

PROVISIONAL WORK PROGRAMME 2007¹

***EURATOM FOR NUCLEAR RESEARCH AND
TRAINING ACTIVITIES²***

(European Commission C(2006) 6850)

¹ This provisional work programme is subject to formal confirmation following the entry into force of the 7th Euratom Framework Programme and the Specific Programme Euratom.

² In accordance with the Treaty establishing the European Atomic Energy Community and in particular Articles 7 and 10 as contextualised in the following decisions :

Decision related to the Seventh Framework Programmes as set out in the provisional draft budget for 2007 (ref XXX), and Decisions XXX/2006/Euratom of the European Parliament and of the Council of XX December 2006 and XXX/2006 of the Council of XX December 2006 (Euratom Specific Programme), and the Decision of the Commission ...

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OBJECTIVES

Research and development activities in this work programme comprise two themes: Fusion Energy, and Nuclear Fission and Radiation Protection. In the priority theme of Fusion Energy, the overall objective is 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.

In the priority theme of Nuclear Fission and Radiation Protection, the overall objective is to establish a sound scientific and technical basis in order to accelerate practical developments for the safer management of long-lived radioactive waste, to enhance the safety performance, resource efficiency and cost-effectiveness of nuclear energy and to ensure a robust and socially acceptable system of protection of man and the environment against the effects of ionising radiation.

GENERALITIES

Following the adoption of the 7th Euratom Framework Programme (FP7) and the corresponding Specific Programme for “Nuclear Research and Training Activities”³ and “Rules for Participation”⁴, the Commission adopts work programmes on an annual basis with the assistance of the programme committees for fission and fusion. The work programme (WP) defines the technical scope of actions and provides information on the implementation arrangements, in particular the corresponding call(s) for proposals.

³ Adoption of SP

⁴ Adoption of RfP

I. CONTEXT

I.1 Approach

Energy policy is a growing concern at the EU level, and this is reflected by the increased importance of related R&D in the Community programme. Nuclear power is the principal carbon-free source of base load electricity in the EU, totalling some 135GWe of installed capacity and accounting for one-third of current electricity generation. It therefore plays a key role in limiting the EU's emissions of greenhouse gases, and makes an important contribution to improving the Union's independence, security and diversity of energy supply. Research on current issues such as safety, waste and radiation protection therefore figures prominently, as does R&D on the potential of future systems in line with Community policy to investigate a broad portfolio of future energy sources and carriers.

In the longer term, nuclear fusion offers the prospect of an almost limitless supply of clean energy, with ITER being the crucial next step in the progress towards this ultimate goal. The realisation of the ITER project therefore lies at the heart of the present EU strategy, though 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.

This annual programme will be established using a wide range of inputs to ensure that the activities supported maintain direct relevance to the evolving research needs of industry and EU policies in the nuclear field. The external Advisory Group for Energy established under the EC Cooperation Specific Programme, with effective multi-disciplinary membership and a balance of academic and industrial views, will provide one of these inputs. Consultation Days, as held 22 June 2006 on Nuclear Fission and Radiation Protection, are an effective mechanism to solicit views from the European nuclear research community. Other forums and groups, such as the European Strategy Forum on Research Infrastructures (ESFRI), may also provide the Commission with timely specific advice on opportunities and priorities with relevance to the Euratom research sector. During the course of FP7, the intention is to establish Technology Platforms in the field of geological disposal and "sustainable nuclear fission", and the resulting Strategic Research Agendas will then provide important input for the Euratom programme in these areas.

In the theme of Fusion Energy the priority of the programme is the success of the ITER project which has been successfully negotiated in FP6. With the decision to site ITER at Cadarache in Southern France, the EU has taken the main responsibility for the project contributing up to 50% of its cost. In order to discharge the European obligations to the ITER project, a Joint Undertaking is being set up in Barcelona, Spain. This Joint undertaking will also be responsible for providing the contribution of Euratom to Broader Approach activities with Japan for the rapid realisation of fusion energy and for the implementation of a programme of preparatory activities for the construction of a demonstration fusion reactor (DEMO) and related facilities including the International Fusion Materials Irradiation Facility (IFMIF). The Broader Approach activities will include contribution to the Engineering Validation, Engineering Design Activities (EVEDA) of IFMIF, to the upgrade of the tokamak JT60, and to the International Fusion Energy Research Centre (IFERC) in Rokkasho (Japan), which will cover design and R&D activities for a demonstration fusion reactor, fusion computer simulation and ITER remote experimentation. To prepare for the quick implementation of the ITER experimental programme, the Euratom Associated laboratories will have a more focused research programme that will provide input to the preparation of

ITER and the longer term activities. An important cornerstone of this research programme is the use, under European Fusion Development Agreement (EFDA), of the JET facilities where important enhancements are being made that will provide data for the ITER programme in both physics and technology. EFDA, in its new form adapted to this new phase of the programme, will also coordinate the activities of the Euratom associated laboratories by way of topical groups, task forces and implementing arrangements. Another aspect of the Fusion programme is the investigations into alternative concepts notably with the construction of the W7-X stellarator in Greifswald, Germany.

At an early stage of FP7, a review will be carried out of all the facilities in the fusion programme, examining the possibility of phasing out facilities, and considering the need for new devices in parallel with ITER exploitation. The review will be used as a basis for the possible support of existing/new or upgraded devices in order to ensure that the programme maintain a set of fusion facilities necessary to fulfil the overall objectives of the programme.

It is also necessary to maintain the expertise that has placed the EU fusion programme at the forefront of international research on fusion energy. This will also be provided through a programme of human resources, development, training, education and mobility.

Finally, calls for proposals will be organised to improve the "keep in touch" activities bringing together organisations and bodies involved in fusion energy-related matters e.g. to ensure cooperation with universities, or related scientific communities such as those in the materials and technology areas (see also §II.1.7).

In the theme Nuclear Fission and Radiation Protection, actions will be undertaken in five principal activity areas: management of radioactive waste, reactor systems, radiation protection, infrastructures and human resources. However, important cross-cutting links exist throughout the programme and, to some extent, with other external programmes. This is considered in more detail in §I.4. To implement actions selected on the basis of calls for proposals, the following funding schemes are to be used:

- collaborative projects;
- networks of excellence;
- coordination and support actions.

Support in the field of infrastructures (existing or new research infrastructures of importance at European level) will be provided through either collaborative projects or coordination and support actions. Support to multi-financed large-scale initiatives can also be provided, if necessary, on the basis of Council Decisions, based on a proposal from the Commission.

For both themes (Fusion and Fission), the forms of the grants to be used are indicated in Annex 3.

I.2 Scope of Work

The scope of this work programme corresponds to that defined in the Euratom Specific Programme. The calls for proposals planned within this work programme are those scheduled to be launched in 2007.

I.3 International Cooperation

The international and global dimension in European research activities is important in the interest of obtaining mutual benefits. FP7 is open to the participation of countries having concluded the necessary agreements to this effect, and is also open, at the project level and on the basis of mutual benefit and subject to acceptance by the consortium, to the participation of entities from third countries and of international organisations for scientific cooperation.

International cooperation is an important feature of the fusion research and training programme. The collaboration of third countries in the integrated European programme is through an extensive network of cooperation, including the ITER Agreement and general bilateral agreements and multilateral specific agreements and implementing programmes, the latter generally in the framework under the auspices of the International Energy Agency (IEA) or the International Atomic Energy Agency (IAEA).

In fission research, cooperation with the OECD/NEA and the IAEA should focus on their established competences and historical records tracking nuclear development and associated acquired knowledge. These institutions can indeed play an important role in the restitution of “old knowledge” at a time when today's scientists and engineers investigating features of the new concepts under development (e.g. Generation-IV reactor systems) can benefit from former designs and experiments. Euratom fission research would also benefit from reinforced links with the NEA and IAEA databanks and International Standard Programmes (ISP), including in the area of benchmarking.

For those parts of the programme subject to calls for proposals, this cooperation will be intensified and deepened at a 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. Entities from all third countries, with a few exceptions (see the ICPC list in Annex 1), may participate in projects in addition to the requisite minimum number of participants from Member States or Associated Countries.

Where an international European interest organisation participates in an indirect action, it may receive a Community financial contribution. In the case of a participating international organisation other than a European interest organisation, or a legal entity established in a third country, a Community financial contribution may be granted provided that at least one of the following conditions is satisfied:

- provision is made to that effect in the Specific Programme or this Work Programme;
- the participation is essential for carrying out the action;
- such funding is provided for in a bilateral scientific and technological agreement or any other arrangement between the Community and the country in which the legal entity is established.

In the area of nuclear fission and radiation protection, enhanced international cooperation will also be fostered via the proposed trans-national networking of Euratom NCPs and contacts from third countries. A topic for supporting this action is presented in §II.2.6.

I.4 Cross-Cutting Issues and Proposals

Particular attention will be paid to those technical actions cutting across Euratom and EC Specific Programmes. Interactions between the different actions must be adequately accommodated. Examples include:

- the horizontal aspects of training and research infrastructures, which are critical elements in the maintaining of knowledge and competences;
- the common development of risk analysis tools and means (including computational platforms);
- the research on advanced materials and production technologies
- the human factor and man-machine interface dimension;
- the developments in advanced Instrumentation and Control for industrial processes;
- the approach to standards and regulations;
- the complementarity between different types of reactors and other nuclear systems for the burning (transmutation) of high-level radioactive waste;
- links with other energy areas (including hydrogen production using high temperature reactors).
- cellular and molecular biology, systems biology and epidemiology more generally;
- emergency response and management;
- the uses of radiation in medicine.

Where feasible in view of the difficulties posed by the two different legal bases (Euratom and EC Framework Programmes), joint or coordinated call(s) may be used.

The following broader issues are of particular importance, and specific arrangements for a coordinated approach between the Euratom and EC Framework Programmes are foreseen:

- *Cooperation Specific Programme:* In the area of advanced materials, new production technologies and integration of technology for industrial application for high performance surfaces and materials and computational modelling.
- *Capacities Specific Programme:* (i) In the area of *research infrastructures* there needs to be close collaboration to ensure support for key nuclear research infrastructures with more general research applications; (ii) The *Science in Society* activity also has parallels in activities in the nuclear sector, and there is a clear potential for mutually beneficial cross-fertilisation in areas such as governance and stakeholder issues, especially those associated with the local acceptance of controversial facilities.

- *Security Research Programme*: Adequate consideration regarding the mitigation of impacts from the malevolent use of radioactive material
- *Link with Community policy*: Arrangements for effective coordination within the Commission services will be put in place, in particular to ensure that activities continue to respond to developments in EU policies. For this purpose, the multi-annual programming may draw on the help of user groups from different Commission services associated with the policies concerned.

I.5 Submitting a Proposal

There are significant differences between the management and funding of the two themes. In the theme Fusion Energy the main funding schemes are through Contracts of Association between Euratom and national research organisations or bodies and multilateral agreements. Within these contracts and agreements an annual work plan is agreed and implemented. For this part of the fusion energy research programme there are generally no calls for proposals. For some actions, such as coordination and support actions or human resources, education and training, calls may be made. The content of the programme is described in §II.1 and details of any calls are provided in §III.1. For the theme Nuclear Fission and Radiation Protection the details of the activities, areas and topics are presented in §II.2. Section III.2 provides the information on the corresponding call(s) for proposals that will be launched in 2007.

For all calls of this work programme, in general only one project will be retained per topic, except where otherwise indicated. There will also be competition between topics, therefore some topics may end up not being supported if proposals fail to reach a sufficiently high standard. It is also normal practice to constitute a reserve list of projects having passed all evaluation thresholds but for which insufficient funding is currently available.

Proposals should be submitted under the terms of a call for proposals set out in §III. In order to submit a proposal, a proposer should consult the following:

- this work programme;
- the relevant call for proposals as published in the *Official Journal of the European Communities*; and
- the relevant Guide for Applicants.

These and a number of other useful texts, including the rules for participation, are available on the CORDIS Website. The latter should be consulted to ensure that the documents being used are the most recent. Some will be revised periodically during programme lifetime.

I.6 Evaluation Criteria and Related Issues

The “Guidelines on Proposal Evaluation and Project Selection Procedures” describe the basic procedures to be followed by all programmes under FP7. The set of criteria and thresholds applicable to this work programme are given in Annex 2. Any complementary criteria are clearly stated in the relevant part of this work programme.

Furthermore, the work programme, and consequently its call(s) for proposals, may specify and restrict the participation of legal entities in an indirect action to take into account specific objectives of the Framework Programme.

Finally, when evaluating proposals received in response to a call, the Commission may opt to send the proposals to external experts or make proposals available by electronic means, so that experts can carry out their examination at home or their place of work.

I.7 Ethical aspects

All research carried out under this work programme must respect fundamental ethical principles, and the requirements set out in the text of the Euratom Specific Programme. More information on the procedures for the review, where appropriate, of ethical aspects of submitted proposals is given in the "Guidelines on Proposal Evaluation and Project Selection Procedures".

II. CONTENT OF PROGRAMME AND CALL(S) IN 2007

II.1 Fusion Energy

The content of the Fusion Energy programme has several facets covering the full range of funding schemes. These are:

- **International agreements** including those covering the construction and exploitation of ITER;
- **European joint undertaking** to discharge the responsibilities of the European Union towards the ITER Agreement and the Broader Approach activities;
- **Contracts of Association** which are bilateral contracts between research organisations or bodies in all the Member States and Euratom Associated States (Switzerland) and the Community. Some Contracts of Association will include activities of research institutes in more than one Member State (transnational research Units);
- **European Fusion Development Agreement** between all the Associates (signatories of a contract of association) to fully exploit the JET Facilities and possibly other fusion devices and coordinate the research activities, including training, carried out under the Contract of Association;
- **Other multi-lateral agreements**, such as the Mobility Agreement, that promote the collaboration and mobility of researchers between the different research organisation and facilities;
- **Human resources, education and training** which are supported through grants via calls for proposals, or via EFDA
- **Coordination and Support Actions** aimed at "keep in touch" and support activities.

II.1.1 Activity: ITER International Organisation

The ITER Agreement was signed by the Parties in Paris on 21 November 2006, together with the agreement on its provisional application. It is expected that the ITER Agreement will enter into force by the summer 2007 when each of the Parties has informed the Depositary (IAEA) that all the constitutional requirements for ratification have been met. The resources for the construction phase will be provided predominantly by contributions in kind. The procurement of the components to be provided in kind will be under the responsibility of the Member providing that component, acting through its Domestic Agency (see next section). The ITER Organisation will also receive contributions in cash from its Members.

The ITER Agreement contains specific provisions for the Host Party EURATOM to make available or cause to be made available to the ITER Organisation the site in defined initial conditions and the support required for the implementation of the ITER Project. It is foreseen that the scope and conditions of the siting preparations and support arrangements and the

basis on which their costs will be borne will be the subject of a "back to back" Agreement between Euratom and France. A site support agreement on this matter will then be concluded between the ITER Organisation and the French Commissariat à l'énergie atomique.

II.1.2 Activity: European Joint Undertaking

The Euratom contributions to the ITER Organisation, the Broader Approach activities as well as the implementation of activities in preparation for DEMO and IFMIF will be provided by the European Joint Undertaking to be established under Articles 45 – 51 Euratom Treaty. The Community contribution to the Joint Undertaking will be based on the (activities in) its work plan. This contribution will also include the part of the administration expenses of the Joint Undertaking to be borne by the Communities.

The Euratom participation in ITER will 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 participation will also include contribution to the costs to be borne by Europe as a Host Party, contributions to the Broader Approach activities such as the design activities for IFMIF and activities related to DEMO. Until the European joint undertaking is set up and becomes operational, procurement and R&D activities will continue under the EFDA agreement.

II.1.3 Activity: Programmes of the Associations

Through the Contracts of Association, the Work Programmes of the Associates will include: provision of support to the advancement of the ITER physics basis, development of plasma auxiliary systems, development of concept improvements, innovative and long term generic technology, maintain a watching brief on Member States' civil research activities on inertial confinement, and other activities such as training, education, and dissemination of information. Priority will be given to multilateral actions involving one or several machines and aimed at applications on ITER and future potential fusion reactors.

With the revised EFDA agreement the scientific programme of the Associations will become more coordinated. The contribution of the Associations to EFDA will include the joint scientific exploitation of the JET facility in order to contribute to ITER physics as well as on ITER-relevant work notified by EFDA. Activities identified as prioritised actions in the EFDA Work Programme will be supported by preferential support. Facility upgrades will be eligible for preferential support when they contribute to such activities and after recommendation by EFDA. The training of scientific and technical personnel, the dissemination of results and the diffusion of information to the public will be an integral part of the activities of the Associations. This will include exchange of information through conferences, seminars, workshops, scientific and technical meetings, publications and other actions to promote technology transfer.

The Associations' activities will be programmed annually and the content of activities and facilities eligible for funding will be adapted after the comprehensive review of facilities to be carried out early in FP7. The funding of some facilities may be phased out.

II.1.4 Activity: Association Programme within the European Fusion Development Agreement

In 2006 the European Fusion Development Agreement⁵ (EFDA) was extended till end 2007 as an interim measure to guarantee a smooth continuation of the JET operation and to support preparations for an efficient start of ITER construction at the European site.

Following the definition of the scope and role of the “European Organisation for ITER and the Development of Fusion Energy”, an extended revision of the EFDA agreement will be undertaken during 2007 in order to respond to the new circumstances created by the decision on the ITER construction in Europe by redefining EFDA boundaries and roles accordingly. The emphasis of the EFDA agreement is towards the preparation for the operation and exploitation of ITER as well as, on a longer time perspective, to the establishment of the physics base for a fusion reactor power plant. To this end, EFDA will coordinate activities in the Associations for research, development and exploitation of common tools or facilities/devices and provide for the collective use of the JET facilities. In addition EFDA will coordinate and supervise training of researchers and promote links to universities, as well as support the Associations' activities in dissemination of information and quality control. To this end, EFDA will identify support actions to be carried out by all the Associations to improve the effectiveness of the programme. Finally EFDA will provide a framework for coordinating European contributions to international collaborations.

The activities supported under EFDA during 2007 are defined in the EFDA Work Programme.

II.1.5 Activity: Mobility of Researchers

The Mobility Agreement sets the framework for supporting the mobility of the researchers and trainees from the organisations participating in the programme, in order to promote enhanced collaboration and integration of the programme, and to foster international co-operation. Synergy and complementarity with other themes will be highlighted. It will apply to:

- cooperative work between the Associations;
- participation to ITER and the Broader Approach;
- cooperative work under EFDA such as participation in meetings in support of the programme i.e. International Tokamak Physics Agreement (ITPA);
- participation in keep in touch activities and actions supported by support actions.

⁵ Commission Decision C(2006) 3298 of 20.July 2006

II.1.6 Activity: Fellowships and Training

The activities should ensure 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. They will include 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. These activities will be supported through call(s) for proposals or included in the EFDA activities.

The activities to be supported will be defined after a review of the training activities carried out during FP6, in particular the Euratom Fusion Training Scheme. This may lead to a revision of this Work Programme during 2007.

II.1.7 Activity: Coordination and Support Actions

These actions will be managed through calls for proposals and it is expected to fund one project within each category given below. These activities will aim at strengthening the interfaces of the fusion community with related scientific communities, in particular the universities providing master and doctoral studies in fusion, and cross related materials research.

In 2007, the call for proposals for coordination and support actions will include:

Topic: Fusion-2007-7.1: Fusion education

Objectives: To support and coordinate critical-mass cooperation between research organisations and higher education institutions in the area of fusion plasma physics and engineering

Scope: A proposal may include the organisation and management of joint or common initiatives including joint curricula or doctoral studies, cooperation with other education institutes active in relevant fields such as computing, grid-networking and materials, fellowships, seminars, workshops and summer schools and , , access to facilities as training platforms.

Funding Scheme: Coordination or support action

Expected impact: Enhance qualifications in fusion plasma physics and engineering, strengthen cooperation with related fields and attract high quality of researchers, and support the general objectives of the programme.

Topic: Fusion-2007-7.2: Materials research

Objectives: To bring together a range of organisations in materials research, to identify key facilities, provide conditions for mutual access to various communities of researchers to these facilities with the aim to promote joint collaborative initiatives; joint funding with other parts of the programme may be sought;

Scope: A proposal may include an assessment of relevant research groups and facilities, proposals for joint collaborative projects including testing and modelling and an annual review of progress in this field.

Funding Scheme: Coordination or Support action

Expected impact: to enhance materials development by cross field materials activities and support the general objectives of the programme.

Topic: *Fusion-2007-7.3: Atomic data & modelling in support of fusion plasma modelling and diagnostics*

Objectives: This action should support the provision of essential data commonly needed for diagnostics and modelling across the programme.

Scope: A proposal may provide atomic data and modelling targeted to specific fusion applications, based on input from experimentalists, modellers and theoreticians.

Funding Scheme: Coordination or Support action

Expected impact: Improved capability to interpret results from present fusion experiments. Improved predictive capability for ITER and for the performance of its spectroscopic diagnostics as well as support the general objectives of the programme.

II.1.8 Activity: Integrated Infrastructures Supporting Cross-cutting Activities.

There are no calls foreseen during 2007.

II.1.9 Activity: Cost Sharing Actions

Cost sharing actions to promote and contribute to fusion energy research with bodies in the Member States or Associated Countries that are not associated with the Seventh Framework Programme. No calls are foreseen during 2007.

II.2 Nuclear Fission and Radiation Protection

The activities and associated objectives include:

– **Management of radioactive waste**

To support the implementation oriented research and development activities on all remaining key aspects of deep geological disposal of spent fuel and long-lived radioactive waste and, as appropriate, demonstration of the technologies and safety, and to underpin the development of a common European view on the main issues related to the management and disposal of waste. Research on partitioning and transmutation and/or other concepts aimed at reducing the amount and/or hazard of the waste for disposal.

– **Reactor systems**

To support research to underpin the continued safe operation of all relevant types of existing reactor systems (including fuel cycle facilities), taking into account new challenges such as lifetime extension and development of new advanced safety assessment methodologies (both the technical and human element), including as regards severe accidents, and to assess the potential and safety and waste management aspects of future reactor systems in the short and medium term, thereby maintaining the high safety standards already achieved within the EU and considerably improving the long-term management of radioactive waste.

– **Radiation protection**

To support research, in particular on the risks from low doses, on medical uses and on the management of accidents, to provide the scientific basis for a robust, equitable and socially acceptable system of protection that will not unduly limit the beneficial and widespread uses of radiation in medicine and industry. Research to minimize the impact of nuclear and radiological terrorism and diversion of nuclear material will be managed in close cooperation with the Theme Security under the EC Cooperation Research Programme.

– **Infrastructures**

To support the availability of, and cooperation between, research infrastructures such as material test facilities, underground research laboratories and radiobiology facilities and tissue banks, necessary to maintain high standards of technical achievement, innovation and safety in the European nuclear sector.

– **Human resources, mobility and training**

To support the retention and further development of scientific competence and human capacity (for instance through joint training activities) in order to guarantee the availability of suitably qualified researchers, engineers and employees in the nuclear sector over the longer term.

A significant part of the support for human resources, mobility and training will be implemented by encouraging the embedding of this support within the collaborative projects and other actions. The number of PhD students supported in this way will be monitored by the Commission services. FP7 projects in all activities are therefore encouraged to develop a "training and mobility" package, which should also be open to students and professionals from non-participating organisations.

An important aim of the work programme is to cater adequately for those topics that cut across more than one of the above activities (see §I.4). Where necessary, such topics are presented under a separate activity of the work programme (see §II.2.6).

The following topics are all presented using the same format: *objectives, scope, funding scheme* and *expected impact*. Where more than one project per topic is possible, this is indicated under *funding scheme*. In such cases, it is not necessary for a proposal to cover the totality of the defined scope.

Introductory text under "Activity" and "Area" is taken from the corresponding Specific Programme. However, topics proposed in this work programme cover only a part of possible actions.

Synergy and complementarity with other themes, to avoid possible confusion on activities and double funding, will be taken into consideration during the evaluation and negotiation phases, building on the experience acquired during FP6.

II.2.1 Activity: Management of Radioactive Waste

Through implementation-oriented research and technological development (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.

II.2.1.1 Area: 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.

Topic: Fission-2007-1.1.1: Phenomenology and performance assessment

Objectives: To further improve approaches and methods related to a limited number of specific scientific and technical issues of relevance for the safety of geological disposal of spent nuclear fuel and high-level and/or long-lived radioactive waste.

Scope: The issues of interest are:

- in situ experiments of diffusion control of radionuclides in clays, transport in high pH environments, confirmation of mechanisms and associated databases;
- studies on gas generation and transport from waste emplacement to the backfill and host rock, assessment of potential impacts with respect to development of scenarios and optimisation of systems designs;
- long-term monitoring and observation of phenomena (experimentation, technology or methodology development);
- development of modelling tools for simulation over long periods of time and at scales that cannot be represented through experimentation.

Proposals should take into consideration the emerging results from related on-going FP6 projects. A multi-disciplinary approach with effective integration of experimentalists, modellers and designers is essential in addressing these issues.

Funding scheme: One or more collaborative project(s)

Expected Impact: Improved understanding of the above processes at one-to-one scale and the relation with long-term safety will assist in the practical demonstration of geological disposal of high-level and long-lived radioactive waste and facilitate its implementation.

Topic: Fission-2007-1.1.2: Technology demonstration of safe repository operation

Objectives: To propose and evaluate, through the development of mechanical demonstrators, effective and efficient technical solutions to key issues associated with the operation of a geological repository for radioactive waste, with an emphasis on requirements for licence application.

Scope: Development of one-to-one scale demonstrators and/or pilots in repository situations that integrate operability and safety aspects in order to test, *inter alia*:

- the safe on-site transport and handling of waste packages, including their transfer from surface to underground (by shaft or ramp) and their emplacement in disposal cells;
- the feasibility of construction and proof of long-term integrity of seals and plugs in galleries;
- where appropriate as part of national programmes, the operational feasibility of disposal reversibility and its impact on the repository system (engineered barrier system – EBS – and geosphere);
- the development of monitoring strategies associated with the operational and staged closure phases of a repository.

The action should develop in a broader context than purely technical, and include related operational safety aspects, development of arguments for integration in the safety case and information and communication to enhance public confidence. Leading radioactive waste management organisations together with engineering, manufacturing and construction

companies are essential for this action. Full account must be taken of FP6 actions and other on-going research.

Funding scheme: Collaborative project

Expected impact: The demonstration of safe operability of on-site transport and emplacement of waste deep underground, including reversibility of disposal, is an important prerequisite to a licence application and development of pilot facilities. The action will therefore enable definite progress to be made towards implementation of geological disposal facilities by demonstrating the feasibility of safe operation.

II.2.1.2 Area: Partitioning and transmutation

RTD in all technical areas of partitioning and transmutation (P&T) 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

Topic: Fission-2007-1.2.1: Partitioning processes for viable recycling strategies

Objectives: With a view to their full demonstration at a pilot level, develop the technically mature aqueous chemical separation processes that are compatible both with fuel fabrication techniques and with potentially viable future recycling strategies and, in parallel, make advances beyond current state of the art in pyro-chemical separation processes.

Scope: The research activities could include, *inter alia*:

- narrow down the number of aqueous separation processes for partitioning of actinides and grouped actinide separation and optimise the most promising ones that are compatible both with fuel fabrication techniques and with potentially viable future recycling strategies;
- maintain a component of exploratory research at an appropriate level to develop new molecule(s) for potentially viable new separation processes leading to industrial applications;
- continue the development of pyro-chemistry in accordance with the road-mapping exercise undertaken in the FP6;
- conduct, if appropriate, Post-Irradiation Examination (PIE) activities of Accelerator Driven Systems (ADS) and Fast Reactor (FR) fuels and targets underway in European programmes;
- carry out detailed engineering and systems studies on aqueous and pyro-chemical separation processes leading to the demonstration at a pilot level.

The action should aim to further integrate partitioning and fuel fabrication teams across EU, including the new Member States, and foster the participation of the chemical separation

community from European research institutions, educational establishments and industrial players.

Funding scheme: One or more collaborative project(s)

Expected impact: This action will continue important research undertaken in previous programmes and make real advances towards pilot-level demonstration of separation processes; this constitutes a key component of future fuel cycle strategies, whether for ADS or Generation-IV reactors.

II.2.2 Activity: Reactor Systems

The aim is to ensure the continued safe operation 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.

Throughout this activity, it is particularly important for the success of the envisaged actions that as broad a range of stakeholders as possible participate, e.g. research organisations, systems suppliers and architect engineers, utilities and associated services, regulatory bodies and associated technical safety organisations (TSOs), and education and training institutions. In addition, certain actions could also benefit from enhanced cooperation with third countries, and appropriate links are to be encouraged where practicable and mutually beneficial.

II.2.2.1 Area: 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 competence.

Topic: Fission-2007-2.1.1: Numerical coupling of safety-relevant phenomena

Objectives: Development and qualification of core physics and thermal hydraulics numerical simulation tools for reactor safety; coupling and experimental validation of these tools, leading to the creation of a European pole of excellence in reactor safety computations.

Scope: This topic, building on the results of FP6 actions, will contribute to the development of the next generation of experimentally validated "best estimate" tools for modelling thermal-hydraulics and core physics for present PWRs and BWRs, as well as for future reactors, using well proven informatics platform. The project should mainly address:

- coupling of core physics and thermal hydraulics models for reactor safety;
- addition of models related to fuel behaviour and structural mechanics;
- sensitivity and uncertainty analysis using deterministic and statistical methods;

- experimental validation, using industrial plant data and results of existing or new experiments, as necessary, in order to qualify the models, in addition to other means of validation such as benchmarking with other qualified calculation codes when available.

As part of this action, a users' group should test the new tools in a number of benchmark exercises with a view to their qualification.

Funding Scheme: Collaborative project

Expected impact: The action would enable Europe, in particular the EU's nuclear industry, to take a leading position in the field of numerical simulation for nuclear safety evaluations and would help decision making on safety issues regarding both existing and future reactors.

Topic: Fission-2007-2.1.2: Prediction of irradiation effects on reactor internals and/or claddings

Objectives: Development and qualification of multi-scale simulation tools to predict the combined effects of irradiation and corrosion on internals and/or claddings and experimental validation of these tools. The project should also contribute to the creation of a European pole of excellence in numerical simulation for residual lifetime prediction.

Scope: The research activities build on the development of FP6 actions, which focused on multi-scale modelling of irradiation effects on reactor pressure vessels using a qualified software integration platform. The project should include, *inter alia*:

- coupling of corrosion and irradiation effects in PWRs and BWRs;
- sensitivity and uncertainty analysis using deterministic and statistical methods;
- experimental validation and model qualification using industrial plant data and results of existing or new experiments (including non-EU sources) as necessary, in addition to other means of validation such as benchmarking with other qualified calculation codes when available.

In addition, a users' group should test the new developed informatics tools in a number of benchmark exercises with a view to their qualification.

Funding Scheme: Collaborative project

Expected impact: This project would enable the EU's nuclear industry to take a leading position in the field of numerical simulation for residual lifetime prediction and would help decision making in this area regarding both existing and future reactors.

Topic: Fission-2007-2.1.3: Advanced safety assessment methodologies

Objectives: Based on research activities in previous Framework Programmes and in the Member States, develop best practice guidelines for the performance of Level-2 PSA methodologies with a view to harmonisation at EU level.

Scope: Best practice guidelines for:

- the performance of a Level-2 PSA and the definition and clarification of the purpose, objectives and level of harmonisation for the various applications;
- a meaningful and practical uncertainty evaluation in a Level-2 PSA.

Close collaboration with nuclear regulators is essential.

Funding Scheme: Coordination action

Expected Impact: As a result of this action, the developed Level-2 PSA methodologies could be used with greater confidence in the further development of severe accident management procedures and could greatly assist in the decision making associated with plant life management.

Topic: Fission-2007-2.1.4: The man-machine-organisation (MMO) interface and plant safety management

Objectives: Ensure a better understanding of the human factor in the operation of nuclear installations and, through consideration of the man-machine interface (MMI) and possible adaptation of approaches to dealing with the human factor, develop techniques to quantify (e.g. in PSA) and improve these “softer” aspects of safety.

Scope:

- Review the impact of a multinational environment on the safety culture in complex installations (e.g. hiring of external subcontractors, personnel management, sharing of responsibility);
- consider the safety implications of increased automation of industrial processes and in the control room (e.g. installation of digital I&C);
- perform a pilot exercise in a nuclear installation to analyse MMO aspects in order to develop, test and qualify necessary remedial actions.

Funding Schemes: Support action

Expected impact: A better understanding of this issue and development of relevant recommendations will have a positive effect on overall plant safety.

II.2.2.2 Area: 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 (especially material science) and the study of the fuel cycle and innovative fuels and waste management aspects.

Topic: Fission-2007-2.2.1: Innovative fuels and claddings for Generation IV systems

Objectives: To participate in the development and qualification of innovative fuels and claddings in the framework of the Generation-IV International Forum (GIF), and to increase

the efficiency of EU research in support to GIF by focussing on cross-cutting and generic issues applicable to more than one reactor system.

Scope: Research should focus on, *inter alia*:

- selection of fuel/cladding systems working under extreme conditions;
- integration of extended fuel burn-up and/or actinide recycling aspects;
- development of methods and facilities aimed at fabrication and testing, wherever needed;
- experimental validation of predictive numerical simulation tools for fuel behaviour;
- Common qualification methodologies.

The action should seek to reinforce collaboration between related national R&D programmes through the pooling of the expertise and experimental facilities. International collaboration with research organisations outside the EU could also be beneficial.

Funding Scheme: One or more collaborative project(s)

Expected impact: This topic is a key element of the GIF R&D strategy and would enable EU partners to contribute effectively in this global research effort, thereby ensuring the maintaining of EU competence and expertise in this field and the eventual competitiveness of EU industry.

II.2.3 Activity: Radiation Protection

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 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.

II.2.3.1 Area: Quantification of risks for low and protracted exposures⁶

Better quantification of the risk 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.

⁶ This is to be interpreted as exposures typically encountered in the workplace, the environment and in the use of radiation in medicine for diagnostic purposes

Topic: Fission-2007-3.1.1: Non-cancer effects

Objective: To better understand the mechanisms of and quantify the risks for non-cancer health effects resulting from exposure to low and protracted doses.

Scope:

- Non-cancer health effects, in particular cardio- and cerebro-vascular diseases.

A multi-disciplinary approach will be required with the effective integration, in particular, of radiobiologists (especially those with expertise in animal irradiation) and those with experience with appropriate animal models. Collaboration with ongoing Community research will also be required and mechanisms for this will be established during negotiation.

Funding scheme: One or more collaborative project(s)

Expected impact: An understanding of the mechanisms and risks of non-cancer health effects sufficient to underpin radiation protection policy or, at least, tangible and stepwise progress within a longer term strategic approach to resolution of this issue.

Topic: Fission-2007-3.1.2: Prospective cohort of medically exposed children

Objective: To assess the feasibility of establishing a prospective trans-national cohort for longer term follow-up of those exposed in infancy or childhood to significant medical exposure.

Scope:

- Feasibility of establishing a trans-national cohort suitable for long term follow up;
- development of protocols and procedures;
- cancer incidence and mortality, non-cancer health effects;
- power of the cohort.

The study should be strictly limited to demonstrating the feasibility of establishing a prospective cohort and its power in terms of better quantifying the risks of exposure in infancy and childhood.

Funding scheme: Support action

Expected impact: Will determine the feasibility and worth of establishing a prospective cohort, subsequent analyses of which would quantify the risks of medical exposures in infancy and childhood and influence clinical practice.

II.2.3.2 Area: 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 the risks of such uses.

Topic: Fission-2007-3.2.1: Enhanced safety and efficacy in the medical uses of radiation

Objective: Enhance the safety and efficacy of the uses of radiation in diagnosis and therapy through new technological developments and achieving a proper balance between the benefits and risks of radiation.

Scope:

- Development of methodologies for reducing patient exposures while maintaining or improving diagnostic/clinical information from existing and emerging imaging techniques;
- development of methodologies for better assessing and reducing exposures to medical staff for procedures resulting in potentially large doses or complex radiation fields (eg interventional radiology, nuclear medicine, pulsed beams, etc);
- acquisition of the key information necessary for sound and scientifically based judgements (e.g. justification, optimisation, referral criteria) on the use of radiation in medicine, both for existing and emerging imaging techniques;
- development of quality criteria, expressed in terms of measurable/controllable quantities, that are practicable and have potential for take up by standards setting bodies;
- achieving synergy through networking of relevant activities in Europe and beyond;
- development of broadly applicable methodologies for assessing and reducing doses to peripheral tissues for therapy in general and, in particular, for more advanced and innovative procedures that have potential for wide use.

Duplication of ongoing research should be strictly avoided. Any successful proposal is likely to be multi-disciplinary and effectively exploit synergies between, where appropriate, state of the art expertise in the radiation sciences, imaging technologies, computer aided support, radiology and also establish effective links with clinicians and manufacturers.

Funding scheme: One or more collaborative project(s) and/or coordination action(s)

Expected impact: Reduction in the exposures (and risks) to patients from diagnostic procedures without loss of clinical information, reduced doses (and risks) to peripheral tissues of those receiving radiotherapy treatment and improvements in the competitiveness of European industry.

II.2.3.3 Area: 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.

Topic: Fission-2007-3.3.1: Optimal approaches for monitoring

Objective: To develop a methodology for optimising the design of monitoring systems for timely and effective decision making in an emergency.

Scope:

- Through the use of state of the art decision support systems, identify how monitoring information of different types, obtained at different times and with differing spatial resolution, can improve the quality of decision making in an emergency and in its aftermath;
- develop a methodological approach for optimising the design of a monitoring system at national or regional levels for use in conjunction with state of the art decision support systems.

Funding scheme: Collaborative project

Expected impact: A tool for making more efficient use of monitoring resources and improving the bases for decision making in emergencies, in particular in the context of the need to upgrade/replace during the next decade many of the monitoring systems installed post-Chernobyl.

II.2.4 Activity: Infrastructures

Research infrastructures are an essential part of RTD in nuclear science and technology and 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 EU 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 trans-national 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.

II.2.4.1 Area: Supporting infrastructures

Support for the design, refurbishment, construction and/or operation of key research infrastructures required in any of the above activities; for example: underground laboratories for research on geological disposal of radioactive waste, pilot/test facilities for partitioning and transmutation devices, reactor components and sub-systems, hot cells, facilities for severe accident testing and thermal hydraulic testing, material testing reactors, numerical simulation tools and radiobiology facilities, databases and tissue banks for use in radiation protection research.

Topic: *Fission-2007-4.1.1: Networking of underground research laboratories (URLs)*

Objectives: Develop the pooling of facilities and expertise in underground research for radioactive waste disposal and develop integrated management and operation of, and communication on, URL activities on geological disposal at European level.

Scope: The action should combine networking activities:

- sharing the use of facilities, equipment and instrumentation;
- promoting knowledge and transfer of technology through common communication exchanges, training and fellowships;

and trans-national access and/or service activities:

- making the acquired expertise and competence available to scientists and engineers throughout the network;
- facilitating the mobility and exchange of scientists and professionals between URLs and related lab facilities;
- adopting a communication strategy to address public concerns and increase confidence building in geological disposal.

Though the action is primarily aimed at the networking of URLs in Europe, links should also be considered, where practicable and mutually beneficial, with similar facilities either operating or under construction in third countries.

Funding scheme: Coordination action

Expected Impact: The action would help to underpin a common European approach to the demonstration of geological disposal and the carrying out of joint projects, by ensuring the access to shared knowledge on and competences in URL operation and activities.

Topic: *Fission-2007-4.1.2: Support to new research infrastructures of pan-European interest*

Objectives: To support the development of research infrastructures of pan-European interest in the field of nuclear fission and radiation protection.

Scope: Support will be provided to those mature projects retained in the European Strategy Forum on Research Infrastructures (ESFRI) roadmap for new research infrastructures of pan-European interest. Support will follow a two stage-approach (as adopted in the EC FP7 Capacities Specific Programme): (i) Stage 1 - support for the preparatory phase; (ii) Stage 2 - support for the implementation phase involving the actual construction, based on the technical, legal, administrative and financial agreement achieved during the preparatory phase between all stakeholders. Only projects that have progressed satisfactorily in the preparatory phase will proceed to Stage 2. The present call concentrates on Stage 1 - support to the preparatory phase. This preparatory phase aims at bringing the project to the level of maturity required to enable the construction work to start, and the action should therefore cover all relevant outstanding issues in the following areas:

- strategic planning;
- technical work;
- financial arrangements and financing mechanisms;

- project logistics;
- legal aspects.

Funding Scheme: Collaborative project

Expected impact: Impacts have already been assessed and evaluated as part of the ESFRI roadmapping exercise. Such projects are essential if the EU scientific community is to remain at the forefront of the advancement of science in this field and if the related industrial base and technological know-how is to be strengthened. Community support underscores the EU dimension of the project and will guarantee access rights by EU research workers.

Topic: Fission-2007-4.1.3: Databases and tissue banks

Objective: Design, refurbish, construct, operate and/or provide access to key databases or tissue banks for use in radiation protection research.

Scope:

- Tissue banks;
- databases;
- limited to research topics covered by this Framework Programme;
- sustainability and accessibility.

Successful proposal(s) will need to pay particular attention to ensuring accessibility to and sustainability of any tissue bank(s) or database(s) developed/improved, etc. Establishing critical mass and cost efficiency by integrating (either in practice or virtually) tissues/data from various sources will also be an important consideration. For tissue banks, preference will be given to those where the probability of causation of disease by radiation is significant, where the exposure of the tissue is known or can be reasonably estimated, and where the collection, storage and documentation of tissues are state of the art.

Funding scheme: One or more collaborative project(s) and/or coordination action(s)

Expected impact: Sustainable and accessible databases and tissue banks essential for state of the art research in the radiological sciences, in particular in better understanding the mechanisms and quantifying the risks of low and protracted doses of radiation.

Topic: Fission-2007-4.1.4: Radiobiology infrastructures

Objective: Assess the status of radiobiology infrastructures in Europe and evaluate their adequacy for research on the risks of low and protracted exposures to radiation

Scope:

- Status of existing infrastructures;
- infrastructures planned or under development;
- sustainability in medium and longer term;

- identification of future needs;
- opportunities for shared development, use and maintenance of key infrastructures (including with third countries);
- focus on infrastructures essential for soundly based and well conceived research aimed at the better quantification of the risks of exposure to low and protracted doses of radiation.

Funding scheme: Support action

Expected impact: Determination of the need or otherwise for new infrastructures essential for low dose risk research and how these may be jointly developed and used.

II.2.4.2 Area: Access to infrastructures

Facilitate transnational access to existing and future infrastructures by individual research workers and research teams.

Topic: Fission-2007-4.2.1: Transnational access to large infrastructures

Objectives: To promote access for researchers to infrastructures that provide essential and unique services to the European research community.

Scope: Community support will be provided to cover costs of access for researchers from Member States and Associated States other than the state where the infrastructure is established. The active participation of major infrastructure operators and potential users will be required to achieve the objectives.

Funding Scheme: One of more support action(s)

Expected impact: The action will maximise the use of existing nuclear research infrastructures in Europe in all activities of the programme and facilitate access to and use of these infrastructures by research workers throughout Europe.

II.2.5 Activity: Human Resources, Mobility and Training

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.

II.2.5.1 Area: Training & mobility of research workers

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

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.

Topics: These actions will be implemented largely via the inclusion of appropriate work packages and other initiatives in the major projects under the various activities. See also area II.2.4.2 and relevant cross-cutting actions in §II.2.6. Indicative priorities for future work programmes are mentioned in §IV.2.

II.2.6 Activity: Cross-cutting Topics

Topic: Fission-2007-6.1: Treatment and disposal of irradiated graphite

Objectives: Development of best practices in the treatment and disposal of irradiated graphite.

Scope: The action should consider both existing legacy waste, i.e. structural material and fuel coating, as well as waste from graphite-based nuclear fuel that could result from a new generation of reactor systems.

Funding Scheme: Collaborative project

Expected impact: The action will assist in the development of safe management practices related to the treatment and disposal of significant accumulations of waste considered problematic by a number of countries.

Topic: Fission-2007-6.2: Materials for transmutation technologies and advanced reactors

Objectives: To participate in the development and qualification of materials under extreme conditions for advanced fission reactors (in the framework of GIF) and transmutation systems.

Scope: Actions could cover, *inter alia*:

- selection of materials, in particular steels, for core and primary components;
- study of the effect of a fast neutron flux on the microstructure and the mechanical behaviour of the various steels and, where applicable, of the related corrosion protection barriers;
- study of materials behaviour under the combined effect of extreme conditions such as high temperature, high fluence, chemistry, etc;

- investigation of the impact of spallation / fission products on fuel claddings in HLM environment;
- conduct, if appropriate, Post-Irradiation Examination (PIE) activities of relevant materials underway in European Programmes;
- development of methods and facilities for fabrication and testing, wherever needed;
- experimental validation of predictive numerical simulation tools for materials behaviour;
- common qualification methodologies.

The focus should be on cross-cutting or generic issues applicable to more than one system, and proposals should seek to maximise collaboration amongst national R&D programmes through the pooling of expertise and experimental facilities of specialised institutes (including fusion laboratories). International collaboration with research organisations outside the EU could also be very useful for the carrying out of this action.

Funding scheme: One or more collaborative project(s)

Expected impact: The project is expected to lead to advances in materials technology for transmutation and advanced reactor systems, with wider implications for possible future waste management strategies and/or in the development of Generation-IV systems as part of a coordinated Euratom support to GIF.

Topic: *Fission-2007-6.3: Database of competences and facilities*

Objectives: In collaboration with the OECD/NEA and IAEA and by integrating the results of previous Euratom programmes, to create a user-friendly and open access database of nuclear competences and infrastructure facilities in the EU, thereby facilitating the transnational access and mobility of researchers.

Scope: The action should include:

- the cataloguing of current competences, RTD programmes and facilities available at European level both in the public and private sectors in the fields of reactor design and safety, waste management, P&T, innovative reactor systems and fuel cycles and nuclear education and training;
- the creation of a user-friendly interactive web-based database containing the above information that is freely and readily available to the nuclear research community;
- the maintaining and updating on at least an annual basis and the development of self-sustainable mechanisms and procedures for the updating on a similar frequency after the end of this project.

Funding Scheme: Coordination action

Expected impact: This work will enable a better structuring of the nuclear fission research community in Europe and provide an all-important definitive overview of European nuclear competences, tools and facilities.

Topic: Fission-2007-6.4: Actions supporting programme implementation and other activities

Objectives: To contribute to programme implementation through dissemination of results and preparation of possible future activities.

Scope: Actions should cover one or more of the following:

- promoting and facilitating the dissemination, transfer, exploitation, assessment and broad take-up of past and present programme results (over and above the standard diffusion and exploitation activities of individual projects);
- contributing to achievement of strategic objectives, notably regarding the European Research Area (e.g. pilot initiatives on benchmarking, mapping, networking, etc.);
- preparation of possible future Community R&D activities (e.g. via prospective studies, exploratory measures, pilot actions, etc.);

Events such as annual workshops and conferences are not covered if (i) they would take place anyway without Commission support, and (ii) the action does not demonstrably serve the Community programme's strategic objectives (in the sense of the European Research Area, improved coordination, public awareness, preparation of Community initiatives, etc.).

Funding Scheme: One or more support action(s)

Expected impact: Such actions can serve an important purpose in all activities under the programme by providing funding for prospective and novel R&D outside that being performed in major projects. This is a bottom-up action that can be of particular benefit to smaller research groups.

Topic: Fission-2007-6.5: Trans-national cooperation among NCPs and third country contacts

Objectives: To reinforce the networking of FP7 National Contact Points (NCP) and third country contacts, under the theme of nuclear fission and radiation protection, by promoting trans-national cooperation.

Scope: The action should be adapted to the specific needs in the area of nuclear fission and radiation protection and to the requirements identified by the NCPs and contact points concerned. General activities could include:

- the identifying and sharing of good practice (e.g. joint workshops, training, twinning schemes);
- practical initiatives to benefit cross-border audiences (e.g. trans-national brokerage events);

- specific efforts to help less experienced NCPs, especially from the New Member States, benefit from the experience accumulated in other countries.

Proposals should include NCPs officially appointed by the relevant national authorities and any third country contact points similarly endorsed at the national level. NCPs and contact points should preferably be unique to the area of Euratom / fission and radiation protection. Other EU participants are not eligible. Not all NCPs need to be included in a proposal.

Funding Scheme: Coordination action; indicative budget: up to €250,000. The project will last until end 2009, though the activity may be extended in a later call. Subject to the applicable rules, eligible costs of third country partners may also be reimbursed under the programme.

Expected impact:

- Improved NCP service across Europe in the area of nuclear fission and radiation protection thereby facilitating simplified access to FP7 calls in this field and improved quality of submitted proposals.
- A more consistent level of NCP support services across Europe.
- More effective participation of organisations from third countries alongside those from the EU and associated countries.

Non competitive action

The Commission intends to support the preparation of a synthesis report on Engineered Barrier Systems (EBS) and the safety of deep geological repositories for high-level radioactive waste. The report will bring together the main conclusion from a series of key thematic international workshops organised by the OECD/NEA on the Engineered Barrier Systems (EBS) to which the EC has been closely associated. The last workshop in the series took place in September 2006. Using the proceedings of the workshops as a starting point, a report should be drawn up developing common views on the role that EBS play in the disposal system through reinforcing the performance of the natural barrier and on how integration is necessary to achieve successful design, construction, testing, modelling and performance assessment. The work will be carried out by Galson Sciences Ltd (UK) who has drafted the individual workshop proceedings. This support action will be for a maximum of €25k.

II.3 Indicative EURATOM BUDGET 2007

		Year 2007⁷
Calls	<i>Call FP7 Fission 2007</i>	48 650 000
	<i>Call FP7 Fusion 2007</i>	5 000 000
Experts évaluateurs	<i>Evaluation and monitoring</i>	350 000
Other	<i>International agreement</i>	4 000 000
	<i>European JU for ITER</i>	92 800 000
	<i>COA</i>	70 271 000 ⁸
	<i>EFDA</i>	75 610 000
	<i>Mobility and other agreement</i>	5 000 000
	<i>FP6 Ex post evaluation</i>	200 000
RSFF		0
Cordis		0
COST		0
Eureka		0
ERA nets		0
Montant de l'action proposée		301 881 000

Monitoring and Evaluation and Impact Assessment

The Euratom Framework Programme will comply with the prevailing requirements for monitoring, evaluation, and impact assessment. This may involve studies and surveys as well as appointing experts or groups of experts. This will include the "FP6 ex-post evaluation for fusion, nuclear fission and radiation protection" of Euratom indirect actions under the 6th Framework Programme, which will be implemented through public procurement expected to be published in the course of 2007. The commitment appropriations for this activity in 2007 will be up to 200 000 EUR covering both Fusion and Nuclear Fission and Radiation Protection for a duration of 10 months.

⁷ Under the condition that the preliminary draft budget for 2007 is adopted without modifications by the budget authority.

⁸ A new financing decision to cover 2008 budget will be requested at the appropriate time.

III. IMPLEMENTATION OF PROGRAMME AND CALL(S) IN 2007

III.1 Fusion

Activities under the thematic area 'Fusion energy research' will be implemented on the basis of procedures and rules for dissemination and use set out in the following funding schemes with the indicative budget shown in Table §II.3:

International agreements

International agreements relating to cooperation with third countries, or any legal entity which may be established by such an agreement, in particular the ITER Agreement;

All contributions to the ITER project will be carried out by the European Joint Undertaking once it becomes operational.

Pending entry into force of the ITER Agreement, the ITER Parties will continue joint preparatory work in the frame of the ITER Transitional Arrangements. This would entail the continued operation of a Common Fund contributed to by the prospective Members of the ITER Organization to support common expenditures, to which the Community would contribute about 4Meuro.

European Joint Undertaking for ITER

The Euratom contributions to the ITER Organisation, the Broader Approach activities as well as the implementation of activities in preparation for DEMO and IFMIF will be provided by the European Joint Undertaking to be established under Articles 45 – 51 Euratom Treaty.

The overall budget foreseen for the ELE Work Plan is shown in Table §II.3 jointly with the overall budget for International agreements. Pending the establishment of the European Joint Undertaking for ITER, the Euratom contribution to the international activities maybe directly made by the Commission.

Contracts of Association

The Contracts of Association renewed under FP7 between the Community and Member States or Associated Third Countries or legal entities within Member States or Associated Third Countries will have an indicative budget that comprises financing of general support, preferential support and training support actions; the total amount for these activities is shown in Table §II.3.

European Fusion Development Agreement

The European Fusion Development Agreement (EFDA) renewed under FP7 and concluded between the Community and organisations in, or acting for, Member States and Associated Countries. The Community support will cover research co-ordination activities, JET S/T orders implemented under the Contracts of Association, the JET Implementing Agreement (JIA), the JET Operation Contract and the EFDA Host support, secondment and assignment of staff.

The global indicative budget for EFDA, (including Host support, JET Operational Contract and JET activities) is shown in Table §II.3.

Mobility agreement and other multilateral agreement

The indicative expenditure for the mobility agreement and any other multilateral agreement concluded between the Community and associated organisations is shown in Table §II.3

Fellowships and Training

A call for proposals may be published after a review of the training activities carried out during FP6, in particular the Euratom Fusion Training Scheme.

Support Actions

Call Identifier: FP7-Fusion-2007

Date of Publication: 22nd May 2007⁹

Deadline: 23rd October 2007¹⁰, at 17:00, Brussels local time

Indicative budget: 5 million EUR from 2007 budget¹¹

Topics called:

Activity	Topic	Funding Schemes
Coordination and Support Actions	Fusion-2007-1.7.1: Fusion education	Coordination or Support action
	Fusion-2007-1.7.2: Materials research	Coordination or Support action
	Fusion-2007- 1.7.3: Atomic data & modelling in support of fusion plasma modelling and diagnostics	Coordination or Support action

Evaluation Procedure:

- The evaluation criteria (including weights and thresholds) and sub-criteria together with the eligibility, selection and award criteria for the different funding schemes are set out in annex 2 to this work programme
- The evaluation will follow a single stage procedure.
- Proposals will not be evaluated anonymously.
- Proposals may be evaluated remotely.

⁹ The Director-General responsible for the call may publish it up to one month prior to or after the envisaged date of publication.

¹⁰ At the time of the publication of the call, the Director-General responsible may delay this deadline by up to two months

¹¹ Under the condition that the preliminary draft budget for 2007 is adopted without modifications by the budget authority.

Indicative evaluation and contractual timetable: Evaluation completed in November with contracts in place January 2008

Consortia Agreements: Refer to the Rules for Participation

Particular requirements for participation, evaluation and implementation: None beyond the standard rules and guidelines. The rate of support will be negotiated with the Commission.

- The forms of grant and maximum reimbursement rates which will be offered are specified in Annex 3 to the Euratom work programme.

Minimum number of participants¹² as set out in the Rules for Participation

Funding scheme	Minimum conditions
Co-ordination and support action (co-ordinating)	At least 3 independent legal entities, each of which is established in a MS or AC, and no two of which are established in the same MS or AC.
Co-ordination and support action (supporting)	At least 1 independent legal entity

III.2 Nuclear Fission and Radiation Protection

Call Identifier: FP7-Fission-2007

Date of Publication: 22nd December 2006¹³

Deadline: 2nd May 2007¹⁴, at 17:00, Brussels local time

Indicative budget: 48 650 000 EUR from 2007 budget¹⁵

Topics called:

Activity/Area	Topic	Funding Schemes
Management of Radioactive Waste: <i>Geological disposal</i>	Fission-2007-1.1.1: Phenomenology and performance assessment	Collaborative project(s)

¹² MS = Member States of the EU; AC = Associated country. Where the minimum conditions for an indirect action are satisfied by a number of legal entities, which together form one legal entity, the latter may be the sole participant, provided that it is established in a Member State or Associated country

¹³ The Director-General responsible for the call may publish it up to one month prior to or after the envisaged date of publication.

¹⁴ At the time of the publication of the call, the Director-General responsible may delay this deadline by up to two months

¹⁵ Under the condition that the preliminary draft budget for 2007 is adopted without modifications by the budget authority.

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	Fission-2007-1.1.2: Technology demonstration of safe repository operation	Collaborative project
Management of Radioactive Waste: <i>Partitioning and transmutation</i>	Fission-2007-1.2.1: Partitioning processes for viable recycling strategies	Collaborative project(s)
Reactor Systems: <i>Nuclear installation safety</i>	Fission-2007-2.1.1: Numerical coupling of safety-relevant phenomena	Collaborative project
	Fission-2007-2.1.2: Prediction of irradiation effects on reactor internals and/or claddings	Collaborative project
	Fission-2007-2.1.3: Advanced safety assessment methodologies	Coordination action
	Fission-2007-2.1.4: The Man-machine organisation (MMO) interface and plant safety management	Support action
Reactor Systems: <i>Advanced nuclear systems</i>	Fission-2007-2.2.1: Innovative fuels and claddings for Generation IV systems	Collaborative project(s)
Radiation Protection: <i>Quantification of risks for low and protracted exposures</i>	Fission-2007-3.1.1: Non-cancer effects	Collaborative project(s)
	Fission-2007-3.1.2: Prospective cohort of medically exposed children	Support action
Radiation Protection: <i>Medical uses of radiation</i>	Fission-2007-3.2.1: Enhanced safety and efficacy in the medical uses of radiation	Collaborative project(s) and/or coordination action(s)
Radiation Protection: <i>Emergency management and rehabilitation</i>	Fission-2007-3.3.1: Optimal approaches for monitoring	Collaborative project
Infrastructures: <i>Supporting infrastructures</i>	Fission-2007-4.1.1: European networking of underground research laboratories (URLs)	Coordination action
	Fission-2007-4.1.2: Support to new research infrastructures of pan-European interest	Collaborative project
	Fission-2007-4.1.3: Databases and tissue banks	Collaborative project(s) and/or coordination action(s)
	Fission-2007-4.1.4: Radiobiology infrastructures	Support action
Infrastructures: <i>Access to infrastructures</i>	Fission-2007-4.2.1: Transnational access to large infrastructures	Support action(s)
Human Resources, Mobility and Training: <i>Training & mobility of research workers</i>	Included in above actions; see also Cross-cutting Topics	
Cross-cutting Topics	Fission-2007-6.1: Treatment and disposal of irradiated graphite	Collaborative project
	Fission-2007-6.2: Materials for transmutation technologies and advanced reactors	Collaborative project(s)
	Fission-2007-6.3: Database of competences and facilities	Coordination action

	Fission-2007-6.4: Actions supporting programme implementation and other activities	Support action(s)
	Fission-2007-6.5: Trans-national cooperation among NCPs and third country contacts	Coordination action

Evaluation Procedure:

- The evaluation criteria (including weights and thresholds) and sub-criteria together with the eligibility, selection and award criteria for the different funding schemes are set out in annex 2 to this work programme
- The evaluation will follow a single stage procedure.
- Proposals will not be evaluated anonymously.
- Proposals may be evaluated remotely.

Indicative evaluation and contractual timetable: Evaluation: spring 2007; contract negotiation and signature: autumn 2007

In order to maximise flexibility in the implementation of the annual work programmes, thereby enabling Community support to remain as relevant and effective as possible over the full duration of FP7, no predetermined budgets for individual activities have been fixed by the Specific Programme. Nevertheless, the initial aim is to provide roughly equivalent degrees of support in the three main activities (§II.2.1 - .3) over the full duration of FP7, though this excludes any additional funding via horizontal and support activities (§II.2.4 & 5) for which the respective needs and level of required new investment in the three activities cannot be readily compared. Furthermore, the growing importance of cross-cutting topics means it will become more difficult to assign labels to the funding provided through the programme. This strategy will be reviewed during the course of FP7, especially in the planned mid-term review. If necessary, corrective action may be taken, e.g. in the form of dedicated calls.

Every attempt will be made to maximise coverage and ensure a balance within the programme regarding allocation of resources to projects, commensurate with strict adherence to the evaluation rules and available guidance.

Consortia Agreements: Refer to the Rules for Participation

Particular requirements for participation, evaluation and implementation: None beyond the standard rules and guidelines.

The forms of grant and maximum reimbursement rates which will be offered are specified in Annex 3 to the Euratom work programme.

Minimum number of participants¹⁶ as set out in the Rules for Participation

Funding scheme	Minimum conditions
Collaborative project	At least 3 independent legal entities, each of which is established in a MS or AC, and no two of which are established in the same MS or AC.
Co-ordination and support action (co-ordinating)	At least 3 independent legal entities, each of which is established in a MS or AC, and no two of which are established in the same MS or AC.
Co-ordination and support action (supporting)	At least 1 independent legal entity

¹⁶ MS = Member States of the EU; AC = Associated country. Where the minimum conditions for an indirect action are satisfied by a number of legal entities, which together form one legal entity, the latter may be the sole participant, provided that it is established in a Member State or Associated country

IV. INDICATIVE PRIORITIES FOR FUTURE WPs AND CALLS

This section provides an indication of possible future actions to be included in the Euratom Work Programme for 2008 or later. No guarantee can be given at this time of inclusion in a future programme, the intention being merely to provide the European nuclear research community with a longer-term vision of the Euratom Programme thereby emphasising continuity and the coherence of the underlying Community strategy. The decision on the possible timing of individual actions is a result of several factors, not least of which being the foreseen completion of related FP6 projects.

IV.1 Fusion

The objective of the Fusion programme in the near term is the successful realisation of the ITER project and preparations for the earliest possible start of the experimental activities. The Euratom work programme for the thematic priority Fusion Energy in 2008 will continue to concentrate on the following activities:

- providing support for the ITER project through the activities of the European Joint Undertaking;
- coordination of the work programmes in the Contract of Association through the activities of EFDA;
- support for enhanced collaborations through the mobility agreement;
- support for specific support actions and actions in favour of training and career development of researchers.

IV.2 Nuclear Fission and Radiation Protection

Activity: Management of Radioactive Waste

Area: Geological disposal

Possible topics include inter alia:

- ***Disposal of long-lived low & intermediate-level waste:*** There remain a number of waste streams under this general category for which industrial disposal solutions have yet to be implemented, though Community R&D funding will only be possible for the more important cases and where EU Member States have common needs. Expressions of interest could be solicited prior to the call for proposals.
- ***Issues related to the governance of spent nuclear fuel and high-level long-lived radioactive waste:*** Due consideration will be taken of the outcome of on-going projects in the area in FP6 and the need for any follow-up actions. Support may be provided for the establishment and initial operation of a European network for the provision and delivery of independent expertise and training.

- **Support for the scientific secretariat of a European Technology Platform (TP) on geological disposal:** A TP may be established in this field next year and this action would provide support for the associated secretariat, whose functions include coordination of TP activities leading to the elaboration and implementing of the Strategic Research Agenda, and related dissemination and communication duties.

Activity: Reactor Systems

Area: Nuclear Installation Safety

Possible topics include inter alia:

- **Plant lifetime management:** Further actions might be pursued in fields such as corrosion, thermal fatigue, ageing of critical plant components and concrete structures, modernisation of I&C control equipment, in-service inspection and non-destructive evaluation, dosimetry and safety margin calculations.
- **Severe accident analysis:** This action foresees the possibility, as a result of the outcome of on-going work on Severe Accident Management, of performing further research on severe accidents.
- **Support for the scientific secretariat of a European Technology Platform (TP) on sustainable nuclear fission:** A TP may be established in this field next year and this action would provide support for the associated secretariat, whose functions include coordination of TP activities leading to the elaboration and implementing of the Strategic Research Agenda, and related dissemination and communication duties.

Area: Sustainable Nuclear Systems

Possible topics include inter alia:

- **Innovative concepts and processes for nuclear energy that fit the GIF performance criteria:** Includes issues such as safety and reliability, environmental compatibility, economics, proliferation resistance and physical protection and could cover core and fuel design, material research for design and operation, fuel cycle studies including the back end, preliminary plant design studies, safety analysis and cogeneration of electricity and heat.
- **Support to the OECD/NEA's GIF scientific secretariat activities:** This topic would extend a current action and is required as part of the Euratom contribution to the GIF secretariat activities.

Activity: Radiation Protection

The Work Programme for 2008 is expected to focus on radiobiological research and epidemiological studies related to the better understanding and quantification of risks of radiation from low and protracted exposures. These topics are also expected to feature in the Work Programme for 2009 along with further research on the medical uses of radiation; consideration will also be given to the establishment of Networks of Excellence in the fields

of radioecology and dosimetry but decisions on this will depend on the outcome of ongoing research in FP6.

Activity: Infrastructures

Area: Supporting Infrastructures

Possible topics include inter alia:

- ***Fast neutron spectrum test facility or transmutation device:*** The action could cover the necessary support for the design and preparatory phase and should be in line with the guidance from the ESFRI process or other forums at the EU level, such as the envisaged technology platform and roadmapping exercises being conducted in ongoing actions. The device will be useful for the future development of fast neutron systems (critical or sub-critical), as part of the Generation IV activities or in the framework of transmutation development programmes
- ***Geological disposal and URLs:*** The action could include incentives for the new Member States to support planning, design, and construction of underground research facilities, or to support the construction, operation or refurbishment of existing facilities with joint use of these infrastructures by research organisations from across the EU.

Activity: Human Resources, Mobility and Training

Area: Training and mobility of research workers

Possible topics include inter alia:

- ***Harmonisation of nuclear education and training schemes across EU:*** To contribute to the European area of higher education in the nuclear fission field and extend it to training activities to meet the stakeholders needs in the areas of reactor safety, waste management and radiation protection through an expansion of the ENEN approach.
- ***Euratom fission training schemes:*** In line with the ENEN strategy, the action would provide for a critical mass of qualified workers of higher level education (aimed at the private or the public sector) in those areas where a shortage of skilled professionals has been identified. Could include support for education and training facilities and the organising of modular training sessions as well as mobility of trainees and trainers across the EU.

ANNEXES:

- 1: International Cooperation Partner Countries (ICPC)
- 2: Eligibility and Evaluation Criteria for proposals
- 3: Table for Forms of Grants and Maximum Reimbursement Rates for Projects Funded Through the Euratom Work Programme

ANNEX 1: List of International Co-operation Partner Countries (ICPC)

ACP *

- AFRICAN

- Angola
- Benin
- Botswana
- Burkina-Faso
- Burundi
- Cameroon
- Cape Verde
- Central African Republic
- Chad
- Comoros
- Congo (Republic)
- Congo (Democratic Rep. of)
- Côte d'Ivoire
- Djibouti
- Equatorial Guinea
- Eritrea
- Ethiopia
- Gabon
- Gambia
- Ghana
- Guinea
- Guinea-Bissau
- Kenya
- Lesotho
- Liberia
- Madagascar
- Malawi
- Mali
- Mauritania
- Mauritius
- Mozambique
- Namibia
- Niger
- Nigeria
- Rwanda
- Sao Tome and Principe
- Senegal
- Seychelles
- Sierra Leone
- Somalia
- South Africa¹
- Sudan
- Swaziland
- Tanzania
- Togo
- Uganda
- Zambia
- Zimbabwe

- CARIBBEAN

- Barbados
- Belize

¹ Signed an agreement with the EC covering Science & Technology

- Cuba
- Dominica
- Dominican Rep.
- Grenada
- Guyana
- Haiti
- Jamaica
- Saint Kitts and Nevis
- Saint Lucia
- Saint Vincent and Grenadines
- Suriname
- Trinidad and Tobago

- PACIFIC

- Cook Islands
- Timor Leste
- Fiji
- Kiribati
- Marshall Islands
- Micronesia, Federal States of
- Nauru
- Niue
- Palau
- Papua New Guinea
- Solomon Islands
- Tonga
- Tuvalu
- Vanuatu
- Samoa

ASIA

- Afghanistan
- Bangladesh
- Bhutan
- Burma/Myanmar
- Cambodia
- China^{1**}
- India^{1**}
- Indonesia
- Iran
- Iraq
- Lao People's Democratic Republic
- Malaysia
- Maldives
- Mongolia
- Nepal
- Oman
- Pakistan
- Philippines
- Sri Lanka
- Thailand
- Vietnam
- Yemen

EASTERN EUROPE AND CENTRAL ASIA (EECA)

- Armenia²
- Azerbaijan²
- Belarus²
- Georgia²
- Kazakhstan
- Kyrgyz Republic
- Moldova²
- Russia^{1**}
- Tajikistan
- Turkmenistan
- Ukraine^{1,2}
- Uzbekistan

LATIN AMERICA

- Argentina¹
- Bolivia
- Brazil^{1**}
- Chile¹
- Colombia
- Costa Rica
- Ecuador
- El Salvador
- Guatemala
- Honduras
- Mexico¹
- Nicaragua
- Panama
- Paraguay
- Peru
- Uruguay
- Venezuela

MEDITERRANEAN PARTNER COUNTRIES (MPC)²

- Algeria
- Egypt¹
- Jordan
- Lebanon
- Libya
- Morocco¹
- Palestinian-administered areas
- Syrian Arab Rep.
- Tunisia¹

WESTERN BALKAN COUNTRIES (WBC)

- Albania

² These countries are also part of the European Neighbourhood Policy (ENP).

- Bosnia-Herzegovina
- Former Yugoslav Republic of Macedonia (FYROM)^{***}
- Montenegro
- Serbia³

*In the 'Specific international cooperation actions', Africa can also be considered as a region on its own, while the Caribbean countries can also participate with Latin American and the Pacific countries with Asia.

**For participation in the 'Specific international cooperation actions' each of Brazil, China, India and Russia may be considered individually as a region on its own. Thus, the required two or more partners can be located in these countries. However, in this case, at least two different partners from different provinces, oblasts, republics or states within Brazil, China, India or Russia are necessary.

*** On 16/12/2005 the Former Yugoslav Republic of Macedonia (FYROM) became a Candidate Country. FYROM is not an associated country to FP7 and thus remains a target country for International Cooperation Specific Actions.

³ Including Kosovo as defined by UNSC resolution 1244 of 10 June 1999

Annex 2: FP7 Evaluation Criteria

Eligibility and Evaluation Criteria for Proposals

Eligibility criteria

A proposal will only be considered eligible if it meets all of the following conditions:

- It is received by the Commission before the deadline given in the call text.
- It involves at least the minimum number of participants given in the call text.
- It is complete (i.e. both the requested administrative forms and the proposal description are present)
- The content of the proposal relates to the topic(s) and funding scheme(s), including any special conditions, set out in those parts of the relevant work programme

Other eligibility criteria may be given in the call text.

Evaluation criteria

The evaluation criteria against which proposals will be judged are set out in articles 14 and 15 of the Rules for Participation. For the 'Euratom' specific programme these are:

- scientific and/or technological excellence;
- relevance to the objectives of these specific programmes¹⁷;
- the potential impact through the development, dissemination and use of project results;
- the quality and efficiency of the implementation and management.

Within this framework, the work programmes will specify the evaluation and selection criteria and may add additional requirements, weightings and thresholds, or set out further details on the application of the criteria.

The purpose of this annex is to set out such specifications. Unless otherwise indicated in the relevant parts of this work programme, the criteria, weightings and thresholds given here will apply to all calls for proposals.

Proposals will be evaluated in line with the Commission 'Rules on Submission of Proposals and the Related Evaluation, Selection and Award Procedures'.

A proposal which contravenes fundamental ethical principles, fails to comply with the relevant security procedures, or which does not fulfil any other of the conditions set out in the specific programme, the work programme or in the call for proposals shall not be selected.

¹⁷ **Relevance:** A proposal may be **partially relevant** if it addresses only marginally the topic(s) of the call, or if only part of the proposal addresses them. Such conditions will be reflected in the evaluation of the first criterion ('S/T excellence'). The degree to which a proposal is relevant to the objectives of a call will be reflected in the evaluation of the third criterion ("impact"). Proposals that are clearly not relevant to a call ("out of scope"), will be rejected on eligibility grounds before the evaluation.

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Such a proposal may be excluded from the evaluation, selection and award procedures at any time. Details of the procedure to be followed are given in the Commission rules mentioned above.

The arrangements for a particular call will be set out in the relevant Guide for Applicants.

		1. Scientific and/or technological excellence <i>(relevant to the topics addressed by the call)</i>	2. Quality and efficiency of the implementation and the management (selection)	3. The potential impact through the development, dissemination and use of project results (award)
		(award)		
All funding schemes		<ul style="list-style-type: none"> • <i>Soundness of concept, and quality of objectives</i> 	<ul style="list-style-type: none"> • Appropriateness of the management structure and procedures • <u>Quality and relevant experience of the individual participants</u> 	<ul style="list-style-type: none"> • <i>Contribution, at the European [and/or international level], to the expected impacts listed in the work programme under relevant topic/activity</i>
Collaborative projects		<ul style="list-style-type: none"> • <i>Progress beyond the state-of-the-art</i> • Quality and effectiveness of the S/T methodology and associated work plan 	<ul style="list-style-type: none"> • <u>Quality of the consortium as a whole (including complementarity, balance)</u> • Appropriateness of the allocation and justification of the resources to be committed (budget, staff, equipment) 	<ul style="list-style-type: none"> • Appropriateness of measures for the dissemination and/or exploitation of project results, and management of intellectual property.
Networks of Excellence		<ul style="list-style-type: none"> • <i>Contribution to long-term integration of high quality S/T research</i> • Quality and effectiveness of the joint programme of activities and associated work plan 	<ul style="list-style-type: none"> • <u>Quality of the consortium as a whole (including ability to tackle fragmentation of the research field, and commitment towards a deep and durable integration)</u> • Adequacy of resources for successfully carrying out the joint programme of activities 	<ul style="list-style-type: none"> • Appropriateness of measures for spreading excellence, exploiting results, and disseminating knowledge, through engagement with stakeholders and the public at large.
Co-ordination & support actions	CA	<ul style="list-style-type: none"> • Contribution to the co-ordination of high quality research • Quality and effectiveness of the co-ordination mechanisms, and associated work plan 	<ul style="list-style-type: none"> • <u>Quality of the consortium as a whole (including complementarity, balance) [for SA: only if relevant]</u> • Appropriateness of the allocation and justification of the resources to be committed (budget, staff, equipment) 	<ul style="list-style-type: none"> • Appropriateness of measures for spreading excellence, exploiting results, and dissemination knowledge, through engagement with stakeholders, and the public at large.
	SA	<ul style="list-style-type: none"> • Quality and effectiveness of the support action mechanisms, and associated work plan 		

Notes:

1. Evaluation scores will be awarded for each of the three criteria, and not for the sub-criteria. Each criterion will be scored out of 5. No weightings will apply. The threshold for individual criteria will be 3. The overall threshold, applying to the sum of the three individual scores, will be 10.
2. The second column corresponds to the **selection criteria** in the meaning of the financial regulation¹⁸ (article 115) and its implementing rules¹⁹ (article 176 and 177). They also will be the basis for assessing the 'operational capacity' of participants. The other two criteria correspond to the **award criteria**.
3. For the evaluation of first-stage proposals under a two-stage submission procedure, only the sub-criteria in italics apply.

¹⁸ OJ L248 16.9.2002, p1.

¹⁹ OJ L357 31.12.2002, p1

Annex 3: Table for Forms of Grant and Maximum Reimbursement Rates for Projects Funded Through the Euratom Work Programme

Forms of Grant

The FP7 'Rules for Participation' propose three potential forms of grant for the Community financial contribution: reimbursement of eligible costs, flat rate financing including scale of unit costs, and lump sum financing. In this work programme, for all funding schemes, the reimbursement of eligible costs (including the different options for flat rates on indirect costs as established in Article 32 of the Rules for Participation) will be the only form of grant used²⁰.

Maximum Reimbursement Rates

The upper limits foreseen in the Rules for Participation (Article 32) for the Community financial contribution are summarised in the following table.

	Non-profit public bodies, secondary and higher education establishments, research organisations and SMEs	All other organisations
Research and technological development activities	75%	50%
Demonstration activities	50%	50%
Coordination and support actions and actions for the training and career development of researchers	100%	100%
Management, audit certificates and other activities ²¹	100%	100%

²⁰ This annex does not apply to the funding schemes listed under section III.1 (fusion energy), except where the activities are implemented through calls for proposals.

²¹ Including, inter alia training in actions that do not fall under the funding schemes for training and career development of researchers, coordination, networking and dissemination (as set out in Article 32(4) of the Rules for Participation).