying down detailed rules for the implementation of that Financial Regulation and any future amendments.
- (12) Appropriate measures — proportionate to the European Communities' financial interests — should be taken to monitor both the effectiveness of the financial support granted and the effectiveness of the utilisation of these funds in order to prevent irregularities and fraud and the necessary steps should be taken to recover funds lost, wrongly paid or incorrectly used in accordance with Regulation (EC, Euratom) No 1605/2002, Commission Regulation (EC, Euratom) No 2342/2002, Council Regulations (EC, Euratom) No 2988/95 of 18 December 1995 on the protection of the European Communities' financial interests ⁽³⁾, (Euratom, EC) No 2185/96 of 11 November 1996 concerning on-the-spot checks and inspections carried out by the Commission in order to protect the European Communities' financial interests against fraud and other irregularities ⁽⁴⁾ and Regulation (EC) No 1073/1999 of the European Parliament and of the Council of 25 May 1999 concerning investigations conducted by the European Anti-Fraud Office (OLAF) ⁽⁵⁾.
- (13) Each thematic area should have its own budget line in the General Budget of the European Communities.
- (14) In the implementation of this programme adequate attention needs to be paid to gender mainstreaming, as well as to, *inter alia*, working conditions, transparency of recruitment processes, and career development as regards the researchers recruited on projects and programmes

funded under the actions of this programme, for which the Commission Recommendation of 11 March 2005 on the European Charter for Researchers and on a Code of Conduct for the Recruitment of Researchers offers a reference framework, while respecting its voluntary nature,

HAS ADOPTED THIS DECISION:

Article 1

The specific programme for nuclear research and training activities in the fields of Fusion Energy, Nuclear Fission and Radiation Protection under the Seventh Euratom Framework Programme, hereinafter the 'specific programme', is hereby adopted for the period from 1 January 2007 to 31 December 2011.

Article 2

The specific programme shall support the activities for research and training on nuclear energy, supporting the whole range of research actions carried out in the following thematic areas:

- (a) fusion energy research;
- (b) research on nuclear fission and radiation protection.

The objectives and the broad lines of those activities are set out in the Annex.

Article 3

In accordance with Article 3 of the Framework Programme, the amount deemed necessary for the execution of the specific programme shall be EUR 2 234 million, of which up to 15 % shall be for the Commission's administrative expenditure. This amount shall be allocated as follows:

	(EUR million)
Fusion energy research ⁽¹⁾	1 947
Nuclear fission and radiation protection	287

⁽¹⁾ Within the amount foreseen for fusion energy research, at least EUR 900 million will be reserved for activities other than the construction of ITER, listed in the Annex.

Article 4

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

Article 5

1. The specific programme shall be implemented by means of the funding schemes established in Annex II to the Framework Programme.

⁽¹⁾ OJ L 248, 16.9.2002, p. 1.

⁽²⁾ OJ L 357, 31.12.2002, p. 1. Regulation as last amended by Regulation (EC, Euratom) No 1248/2006 (OJ L 277, 19.8.2006, p. 3).

⁽³⁾ OJ L 312, 23.12.1995, p. 1.

⁽⁴⁾ OJ L 292, 15.11.1996, p. 2.

⁽⁵⁾ OJ L 136, 31.5.1999, p. 1.

2. The rules for participation and dissemination shall apply to this specific programme.

Article 6

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 the Annex, the funding schemes to be used for the topic on which proposals are invited, and the timetable for implementation.

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

3. The work programme will specify the criteria on which proposals for indirect actions under the funding schemes shall be evaluated and projects selected. The criteria will be those of excellence, impact and implementation and within this framework additional requirements, weightings and thresholds may be further specified or complemented in the work programme.

4. The work programme may identify:

- (a) organisations that receive subscriptions in the form of a membership fee;
- (b) support actions for the activities of specific legal entities.

Article 7

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

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 ⁽¹⁾. For the fusion-related aspects they shall be as laid down in the Council Decision of 16 December 1980 setting up a Consultative Committee for the fusion programme ⁽²⁾.

3. The Commission shall regularly inform the committee of the overall progress of the implementation of the specific programme, and shall provide it with timely information on all RTD actions proposed or funded under this programme.

Article 8

The Commission shall arrange for the independent monitoring, assessment and review provided for in Article 6 of the Framework Programme to be conducted concerning the activities carried out in the fields covered by the specific programme.

Article 9

This Decision shall enter into force on the third day following its publication in the *Official Journal of the European Union*.

Article 10

This Decision is addressed to the Member States.

Done at Brussels, 19 December 2006.

For the Council

The President

J. KORKEAOJA

⁽¹⁾ OJ L 177, 4.7.1984, p. 25.

⁽²⁾ Not yet published, but as last amended by Decision 2005/336/Euratom (OJ L 108, 29.4.2005, p. 64).

ANNEX

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

Nuclear power currently generates one third of all electricity consumed in the EU and, as the most significant source of base load electricity that, during the operation of a nuclear power plant, does not emit CO₂, constitutes an important element in the debate on the means of combating climate change and reducing Europe's dependence on imported energy.

Fusion has the potential to make a major contribution to the realisation of a sustainable and secure energy supply for the EU a few decades from now after the market penetration of commercial fusion reactors with ITER being the major step in the progress towards this goal. The realisation of the ITER project therefore lies at the heart of the present EU strategy, though it must be accompanied by a strong and focused European R & D programme to prepare for the exploitation of ITER and to develop the technologies and knowledge base that will be needed during its operation and beyond.

On the other hand, nuclear fission remains a viable option for those Member States wishing to avail themselves of this technology for a balanced mix of their energy supplies. Research and training activities are of paramount importance in ensuring continued high levels of nuclear safety both now and in the future, maintaining the progress towards implementation of sustainable waste management solutions, and improving efficiency and competitiveness of the sector as a whole. Research in radiation protection constitutes an essential aspect of this policy, ensuring optimal safety of the public and workforce in all medical and industrial applications.

In all domains, the right level of investment in research is essential if Europe is to remain competitive; for maximum effectiveness this requires a concerted approach at the EU level with continued cooperation between Member States and significant efforts to maintain infrastructures, competences and know-how. In general, research will also be needed to explore new scientific and technological opportunities and to respond in a flexible way to new policy needs that arise during the course of the Framework Programme.

2. Thematic areas of research**2.1. Fusion energy**

The construction of ITER at Cadarache in France, and of 'Broader Approach' projects to accelerate the development of fusion energy, will take place within the framework of international cooperation. An international ITER agreement will establish the ITER Organisation. The construction of ITER and Broader Approach projects, and their exploitation together with other facilities in international collaboration will expand such collaboration to an unprecedented level. This will provide significant benefits to Europe, in particular in terms of efficiency and possible cost sharing. The Domestic Agency for ITER will be established as a Joint Undertaking under the Euratom Treaty. It will provide the means for Euratom to discharge its international obligations under the ITER Agreement and to ensure that Euratom provides in an efficient and coherent manner the European contribution to ITER and to Broader Approach projects, including the R & D activities in support of these projects.

Europe's leading position in fusion energy research is due to the combination of a single and fully integrated European fusion programme of the European Research Area (ERA) type, strong continuous Community support, coordination by Euratom, and the development of human capital in the Euratom Fusion Associations. The Fusion Associations are centres of excellence in fusion research and have an extensive network of collaborations, largely based on their experimental facilities. The outstanding technology developments achieved by Euratom in contributing to the ITER Engineering Design Activities and the successful exploitation of the JET facilities have contributed significantly to further enhancing the strong cohesion of the European fusion programme. This has also given Europe the knowledge and experience needed for broad collaborative efforts in all aspects of fusion energy research, including the realisation of ITER and Broader Approach projects. Building on these achievements, the organisation and management of the Seventh Framework Programme will ensure that the R & D will be effectively and efficiently coordinated for the fulfilment of the near and long term goals of the programme.

The rapid development of fusion also requires a wide industrial base to ensure a timely deployment of fusion energy. European industry has already contributed substantially to the ITER Engineering Design Activities. During the Seventh Framework Programme, European industry, including SMEs, will play a central role in the construction of ITER and will position itself to participate fully in the development of fusion power technologies for DEMO (a 'demonstration' fusion power station) and future fusion power plants.

ITER and the European fusion energy research programme will contribute to some of the urgent actions identified in the report of the High Level Group (Kok Report) as necessary to make progress in the Lisbon strategy. In particular, ITER will become a magnet for the best fusion scientists and engineers and high technology industries. This will create benefits for both the European fusion programme and the overall scientific and technical knowledge base. The skills and knowledge which will be acquired by European industry when building systems and components to meet the highly demanding technical requirements of the ITER device will help boost its competitiveness.

Overall objective

To develop the knowledge base for, and to realise ITER as the major step towards, the creation of prototype reactors for power stations that are safe, sustainable, environmentally responsible, and economically viable.

Activities

(i) The realisation of ITER

This includes activities for the joint realisation of ITER as an international research infrastructure, as follows:

the Community will have a special responsibility within the ITER Organisation as the host of the project and will assume a leading role, in particular regarding site preparation, establishing the ITER Organisation, management and staffing, plus general technical and administrative support;

Community participation in ITER as a Party will include contributions to the construction of equipment and installations which are within the perimeter of the ITER site and necessary for its exploitation and support to the project during construction;

the R & D activities in support of ITER construction will be carried out in the Fusion Associations and European industries. They will include the development and testing of components and systems.

(ii) R & D in preparation of ITER operation

A focused physics and technology programme will aim at consolidation of ITER project choices and preparation for a rapid start-up of ITER operation, reducing significantly the time and cost needed for ITER to achieve its baseline objectives. It will be executed through coordinated experimental, theoretical and modelling activities using the JET facilities and other magnetic confinement devices, existing, future or those under construction (Tokamaks, Stellarators, RFPs), and other devices in the Associations, it will ensure that Europe has the necessary impact on the ITER project, and it will prepare for a strong European role in its exploitation. This programme will include:

- assessment of specific key technologies for ITER operation through the completion and exploitation of the JET Enhancements (first wall, heating systems, diagnostics),
- exploration of ITER operating scenarios by means of targeted experiments on JET and other facilities, and coordinated modelling activities.

At an early stage of the Framework Programme, a review will be carried out of the facilities in the programme, examining the possibility of phasing out existing facilities, and considering the need for new devices in parallel to ITER exploitation. The review will be used as a basis for the possible support of new or upgraded devices in order to ensure that the programme will maintain an adequate set of fusion facilities for the relevant R & D.

(iii) Technology activities in preparation of DEMO

Key technologies and materials required for the licensing, construction and operation of the DEMO power plant will be further developed in Associations and industry in order to test them in ITER and to position European industry to be able to construct DEMO and develop future fusion power plants. The following activities will be implemented:

- establishment of a dedicated project team and implementation of the Engineering Validation and Engineering Design Activities (EVEDA) to prepare for the construction of the International Fusion Materials Irradiation Facility (IFMIF), which will be used for testing materials of a fusion power station — an essential pre-condition for the licensing of DEMO,
- development, irradiation testing and modelling of low activation and radiation resistant materials; development of the key technologies required for fusion power plant operation, including blankets; conceptual design activities of DEMO, including safety and environmental aspects.

(iv) R & D activities for the longer term

Building on the activities aimed specifically at ITER and DEMO, the fusion programme will develop competences and enlarge the knowledge base in fields which are strategically relevant to future fusion power stations. These research activities will lead to enhanced technical feasibility and economic viability of fusion power. Specific actions for these purposes in the Seventh Framework Programme will include:

- improved concepts for magnetic confinement schemes will be studied on those concepts offering a high reactor potential, including stellarators. Work will concentrate on completion of the W7-X stellarator; utilisation of existing devices for expansion of the experimental databases; and appraisal of the future perspectives for these configurations,
- an experimental fusion physics programme, which will be carried out with the objective of realising a comprehensive understanding of fusion plasmas aimed at the optimisation of power station design,
- theory and further modelling with the ultimate aim of a comprehensive understanding of reactor-grade fusion plasmas,
- studies of the sociological aspects and economics of fusion power generation, and actions aimed at the promotion of public awareness and understanding of fusion;

The existing activity in Inertial Fusion Energy, which maintains a watching brief on Member States' civil research activities on inertial confinement will continue.

(v) Human resources, education and training

Ensuring adequate human resources and a high level of cooperation within the programme, both for the immediate and medium term needs of ITER, and for the further development of fusion, will be addressed by:

- support for the mobility of researchers between organisations participating in the programme, in order to promote enhanced collaboration and integration of the programme, and to foster international cooperation,
- high-level training for engineers and researchers at post-graduate and post-doctoral level, including the use of facilities in the programme as training platforms and dedicated seminars and workshops. Action shall be taken to foster cooperation between participants in the programme in higher education, which may include masters and doctoral courses in Physics and Engineering for Fusion,
- promotion of innovation and exchange of know-how with related universities, research institutes and industry,
- encouragement in the generation of patents.

(vi) Infrastructures

The realisation of ITER in Europe, in the international framework of the ITER Organisation, will be an element of the new research infrastructures with a strong European dimension.

(vii) Technology transfer processes

ITER will require new and more flexible organisational structure to enable the process of innovation and technological progress which it creates to be swiftly transferred to industry, so that the challenges can be met to enable European industry to become more competitive.

(viii) Responding to emerging and unforeseen policy needs

A 'fast track' fusion development programme could bring fusion energy earlier to the market, as part of a wider policy of addressing the issues of the security of Europe's energy supply, climate change, and sustainable development. The primary objective and a major milestone of the 'fast track' would be an earlier realisation of DEMO. In the Seventh Framework Programme, this would involve activities and projects embedded in the international Broader Approach to fusion energy, undertaken by Euratom in collaboration with ITER partners.

2.2. Nuclear fission and radiation protection

Indirect actions will be undertaken in five principal areas of activity detailed below. The overall objective is to enhance in particular the safety performance, resource efficiency and cost-effectiveness of nuclear fission and uses of radiation in industry and medicine. However, important cross-cutting links exist throughout the programme, and interactions between

different activities must be adequately accommodated. Crucial in this respect are support for training activities and research infrastructures. Training needs must constitute a key aspect of all Community-funded projects in this sector, and these together with support for infrastructures will be an essential component in addressing the nuclear competence issue.

A common European view on key problems and approaches is required in accordance with the needs of strengthening the European Research Area. Links will be established among national programmes and networking will be promoted with international organisations and third countries including the USA, NIS, Canada and Japan. Where there is a clear Community interest, Euratom must play a full role in existing forums coordinating RTD (research and technological development) activities at the international level. Coordination will also be assured where appropriate with the programme of direct actions carried out by the JRC in this field as well as with indirect actions under fusion energy research.

Equally important links must be established with research in the EC Framework Programme, in particular in the activities of European standards, education and training, environmental protection, material science, governance, common infrastructures, security, safety culture and energy. International collaboration will be a key feature of the activities in many of the thematic areas.

(i) Management of radioactive waste

Objectives

Through implementation-oriented RTD, the activities aim to establish a sound scientific and technical basis for demonstrating the technologies and safety of disposal of spent fuel and long-lived radioactive wastes in geological formations, to underpin the development of a common European view on the main issues related to the management and disposal of waste, and to investigate ways of reducing the amount and/or hazard of the waste by partitioning and transmutation or other techniques.

Activities

Geological disposal: RTD in the field of geological disposal of high-level and/or long-lived radioactive waste involving engineering studies and demonstration of repository designs, *in situ* characterisation of repository host rocks (in both generic and site-specific underground research laboratories), understanding of the repository environment, studies on relevant processes in the near field (waste form and engineered barriers) and far-field (bedrock and pathways to the biosphere), development of robust methodologies for performance and safety assessment and investigation of governance and societal issues related to public acceptance.

Partitioning and Transmutation: RTD in all technical areas of partitioning and transmutation which could be the basis for the development of pilot facilities and demonstration systems for the most advanced partitioning processes and transmutation systems, involving sub-critical and critical systems, with a view to reducing the volumes and hazard of high-level long-lived radioactive waste issuing from treatment of spent nuclear fuel. Research will also explore the potential of concepts that produce less waste in nuclear energy generation, including the more efficient use of fissile material in existing reactors.

(ii) Reactor systems

Objectives

The aims of these actions are to ensure the continued safe operation of all relevant types of existing installations and, as a contribution to enhancing diversity and security of supply and combating global warming, to explore the potential of more advanced technology to deliver an even safer, more resource-efficient and more competitive exploitation of nuclear energy.

Activities

Nuclear installation safety: RTD in operational safety of current and future nuclear installations, especially plant life assessment and management, safety culture (minimising the risk of human and organisational error), advanced safety assessment methodologies, numerical simulation tools, instrumentation and control, and prevention and mitigation of severe accidents, with associated activities to optimise knowledge management and maintain competences.

Advanced nuclear systems: RTD to improve the efficiency of present systems and fuels and, in collaboration with the international efforts in this field such as the Generation IV International Forum, to investigate aspects of selected advanced reactor systems in order to assess their potential, proliferation resistance and their effects on long-term sustainability, including upstream research activities ⁽¹⁾ (especially material science) and the study of the fuel cycle and innovative fuels and waste management aspects.

⁽¹⁾ It is recalled that under EC specific programme 'Ideas' the ERC supports frontier research in any field of basic scientific and technological research.

(iii) Radiation protection

Objectives

The safe use of radiation in medicine and industry relies on a sound radiation protection policy and its effective implementation, and remains a priority in the programme. Research plays a key role in maintaining and improving the standards of protection, and this is a common objective of all activities in the programme. Research also has the important objectives of underpinning Community policies and their effective implementation and responding rapidly and effectively to emerging needs.

A key objective of this research will be to help resolve the controversy over the risk from exposures to radiation at low and protracted doses. Resolution of this scientific and regulatory issue has potentially important cost and/or health implications for the use of radiation in both medicine and industry.

Activities

- Quantification of risks for low and protracted exposures: better quantification of the risks to health for low and protracted exposures, including individual variability, through epidemiological studies and an improved understanding of the mechanisms from cellular and molecular biology research.
- Medical uses of radiation: enhance the safety and efficacy of medical uses of radiation in diagnosis and therapy (including nuclear medicine) through new technological developments and achieving a proper balance between the benefits and risks of such uses.
- Emergency management and rehabilitation: improve the coherence and integration of emergency management (including the characterisation of contamination and the rehabilitation of accidentally contaminated territories) in Europe through the development of common tools and strategies and demonstrate their efficacy in operational environments.
- Malevolent uses of radiation or radioactive material: develop robust and practicable approaches to manage the impact of malevolent uses (including from diversion) of radiation or radioactive material covering direct and indirect health effects and contamination of the environment, particularly inhabited areas and food and water supplies.

Complementarity will be ensured and duplication avoided with the 'Security' theme of the 'Cooperation' specific programme ⁽¹⁾, which can also benefit from any relevant expertise acquired during previous Euratom actions.

- Other topics: national research activities in other areas (e.g. natural radiation, radioecology, protection of the environment, dosimetry, occupational exposure, risk governance, etc) will be more effectively integrated.

(iv) Infrastructures

Objectives

Research infrastructures are an essential part of RTD in nuclear science and technology and the radiological sciences, ranging in size from very large and expensive plant and laboratory networks to much smaller facilities such as databases, numerical simulation tools and tissue banks. The objectives of the programme are to provide support for key infrastructures where there is clear European added value especially in order to establish critical mass and for the replacement of ageing facilities such as e.g. research reactors. This will consolidate the success of previous Community programmes, which have facilitated transnational access to, as well as cooperation between, such infrastructures, and contribute to maintaining the high standards of technical achievement, innovation and safety in the European nuclear sector.

Infrastructures also make an important contribution to the training of scientists and engineers.

Activities

- Supporting infrastructures: support for the design, refurbishment, construction and/or operation of key research infrastructures required in any of the above thematic areas; for example: underground laboratories for research on geological disposal of radioactive waste, pilot/test facilities for partitioning and transmutation devices, reactor

⁽¹⁾ Part of the Seventh Framework Programme of the European Community.

components and subsystems, hot cells, facilities for severe accident testing and thermal hydraulic testing, material testing facilities, numerical simulation tools and radio-biology facilities, databases and tissue banks for use in radiation protection research.

- Access to infrastructures: facilitate transnational access to existing and future infrastructures by individual research workers and research teams.

(v) Human resources, mobility and training

Objectives

Owing to the concern in all sectors of nuclear fission and radiation protection over maintaining the required high level of expertise and human resources, and the implications this may have especially on the ability to retain current high levels of nuclear safety, the objectives of the programme will be to support, through a variety of measures, the spreading of scientific competence and know-how throughout the sector. These measures aim to guarantee the earliest possible availability of suitably qualified researchers, engineers and technicians, for instance through joint training activities and improved coordination between EU educational institutions in order to ensure qualifications are equivalent across all Member States, or by facilitating the training and mobility of students and scientists. Only a truly European approach can ensure the required incentives and harmonised levels of higher education and training, thus facilitating the mobility of a new generation of scientists and catering for the career-long training needs of engineers faced with tomorrow's scientific and technological challenges in an increasingly integrated nuclear sector.

Activities

- Training: Coordination of national programmes and provision for general training needs in nuclear science and technology through a range of instruments, including competitive ones, as part of general support to human resources in all thematic domains. Includes support for training courses and training networks, and measures to make the sector more attractive to young scientists and engineers.
- Mobility of research workers: Support principally through grants and fellowships for the increased mobility of scientists and engineers between different universities and institutes in Member States and also in countries outside the EU. Special assistance may be provided in the case of research workers from the NIS.

3. Ethical aspects

During the implementation of this programme and in the research activities arising from it, fundamental ethical principles are to be respected. These include, *inter alia*, the principles reflected in the Charter of Fundamental Rights of the EU, including the following: protection of human dignity and human life, protection of personal data and privacy, as well as animals and the environment in accordance with Community law and the latest versions of relevant international conventions, guidelines and codes of conduct, e.g. the Helsinki Declaration, the Convention of the Council of Europe on Human Rights and Bio-medicine signed in Oviedo on 4 April 1997 and its Additional Protocols, the UN Convention on the Rights of the Child, the Universal Declaration on the human genome and human rights adopted by UNESCO, UN Biological and Toxin Weapons Convention (BTWC), International Treaty on Plant Genetic Resources for Food and Agriculture, and the relevant World Health Organisation (WHO) resolutions.

Account will also be taken to the opinions of the European Group of Advisers on the Ethical Implications of Biotechnology (1991 to 1997) and the opinions of the European Group on Ethics in Science and New technologies (as from 1998).

In compliance with the principle of subsidiarity and the diversity of approaches existing in Europe, participants in research projects must conform to current legislation, regulations and ethical rules in the countries where the research will be carried out. In any case, national provisions apply and no research forbidden in any given Member State or other country will be supported by Community funding to be carried out in that Member State or country.

Where appropriate, those carrying out research projects must seek the approval of the relevant national or local ethics committees prior to the start of the RTD activities. An ethical review will also be implemented systematically by the Commission for proposals dealing with ethically sensitive issues or where ethical aspects have not been adequately addressed. In specific cases an ethical review may take place during the implementation of a project.

The Protocol on protection and welfare of animals annexed to the Treaty requires the Community to pay full regard to the welfare requirements of animals in formulating and implementing Community policies including research. Council Directive 86/609/EEC of 24 November 1986 on the approximation of laws, regulations and administrative provisions of the Member States regarding the protection of animals used for experimental and other scientific purposes⁽¹⁾ requires that all experiments be designed to avoid distress and unnecessary pain and suffering to the experimental animals; use the minimum number of animals; involve animals with the lowest degree of neurophysiological sensitivity; and cause the least pain, suffering, distress or lasting harm. Altering the genetic heritage of animals and cloning of animals may be considered only if the aims are ethically justified and the conditions are such that the animals' welfare is guaranteed and the principles of biodiversity are respected. During the implementation of this programme, scientific advances and national and international provisions will be regularly monitored by the Commission so as to take account of any developments.

⁽¹⁾ OJ L 358, 18.12.1986, p. 1. Directive as amended by Directive 2003/65/EC of the European Parliament and of the Council (OJ L 230, 16.9.2003, p. 32).