

WORK PROGRAMME 2013

Euratom for Nuclear Research and Training Activities¹

(European Commission C(2012)4610 of 09 July 2012)

¹ In accordance with the Treaty establishing the European Atomic Energy Community and in particular Articles 7 and 10 as contextualised in the following decisions: Council Decision 2012/93/Euratom of 19 December 2011 concerning the Framework Programme of the European Atomic Energy Community for nuclear research and training activities (2012-2013) and the Council Decision 2012/94/Euratom of 19 December 2011 concerning the Specific Programme, to be carried out by means of indirect actions, implementing the Framework Programme of the European Atomic Energy Community for nuclear research and training activities (2012-2013).

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GENERALITIES

Following the adoption of the Euratom Framework Programme for 2012-2013 (hereinafter 'the Framework Programme')² and the corresponding Specific Programme (hereinafter 'the Specific Programme')³ for 'Nuclear Research and Training Activities' and the Rules for the participation of undertakings, research centres and universities in indirect actions under the Framework Programme of the European Atomic Energy Community and for the dissemination of research results (hereinafter 'the Rules for Participation')⁴, the Commission adopts annual work programmes with the assistance of the Consultative Committees for Fission and Fusion. This work programme (WP) constitutes a financing decision for 2013. It defines the technical scope of actions and provides information on the implementation arrangements.

Research and development activities in this work programme comprise two research themes: Fusion Energy, and 'Nuclear Fission, Safety and Radiation Protection'.

OBJECTIVES

In the priority theme of Fusion Energy, the overall objective is to develop the knowledge base for, and realising ITER as a 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, Safety and Radiation Protection, the overall objective is to strengthen the research and innovation framework and coordinate part of the Member States' research efforts, thereby avoiding duplication, retaining critical mass in key areas and ensuring public funds are used in an optimal way. While it is for each Member State to choose whether or not to make use of nuclear energy, the role of the Union is to support, in the interest of all its Member States, joint cutting-edge research efforts, knowledge creation and knowledge preservation on nuclear fission, safety and radiation protection. Its activities should therefore contribute to the continuous development of a sound scientific and technical basis all over Europe in order to accelerate practical developments for the safer management of long-lived radioactive waste, to enhance in particular the safety and security while contributing to resource efficiency and cost-effectiveness of the European energy system and to ensure a robust and socially acceptable system of protection of man and the environment against the effects of ionising radiation.

Euratom research, both fission and fusion, pays attention to the gender equality issue and participation of women is actively encouraged.

² Council Decision 2012/93/Euratom of 19 December 2011

³ Council Decision 2012/94/Euratom of 19 December 2011

⁴ Council Regulation 139/2012 of 19 December 2011

I. CONTEXT

I.1 Approach for 2013

Against the backdrop of the current economic situation and increased global competition, the Union has defined a strategy to support growth and job creation, Europe 2020. The Innovation Union Flagship initiative supports this strategy through specific commitments. Research and innovation are key drivers of competitiveness, jobs, sustainable growth and social progress.

The work programme 2013 aligns with, and contributes towards, the objectives of Europe 2020, the Innovation Union Flagship, the EU's Energy and Climate policies as well as other EU policies. There is a determined focus on fostering new ideas, supporting world class teams tackling significant societal challenges, and on ensuring that the fruits of our investments can be properly exploited. In this way the work programme provides for a smooth transition towards the new research and innovation programme for 2014-2020, Horizon 2020.

Nuclear research activities included in this work programme underpin the EU energy policy developments under the SET-Plan and the Energy 2020 strategy. They contribute to the 'Innovation Union' flagship initiative by supporting pre-commercial research and facilitating technology transfer process between academia and industry and to the 'Resource efficient Europe' flagship initiative by increased research in Nuclear Safety. Activities thus contribute to defending Europe's leadership in energy technology and innovation, and in particular contribute to maintaining a high level of safety with special focus on any necessary research emerging following the analysis of the Fukushima accident.

The **fission, safety and radiation protection** programme illustrates the Innovation Union in action, addressing major societal and technological challenges through its coordinating and pioneering research activities. The main objectives pursued by this work programme are joining forces between research organisations, industry and regulatory authorities where appropriate as well as effectively catalysing the research efforts at EU level and thus making it more effective towards safety. The strategy is to provide a financial catalyst triggering further stakeholder investments and joint programming in key topics as part of national and corporate R&D programmes. In the area of *nuclear systems and safety*, Euratom projects will contribute to the pre-conceptual design and related pan-European activities insofar as this effort remains exclusively focused on safety. In *nuclear waste*, Euratom will continue supporting joint research activities on deep geological disposal to ensure the operation of the first repositories in the EU by 2020-25. The work in both these areas is in line with SET-Plan objectives. In the area of *radiation protection*, joint research activities will address the concerns of European citizens on the possible long-term health effects of low radiation doses, especially from the use of radiation in medical diagnostic and therapeutic techniques.

In **fusion**, the activities have two closely linked aims: First, the highest priority of the programme is to advance the construction of ITER under a strict policy of cost containment while maintaining risks at an acceptable level. The strategy for fusion R&D is to focus on the key activities required to accompany the construction of ITER and prepare its exploitation. Secondly, another main goal is to protect the European investment in ITER and make sure that Europe, its research community and its industry, will reap the full benefit of the research at ITER and will be able to successfully further develop fusion as an energy source. Innovation is at the core of the fusion programme. Still in its infancy, the fusion energy sector will mobilise many European high-tech industries which will gain new skills and manufacturing capabilities.

I.2 Scope of Work

This work programme, financed from the 2013 Euratom budget, contributes to the implementation of the Specific Programme.

I.3 International Cooperation

International cooperation – based on balanced reciprocal benefits – contributes to achieving the strategic objectives of fusion and fission research and training programmes in line with the strategic policy on international cooperation and in support to the transition towards Horizon 2020.

The main fusion-related international cooperation frameworks are the ITER Agreement among the seven parties, China, India, Japan, Russia, South Korea and U.S together with Euratom (sections II.1.1 and II.1.2), as well as the Broader Approach Agreement between Euratom and Japan (section II.1.8). The bilateral Cooperation Agreements in force between Euratom and all ITER parties plus some other Third Countries are aimed mainly at developing cooperation on activities in support of or complementary to ITER (section III.1) and to longer-term activities like DEMO. The bilateral work programmes of those Cooperation Agreements encompass extensive networks of collaborative activities between European entities and institutions of those Third Countries. Furthermore, Euratom also contributes to various multilateral cooperation frameworks, i.e. the OECD/IEA Fusion Power Coordinating Committee (FPCC) with eight Implementing Agreements, the IAEA International Fusion Research Council (IFRC), and the International Tokamak Physics Activity (ITPA) under the auspices of ITER-IO.

The importance of the global dimension of international cooperation in the fission area, in particular on nuclear safety-related research, has been underlined by the nuclear accident in Japan in 2011. Further cooperation with Third Countries is also carried out under specific Cooperation Agreements covering nuclear research or nuclear safety.

Cooperation between Euratom and OECD/NEA and IAEA is built on the established competences of these international organisations, in particular the accumulated historical knowledge tracking nuclear development over recent decades. In this regard, the IAEA could also play an important supporting role in fostering cooperation between Euratom and countries not yet having a fully developed nuclear infrastructure.

We draw attention to activities implemented by the EU external cooperation instruments in nuclear field, such as the Instrument for Stability in its component on Chemical, Biological, Radiological, and Nuclear (CBRN) risk mitigation, the Instrument for Nuclear Safety Cooperation and the Instrument for Preaccession in its component nuclear safety and radioprotection. These instruments do not finance research but may facilitate networking with R&D communities in nuclear safety, waste, radioprotection, emergency preparedness and training. This is particularly the case of the CBRN Centre of Excellence Initiative under the Instrument for Stability.

I.4 Cross-Cutting Issues

Whenever possible, synergies will be exploited between fission and fusion research within the Euratom programme, as well as between the Euratom and the Specific Programmes, implementing the Seventh Framework Programme (EU). Interactions between the different activities should be adequately accommodated. In particular, the European Energy Research Alliance (EERA) established under the SET-Plan could be a platform to promote energy-enabling technologies and/or stimulate cross-cutting research activities.

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 the Contracts of Association between Euratom and national research organisations or bodies and multilateral agreements with those organisations. Within these contracts and agreements an annual work programme is agreed and implemented.

The content of the programme is described in section II.1.

For the theme Nuclear Fission, Safety and Radiation Protection, the details of the activities and topics are presented in sections II.2, and III.2 provides information on the corresponding call(s) for proposals.

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

- this work programme;
- the relevant call for proposals as published on the relevant Commission websites following the announcement of the publication in the *Official Journal of the European Union*;
- the relevant Guide for Applicants.

These and a number of other useful texts, including the rules for participation, are available on the relevant Website <http://ec.europa.eu/research/participants/portal>. The latter should be consulted to ensure that the documents being used are the most recent. Some may be revised during the programme lifetime and even during the time a particular call is open.

Participants will have the possibility to use flat rates to cover subsistence costs incurred by beneficiaries during travel carried out within grants for indirect actions.

I.6 Evaluation Criteria and Related Issues

The '[Rules for submission of proposals, and the related evaluation, selection and award procedures](#)⁵' describe the basic procedures to be followed under the Seventh Framework Programmes. The set of criteria and thresholds applicable to this work programme are given in Annex 1 and is applicable to actions as a result of calls for proposals and grants to identified beneficiaries⁶, unless indicated otherwise. Any complementary criteria or thresholds, if applicable, are clearly stated in the relevant part of this work programme at the topic level, and in the call fiche. Furthermore, the work programme, and consequently its call(s) for proposals, may specify and restrict the participation of legal entities in order to take into account specific objectives of the Framework Programme.

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

For the fission call of this work programme, section III.2 provides indicative budgets for activities defined in the Specific Programme, or for areas or combinations of activities/areas,

⁵ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:075:0001:0044:EN:PDF>

⁶ According to Articles 12 and 13 (a) of Council Regulation 139/2012 of 19 December 2011 laying down the rules for the participation of undertakings, research centres and universities in indirect actions under the Framework Programme of the European Atomic Energy Community and for the dissemination of research results (2012-2013).

and explains how the ranked/reserve lists will be constituted.

I.7 Ethical aspects

All research carried out and other activities under this work programme must respect and must be implemented in line with fundamental ethical principles including the rights and principles enshrined in the Charter of Fundamental Rights of the European Union⁷ and the requirements set out in the text of the Specific Programme and Rules for Participation.

⁷ OJ C 303/7, 14.12.2007, p.1. See also Strategy for the effective implementation of the Charter of Fundamental Rights by the European Union, COM(2010) 573 final, 19.10.2010

II. CONTENT OF PROGRAMME AND CALL(S) IN 2013

II.1 Fusion Energy

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

- ***European Joint Undertaking for ITER and the Development of Fusion Energy ('Fusion for Energy' – 'F4E')*** to discharge the responsibilities of the European Union towards the ITER Agreement and the Broader Approach Agreement. Regarding the latter, the Commission promotes and steers the European participation, in particular by representing the Community in the governance bodies established by the Agreement and those of F4E, as well as in relations with the contributing Member States;
- ***Contracts of Association*** which are bilateral contracts between research organisations or bodies in all the Member States or Euratom Fully Associated Third States and the European Atomic Energy Community (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 (EFDA)*** between all the Associates (signatories of a Contract of Association) to fully exploit the Joint European Torus (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 organisations and facilities;
- ***Human resources, education and training*** which are supported through training and career development fellowships via EFDA through the Contracts of Association;
- ***Coordination and Support Actions*** aimed at strengthening the interfaces of the fusion community with related scientific and industrial communities;
- ***International agreements*** including those covering the construction and exploitation of ITER and the implementation of Broader Approach Activities.

The Commission pursues the programmatic objectives of the European fusion programme through the Euratom participation in the various governance bodies of the above agreements and organisations.

II.1.1 Activity: The realisation of ITER

The Community has a special responsibility within the ITER Organisation as the host of the project and will continue to play a strong role, particularly regarding the governance of the ITER International Organisation, management and staffing, plus general technical and administrative support. The Community participation in ITER as a Party will be provided through the European Joint Undertaking for ITER and the Development of Fusion Energy ('Fusion for Energy' – 'F4E')⁸ and will include further contributions to the construction of equipment and installations needed at the ITER site, and support to the project during construction.

⁸ Council Decision No. 2007/198/Euratom of 27 March 2007 establishing the European Joint Undertaking for ITER and the Development of Fusion Energy and conferring advantages upon.

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

II.1.2 Activity: R&D in preparation of ITER operation

A focused physics and technology programme aims to consolidate ITER project choices and prepare for the rapid start-up of ITER operation. It will be carried out through coordinated experimental, theoretical and modelling activities using the JET facilities and other magnetic confinement devices. It will ensure that Europe has the necessary impact on the ITER project, and will prepare for a strong European role in its exploitation.

II.1.3 Activity: Limited technology activities in preparation of DEMO

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

II.1.4 Activity: R&D activities for the longer term

Building on the activities specifically concerning ITER and DEMO, the implementation of the specific programme should result in developing the competences and enlarge the knowledge base in fields strategically relevant to future fusion power stations. These research activities will enhance the technical feasibility and economic viability of fusion power.

II.1.5 Activity: Human resources, education and training

The aim of this activity is ensuring adequate human resources and a high level of cooperation within the fusion thematic area, both for the immediate and medium term needs of ITER, and for the further development of fusion.

II.1.6 Activity: Infrastructures

The realisation of ITER in Europe, within the international framework provided by the ITER Organisation, will add to the new research infrastructures with a strong European dimension.

II.1.7 Activity: Industry and technology transfer processes

The realisation of ITER will bring many opportunities for industry to benefit from technology advancement. Through a pro-active technology transfer programme, industry will be encouraged to exploit all knowledge gained from ITER construction and operation as well as ensuring that a future European industry is provided with all the knowledge required to realise the first demonstration of electricity from fusion, DEMO. The Commission Services will continue to work with the Fusion Industry Innovation Forum in pursuit of this aim.

II.1.8 Activity: Broader Approach projects

The Agreement between the European Atomic Energy Community and the Government of Japan for the Joint Implementation of the Broader Approach Activities in the Field of Fusion

Energy Research covers the joint implementation of three large research projects in Japan. These projects aim to support ITER and to promote the early realisation of fusion energy as a clean and sustainable energy source. They are: the construction of the JT60-SA tokamak; the Engineering Validation and Design Activities for the International Fusion Materials Irradiation Facility (IFMIF/EVEDA); and the provision of a supercomputer for the International Fusion Energy Research Centre (IFERC). These projects cut across the aforementioned activities II.1.1 to II.1.7. The Euratom contribution to these activities consists mainly of in-kind resources (equipment and staff) provided voluntarily by a number of Member States that are coordinated and transferred through F4E. A contribution is also provided directly by F4E.

II.2 Nuclear Fission, Safety and Radiation Protection⁹

Under the Euratom programme, the European Commission should promote and facilitate nuclear safety research activities in the Member States and complement them through specific Community Research and Training activities. In this scope, it should help stimulating joint funding from Member States and/or enterprises and benefits should be taken from the increasing interaction between the 'Sustainable Nuclear Energy Technology Platform' (SNETP), the 'Implementing Geological Disposal – Technology Platform' (IGD-TP), the 'Multi-disciplinary European Low Dose Initiative' (MELODI) and other stakeholder fora at the Union level.

In line with the Treaty and with the vision of Europe 2020, the purpose of the majority of the activities - to be supported in 2013 – will be to provide catalytic and leveraging support for a **preparatory phase** (PP), which should aim at optimal coordination, cross-border operation and possible integration of national research actions of pan-European interest in the field of nuclear fission, safety and radioprotection. This might lead to the possible setting-up and / or reinforcement of legal entities to reach optimal co-operation and joint programming. The preparatory phases should aim at bringing the initiatives emerging today in different fields to the level of managerial, legal and financial maturity required to implement them. Project consortia should involve all the stakeholders necessary to make the project move forward, to take decision and to make financial commitments before joint programme(s) can start (e.g. national/regional ministries/governments, research councils, funding agencies). Operators of research facilities, research centres, universities, industry and regulatory authorities should be involved when appropriate. During these activities the European Commission will act as a 'facilitator'. The preparatory phases would include (non exhaustive list):

- Strategic work, i.e. (1) ex-ante analysis of the socio-economic impact of the initiative(s) considering the limits and benefits of nuclear fission energy in the long term; (2) plans to integrate harmoniously the different national research initiatives in accordance, whenever appropriate, with the EU objective of balanced territorial development; (3) to create or consolidate centres of excellence and/or "regional partner facilities";
- Management work, i.e. (1) planning, in terms of coordination and integration of national efforts for a period of at least ten years; (2) planning (timing, resources) of staff recruitment to manage the initiative(s); (3) organisation of the logistic support for European research teams, including the setting-up of the required e-infrastructure;
- Governance work, i.e. preparation of adequate decision-making and (separated) management structures, advisory bodies, IPRs, access rules for researchers, etc.;
- Financial work, i.e. (1) the financial arrangements, possibly step by step, for the coordination and integration of the national efforts, following EU principles and Financial Regulation; (2) studying new mechanisms, e.g. pre-commercial procurement processes or

⁹ While respecting the overall objective of focusing exclusively on safety while contributing to resource efficiency and cost-effectiveness of nuclear energy, the Euratom Programme (2012-2013) can support “research to underpin the safe operation of all reactor systems in use in Europe or, to the extent necessary in order to maintain broad nuclear safety expertise in Europe, those reactor types which may be used in the future. (...). Activities include basic and key cross-cutting research activities (such as material science) and, while focusing exclusively on safety aspects, the study of future reactors and all aspects of the fuel cycle such as partitioning and transmutation.”

support through the Structural Funds, by which public authorities may develop new research & innovation approaches;

- Legal work, i.e. (1) identification of adequate legal structures for the setting-up, construction and operation of the integrated / joint research programme(s), and (2) drafting of inter-governmental agreements, in the form of a 'signature-ready' document for the setting-up and actual implementation of the initiative(s);
- Technical work, whenever needed, such as (1) planning for the transfer of knowledge from existing prototypes or key enabling technologies developed at national level to the Euratom community; (2) adaptation of national research facilities ensuring their optimal exploitation by the beneficiary scientific communities at European level; additional research work can also be proposed provided it contributes to meet the above objectives.

Successful Preparatory Phases would lead after two or three years to the implementation of joint programmes, based on public-public and Public-Private Partnerships, with increased efficiency and consistency, as well as better visibility and attractiveness at world level.

II.2.1 Activity: Management of Ultimate Radioactive Waste

II.2.1.1: Geological disposal

Expected impact: Contribution to the strengthening of the European Research Area in the nuclear field through better coordination of Member States' research efforts. Equally, contribution to further progress towards the development of geological disposal in line with the priorities of the Strategic Research Agenda (SRA) / Deployment Plan of IGD-TP, the SET-Plan objectives, and the new EU directive on the responsible and safe management of spent fuel and radioactive waste as well as enhancement of basic knowledge. In particular, this should lead to increased confidence at international level in the safety case, while foster the joint strategic planning and implementation necessary to bring about such advances.

Topic Fission-2013-1.1.1: Preparatory Phase (PP) for the implementation of new modes of operation of integrated research programmes at European level for the development of solutions related to the management of ultimate nuclear waste

The European Commission intends to implement the above objectives, for a large part, in the form of support to programmatic activities. These activities could be managed by external legal entities representing national public authorities and by bodies of nuclear research stakeholders such as the Implementing Geological Disposal – Technology Platform (IGD-TP). Their mode of operation would be based on the existence and nature of research programmes in the Member States and the related European added-value. The purpose of this PP will be to establish the range of possible options to jointly implement whole or part of research programmes in the Member States concerned in a coordinated and integrated way. The PP should address all the necessary requirements to start operation. This includes establishing all the strategic, legal, governance, managerial, financial and technical issues and rules¹⁰ for the joint programming and implementation of research programmes at European level, including organisation of calls for proposals and management of projects. The work should also include horizontal activities such as socio-economic and societal impact,

¹⁰ see also text box in section II.2 above

measures to promote, disseminate and exploit the results. Furthermore, provisions for education and training activities will need to be included within the individual projects in close collaboration and coordination with the different Member States, at EU level and associations such as the 'European Nuclear Education Network' (ENEN). Any ensuing entity, body and the Technology Platform should hence have the adequate structure and means to be able to organise open calls for proposals, select, fund and manage research projects as per the EU principles and financial guidelines.

Funding scheme: Maximum one Coordination and Support Action (coordinating)

Topic Fission-2013-1.1.2: Support to the IGD-TP SRA and to advances and innovation research in the treatment and/or understanding of key basic and remaining scientific technical issues

In the transition towards support to joint research programming at European level, support will be provided to a single integrated project combining both urgent priorities of the Strategic Research Agenda (SRA) of IGD-TP for the 2025 vision and basic research. An indicative budget breakdown of 75% SRA priorities 25% basic research is suggested. This basic research should not already be covered in IGD-TP or otherwise not be a SRA priority. The most advanced national programmes are not the only ones to be targeted, and proposals addressing the needs of less advanced programmes in view of developing their knowledge base in preparation for implementation are equally welcome. Proposals will not be welcome in areas already considered adequately covered by past or on-going research. The consortium partnership is expected to reflect the broad spectrum of research stakeholders including as appropriate safety authorities and/or their technical support organisations and public representatives. Partners from Third Countries are also welcome where there is clear mutual interest and benefit. The proposals should include a careful plan to promote and disseminate its progress and conclusions both for the scientific community and the end-user as well as in terms of societal impact.

Funding scheme: Maximum one Collaborative Project

II.2.2 Activity: Reactor Systems

II.2.2.1 Safety of existing nuclear installations

Expected impact: Increased safety through coordinated research between Member States in plant life management and prevention and mitigation of severe accidents; development of common strategies for plant safety at EU level and promotion of the European safety culture worldwide

Topic Fission-2013-2.1.1: Preparatory Phase (PP)¹¹ in support to an efficient EU integrated research programme on safety of existing nuclear installations

Support will be provided to foster coordination and integration of national research efforts in reactor safety in areas where pan-European interest is identified to develop a joint research programme to be implemented at the end of this Preparatory Phase (to be possibly supported

¹¹ see also text box in section II.2 above

under the next Framework Programme, if successful). This joint research programme should cover: plant safety and risk assessment, severe accident prevention and management, core and reactor performance, integrity assessment of ageing system, structures and components, as well as innovative Generation III design and harmonisation of procedures and methods. Key actors for such a project should involve the NUClear GENeration II & III Association (NUGENIA) as well as relevant public authorities and funding bodies. Support will mainly be provided to the establishment of an efficient work plan, of a solid long-term financial engineering, of a reliable governance system and of a professional structure able to manage joint research programme(s) of pan-European interest. Collaborative research actions can also be included in the proposal as pilot exercise for the implementation of the priorities of the joint research programme. National research funding opportunities should be extended to European competitive applications. Links should be maintained with important platforms such as the Sustainable Nuclear Energy Technology Platform (SNETP). International collaboration (outside the EU) is welcome. The foreseen "joint programme" should also attract young researchers to ensure the availability of expertise in the future¹².

Funding scheme: Maximum one combination of Collaborative Project, Coordination and Support Action.

Topic Fission-2013-2.1.2: Consequences of combination of extreme external events on the safety of Nuclear Power Plants (NPPs)

The nuclear accident in Japan resulted from the combination of two correlated extreme external events (earthquake and tsunami). The consequences (flooding in particular) went beyond what was considered in the initial NPP design. Such situations can be identified using PSA methodology that complements the deterministic approach for beyond design accidents. If the performance of a Level 1-Level 2 PSA concludes that such a low probability event can lead to extreme consequences, the industry (system suppliers and utilities) or the Safety Authorities may take appropriate decisions to reinforce the defence in depth of the plant. The present topic aims at providing best practice guidelines for PSA analyses and for the definition of appropriate criteria for decision making in the European context. Involvement of regulatory authorities in the foreseen action is strongly encouraged. Cooperation with Japan is welcome.

Funding scheme: Maximum one Coordination and Support Action (coordinating).

II.2.2.2: Advanced nuclear systems for increased safety

Expected impact: Increased safety of reactor systems through advances in coordinated work and sharing of knowledge between Member States for safer operation, based on common strategies for plant safety at EU level.

Topic: Fission-2013-2.2.1: Preparatory Phase (PP)¹³ in support to the development of a federating body to ensure efficient EU coordinated research on Reactor Safety for the next generation of nuclear installations

Under this topic, all public and private research organisations are encouraged to propose concrete joint and solid plans to carry out, for a sustainable period of time, a coherent RTD programme with

¹² Links should be established with OECD/NEA related activities and possibly with IAEA

¹³ See also text box in section II.2 above.

clear safety research and training priorities taking note of the priorities defined in the SNETP Strategic Research Agenda and ESNII deployment strategy. In addition to the necessary legal, administrative, and governance development work, the PP should ensure the review of the different technological and industrial solutions currently proposed and their political and financial maturity, leading to prioritisation for pursuing EU research at EU level and identification of clear industrial plans. Therefore, the project should help developing a strategic approach about future EU initiatives and RTD priorities at the horizon 2050. Key actors for such a project should involve not only the research and academic community but also industry as well as public safety authorities and funding bodies concerned. International collaboration (outside the EU) is also welcome.

Funding scheme: Maximum one combination of Collaborative Project, Coordination and Support Action.

II.2.2.3: Cross-cutting aspects for nuclear systems

Expected impact: This topic, based on the European Energy Research Alliance (EERA) initiative for a joint programme on nuclear materials, would lead to a common strategic approach and integration of the respective national R&D&I programmes. EU funds should contribute to multi-disciplinary approaches and to the enhancement of the European Research Area, while contributing to resource efficiency and cost-effectiveness of national public funding.

Topic Fission-2013-2.3.1: Support to the development of joint research actions between national programmes on advanced nuclear materials

The European Energy Research Alliance (EERA), set up under the European Strategic Energy Technology Plan (SET-Plan), has launched an initiative for a Joint Programme on Nuclear Materials (JP NM). Through this call, support would be provided to link better this initiative with national research programmes. This should cover at least (i) networking and integrating activities, e.g. planning for joint financing, coordinated links with public authorities; (ii) exchange and harmonisation of best practices; setting-up and sustainable management of a web portal and other efficient communication tools; (iii) setting-up of a management office, covering periodic road-mapping; calls, evaluation, negotiation and management of projects; management of scientific data; IPR issues, etc. As far as the technical focus is concerned, the proposal should address nuclear fission materials used in fuel pins/elements including the phenomena linked to the interaction between fuel and cladding (FCI) as well as nuclear fission and fusion materials used for structural elements of nuclear installations.

Funding scheme: Maximum one Combination of Collaborative Project, Coordination and Support Action.

II.2.2.4: Advanced safety systems for non-electrical uses of nuclear energy

Expected impact: EU activities should contribute to the enhanced safety and reliability of the non-electrical potential uses of nuclear energy, while contributing to resource efficiency and cost-effectiveness of public funding at European level.

Topic Fission-2013-2.4.1: Support to the emergence of a possible European Research Initiative on co-generation

Safety, especially the safe coupling of Nuclear with conventional industry, is the most controversial issue impeding the development of Nuclear Cogeneration. Only concerted actions involving both above industrial research sectors for a mutual understanding of safety requirements and implications would be able to address this. Following the EUROPAIRS roadmap, the European Commission would therefore be ready to support the emergence of a European Research Initiative of pan-European relevance on Nuclear Cogeneration and accompany those research endeavours. For this to happen, this would mean that research stakeholders, public and private, would accept to pool their research resources at the appropriate critical mass at EU level. Such a possible initiative should build on past industrial experience and research results and aim at coordinating /integrating relevant research programmes in the long-term. The future initiative should also interact with relevant international organisations and programmes aiming to develop research cooperation while preserving / maximising the European interest. Concerning the public sector, the National Research Programmes decision makers (typically ministries or regional authorities defining research programmes) should obviously be involved in the governance of such a possible platform.

Funding scheme: Maximum one Coordination and Support Action (coordinating)

II.2.3 Activity: Radiation Protection

Expected impact: Better integration of national and international research efforts in radiation protection and the low-dose risk, leading to significant optimisation of the protection afforded to the workforce, the public and the environment.

II.2.3.1: Qualification of risks for low and protracted exposures¹⁴

Topic Fission-2013-3.1.1: Preparatory Phase (PP)¹⁵ in support to the Multi-disciplinary European Low Dose Initiative (MELODI) for its development as federating body to ensure cost-efficiency and high-performance of low-dose risk research in Europe

In line with the High Level Expert Group vision report (www.hleg.de) and/or Strategic Research Agenda (SRA) of MELODI (www.melodi-online.eu), support will be provided for better coordination and integration of national research efforts. Support will be provided to help MELODI extending national funding opportunities in the field of low dose research to European competitive applications. In particular, support will be dedicated to attract biologists from other disciplines to join MELODI in its effort to clarify the mechanisms at stake at low dose. Support will also be provided to build up an innovative mechanism for the joint programming and implementation of low dose research in Europe. This joint programming will need to involve other bodies in the field of radiation protection, in particular the Heads of European Radiation protection Competent Authorities (HERCA)

¹⁴ 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. Use of radiation in medical therapeutic practices is excluded except where the effect on healthy/normal tissue can also lead to better understanding of low dose risks.

¹⁵ see also text box in section II.2 above

and/or the European Society of Radiology (ESR) to cover item II.2.3.2 below.

Funding scheme: Maximum one combination of Collaborative Project, Coordination and Support Action.

II.2.3.2: Medical uses of radiation

In this work programme, actions in this area are within scope of topic Fission-2013-3.1.1.

II.2.3.3: Emergency and post-accident management

Topic: Fission-2013-3.3.1: Trilateral cooperation on Chernobyl studies

Independent assessment of the need to launch studies on the health effects of the Chernobyl accident shall be proposed. This cooperation should involve third countries such as Japan, the United States of America and MELODI association as European Member States research representative on low dose and international cooperation in this field.

Funding scheme: Maximum of one Coordination and Support Action (coordinating)

II.2.3.4: National research activities in other areas

Topic Fission-2013-3.4.1: Support to the strengthening of pan-European research initiatives on the impact of radiation on the environment, including the food chain and the protection of non-human species

If appropriate an EU support might be provided for better coordination and integration of national research efforts in the field of radioecology, including the food chain, as well as the protection of non-human species, while extending national funding opportunities. Proposed activities should aim at building up an innovative mechanism for the joint programming (and implementation) of research in radioecology in Europe with strong links with the Radioecology Alliance and with the community of emergency and post-accident management. Proposals should forecast the flexibility of integrating new partners if needed during the implementation of the project. International links with countries in which nuclear accidents occurred will be considered as essential.

Funding scheme: Maximum one combination of Collaborative Project, Coordination and Support Action.

II.2.4 Activity: Infrastructures

Expected impact: Optimised development and use of existing and future nuclear safety research infrastructures in Europe in all activities of the programme and facilitated access for researchers to these infrastructures throughout Europe.

II.2.4.1 Area: Supporting research infrastructures

Topic: Fission-2013-4.1.1: Support to the MYRRHA research infrastructure for its development as a pan-European and world-level facility

MYRRHA has been retained as a priority project in the European Strategy Forum on Research Infrastructures (ESFRI) roadmap 2010 for new research infrastructures of pan-European interest. The present call concentrates on the necessary European support to the preparatory phase, which should aim at bringing MYRRHA to the level of maturity required to enable the construction work to start, taking due account of existing FP7 projects related to MYRRHA. 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 aspects¹⁶. An important item of the preparatory phase will be the ability to gather a strong European and possibly international consortium following the standard approach of ESFRI.

Funding scheme: Maximum one Coordination and Support Action (coordinating)

Topic: Fission-2013-4.1.2: Support to a pan-European Integrated Research Infrastructure Initiative for increased safety of nuclear systems at EU level

The European Strategy Forum on Research Infrastructures (ESFRI) highlights the importance of developing distributed research infrastructures at EU level, based on regional facilities¹⁷. The present call opens the possibility for such an initiative in the field of safety of nuclear systems among others in the domain of nuclear data. Proposed activities should tackle three main work packages: (1) coordination activities, enabling the development of a common vision, of a research roadmap for the next 15 years, and of the management structure to make this happen, (2) joint research services and access offered to scientists not belonging to countries with relevant research infrastructures, based on the excellence of their proposed research work; and (3) joint research activities to upgrade the capacities of the various facilities.

Funding scheme: Maximum one combination of Collaborative Project, Coordination and Support Action.

II.2.4.2 Area: Access to scientific data

No specific activity foreseen. Nevertheless, researchers are encouraged to access the scientific database and library of codes managed by the Organisation for Economic Co-operation and Development - Nuclear Energy Agency, since scientific results stemming from the different projects funded by the EU should be systematically transferred to such international entity.

II.2.5 Activity: Human Resources and Training

II.2.5.1: Training of research workers

A significant part of the support for human resources and training will continue to be implemented by encouraging the embedding of this support within the funded projects. It is considered that 5% of the total budget of these should be dedicated to training activities for:

¹⁶ see also text box in section II.2 above

¹⁷ See the ESFRI definition of distributed RI and Regional Facilities.

- The development and delivery of training courses, aiming at sharing RTD results in the subject matter of the EC funded projects. These courses should be widely announced (posted on the ENEN Website – <http://www.enen-assoc.org/>). The target public should involve not only research workers but also governmental and industrial representatives concerned. Special attention should be devoted to the drafting of co-authored textbooks at higher education level, under the control of international review committees.
- The exchange of research workers aiming at improving synergies between private and public research organisations at international level. A part of the research undertaken in the project should normally be executed by researchers preparing a doctoral thesis or employed on a post-doctoral position. More use should be made of the funding instruments provided by national and international programmes, such as trans-European mobility scheme for university studies (Tempus) or programmes of the Education, Audiovisual and Culture Executive Agency (e.g. Erasmus Mundus).

In addition to the above activities, proposals for dedicated *Euratom Fission Training Schemes* (EFTS) can be submitted under this activity, in particular in areas where a shortage of skilled professionals is identified (see 'European Human Resources Observatory for the Nuclear Energy Sector' – <http://ehron.jrc.ec.europa.eu/>). The implementation of ECVET is particularly welcome ('European Credit system for Vocational Education and Training' – <http://www.ecvet-team.eu/>), to improve borderless mobility and lifelong learning. The target public should consist of professionals at post-graduate or higher level who are committed to participate in ambitious training programmes spread over many years and in many countries.

Expected impact: Continuous improvement of nuclear safety culture through effective coordination and support at Community level of training schemes recognised as international scientific references; transfer of higher-level competences for young as well as experienced research workers, increasing the attractiveness of nuclear careers in public and private research organisations across the EU; strengthened links with other Community policies and training networks outside the EU.

Topic Fission-2013-5.1.1: Euratom Fission Training Schemes (EFTS) in 'Nuclear Fission, Safety and Radiation Protection'

Aligned with the above principles of the 'European Credit system for Vocational Education and Training' (ECVET), an EFTS should address the challenges of borderless mobility and lifelong learning in specific domains. This implies: (i) modularity of courses and common qualification criteria, (ii) common mutual recognition system, (iii) facilitation of mobility for trainers and trainees across the EU, and (iv) feedback from the 'employers' from public or private sectors. For this purpose, wherever justified, a *European Passport* ("*individual transcript of record*") should be developed in each EFTS, based on learning outcomes (knowledge, skills and attitudes). Proposals should be submitted by networks of organisations of pan-European relevance consisting of education and training organisations as well as industry, aiming at setting up ECVET partnerships. An EFTS should consist of a variety of learning paths, including PhD student coaching, mentoring of new professionals, internships / apprenticeships in industry, regular or virtual classroom training, face-to-face or distance learning, etc. Special attention should be devoted to the assessment / validation methodology of the individual's learning outcomes at the project level (host provider ⇔ sending provider). At the EU level, competent bodies should be identified or set up to ensure the mutual recognition of the European Passports, thereby facilitating the mobility of professionals in Europe.

Euratom funding is intended principally for the coordination and networking aspects, i.e. scientific secretariat, implementation of joint training programmes and events, mobility of trainers and trainees, access to research and training facilities, etc. The active participation and contribution of 'employers', i.e. representatives of system suppliers, energy providers, safety authorities and Technical Safety Organisations (TSOs), users of ionising radiation in medicine and industry, waste management agencies, etc., is essential. Synergies should be sought with complementary actions supported by the different Member States and by the EU, in particular the DG in charge of Education and Culture (EAC), the DG in charge of nuclear energy policy and radiation protection (DG ENER), the DG in charge of Development and Cooperation (DG DEVCO), in relation with Third Countries, or by DG Employment, Social Affairs and Inclusion (DG EMPL), managing the European Social Fund. The active participation of IAEA and OECD/NEA (for example, to support trainers or trainees from third countries) might add to the value of the project.

Funding scheme: Maximum of three Coordination and Support Actions (coordinating)

II.2.6 Activity: Cross-Cutting Actions

Expected impact: To help support strategic and pan-European objectives of the programme (European Research Area, future actions), in particular related to improved information to the public and increased participation of Member States who could benefit from increased participation in Euratom FP projects, thereby enabling a more broad and effective implementation of the European Research Area in the field of nuclear fission, and exploiting the full potential of institutes, universities and other organisations in these countries as regards their infrastructure, human resources and overall competences.

Topic: Fission-2013-6.0.1: Widening involvement in the 'Fission, Safety and Radiation Protection' Programme

Support will be provided for activities that can demonstrably lead to the greater involvement of those Member States who could benefit from increased participation in the programme. This is focused on those Member States, in particular with civil nuclear power programmes, or hosting institutes involved in nuclear activities. The topic is not to support actual R&D per se, rather to support (i) networking activities, either of public authorities and/or research institutes within the region and with similar organisations in other Member States; (ii) pilot studies to investigate how specific organisations or institutes can better exploit / upgrade their competences and can integrate more effectively in Community activities; (iii) outreach activities enabling such organisations to become more closely involved in pan-European initiatives; or combinations of these and/or other duly justified actions. Proposals should focus on areas such as research in radioactive waste management, in nuclear safety, or in radiation protection. Synergies may be developed with current projects or those specifically dealing with research infrastructure. A strong involvement of appropriate public bodies from the Member States concerned is essential, as well as links with relevant platforms in the domain. All projects need to be aware of and, where appropriate, interact with the bodies managing the Structural Funds in the different countries.

Funding Scheme: Maximum of three Coordination and Support Actions (coordinating)

Topic: Fission-2013-6.0.2: Education / training / information towards the public

Support will be provided for an action aimed at the coordination of information and communication strategies for the general public to get a better understanding of effects of ionising radiation, taking also into consideration the lessons learnt from the 2011 accident in Japan. The scope of the action would include an analysis of education, information and communication needs at EU level. It would also cover identification of good practices and their exchange and it would aim at coordinated approach addressing EU citizens concerns making use of modern communication tools. The consortium should involve stakeholders from national authorities, nuclear industry, different users of ionising radiation (as medical sector) as well as communication professionals and if possible NGOs or other public representatives

Funding Scheme: Maximum one Coordination and Support Action (coordinating)

Topic Fission-2013-6.0.3: Towards a socio-economic analysis of FP7 Euratom actions

The objective of this action is to prepare the ground for the evaluation of FP7 in the nuclear fission research and training field, which would start in 2014. Proposals for relevant impact studies (contribution to an EU knowledge-based society, induced industrial innovation, better public awareness, effects of EU actions on scale and scope of national nuclear fission research, etc) would therefore be welcome.

Funding Scheme: Maximum one Coordination and Support Action (supporting, expert appointment letters)

II.2.7 Activity: Cooperation with Third Countries

A structured dialogue has already been established with Russia and China, leading to specific topics in the 2009-2012 calls. Dialogue has also started with other key Third Countries, e.g. USA (in the context of the EU-US Energy Council) and Ukraine. In both these cases, as with Russia and China, cooperation is being pursued under the umbrella of existing Euratom bilateral cooperation agreements. Furthermore, specific cooperation with Japan in the wake of the recent nuclear accident could be envisaged.

In any case, where relevant and of mutual interest and benefit, entities from Third Countries are encouraged to (i) join proposals / projects as full consortium partners (at zero cost to Euratom unless the appropriate case can be made for reimbursement of their costs according to the Rules for Participation), (ii) join the end-user groups established within the Euratom projects, or (iii) establish Memoranda of Understanding / Collaboration Agreement between projects in the Third Country and similar projects in Euratom. In all cases, such decisions rest with the Euratom consortia concerned. The implementation and cooperation will be monitored under the auspices of any existing cooperation agreements between Euratom and the Third Country concerned.

The main goal in the framework of international cooperation is to increase synergies and consistency with national actions through targeted coordination actions, as well as to increase the European visibility.

Subjects in which cooperation is welcome

In the following topics, opened in 2013, international cooperation is considered particularly

appropriate and may be included as an element of the proposals:

- Fission-2013-1.1.2: Collaborative research on geological disposal
- Fission-2013-2.1.2: Consequences of combination of extreme external events on the safety of Nuclear Power Plants (NPPs)
- Fission-2013-3.3.1: Trilateral cooperation on Chernobyl studies
- Fission-2013-3.4.1: Support to the strengthening of pan-European research initiatives on the impact of radiation on the environment, including the food chain and the protection of non-human species
- Fission-2013-4.1.1: Support to the MYRRHA research infrastructure for its development as a pan-European and world-level facility
- Fission-2013-4.1.2: Support to a pan-European Integrated Research Infrastructure Initiative for increased safety of nuclear systems at EU level
- Fission-2013-5.1.1: Euratom Fission Training Schemes (EFTS) in 'Nuclear Fission, Safety and Radiation Protection'

Coordination of activities included in this work programme with those of the Nuclear Safety Co-operation Instrument (NSCI) is encouraged in the proposals, where appropriate, on the same conditions as above.

III. IMPLEMENTATION OF PROGRAMME AND CALL(S) IN 2013

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 of results set out in the following instruments with the indicative budget shown in the table in section V of this work programme.

International agreements

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

Contributions to the international ITER project and to the Broader Approach projects (see also below) will be provided by 'Fusion for Energy' as domestic agency for the contribution of Euratom to ITER and as implementing agency for the contribution of Euratom to Broader Approach projects.

International cooperation will also continue under the umbrella of existing bilateral Cooperation Agreements aimed at supporting and complementing ITER and DEMO activities in force between Euratom and Switzerland, Japan, U.S. Department of Energy (DoE), Russia, Ukraine, Kazakhstan, South Korea, India, China and Brazil. Further to the collaborative activities of Fusion Associations and EFDA with entities from the aforesaid third States, other collaborations on specific programmes and projects will also be carried out on a bilateral basis, and the Euratom Cooperation Agreements will integrate all these activities.

In this respect, these Euratom Cooperation Agreements represent the framework encompassing all cooperative activities between Euratom and fusion entities from third States, and will continue to be an important instrument to facilitate the decision-making process at international level.

Multilateral cooperation will include participation in the IEA, IAEA and ITPA frameworks, as well as in other frameworks referred in section I.3. The funding of these activities will be through the Contracts of Association, EFDA and the Mobility Agreement.

The European Joint Undertaking for ITER and the Development of Fusion Energy 'Fusion for Energy' (F4E)

Established under the Euratom Treaty as the European Joint Undertaking for ITER and the Development of Fusion Energy, F4E has the tasks of providing the contribution of the Community to ITER, providing the Community contribution to Broader Approach activities with Japan, and preparing and coordinating a programme of activities in preparation for the construction of a demonstration fusion reactor and related facilities. The resources of the Joint Undertaking consist of a contribution from the Community budget (about 83%), the ITER host State (France, about 17%) and the F4E Members (EU Member States and Switzerland, less than 1%).

In 2013 F4E will aim to negotiate and sign further Procurement Arrangements with ITER and to sign the procurement contracts foreseen in the F4E schedule. The main procurement contracts to be initiated will be related to vacuum vessel (additional stages according to progress); tritium system; cryoplant; power supplies; neutral beam systems for construction of the Neutral Beam Test Facility; buildings (mainly civil work on the buildings surrounding the tokamak complex). Contracts already running for major components on the critical path, such

as the tokamak buildings, toroidal and poloidal field coils, vacuum vessel and magnets (assembly, manufacture, tests) will be closely managed by F4E.

F4E will carry out other activities related to ITER construction. It will continue design and R&D activities (including Remote Handling, Heating and Current Drive, Vacuum System, Tritium System, Diagnostics and Test Blanket Modules); continue preparation of safety and licensing documentation for ITER in Cadarache and related safety studies; investigate manufacturing methods and non-destructive tests of critical components for cost minimisation and risk mitigation; prepare new facilities to test prototypes and components; continue activities for the preparation of the ITER site.

With respect to the Broader Approach, F4E will continue with the coordination of the procurement of components provided by the Voluntary Contributors for the three Broader Approach projects and carry out limited direct contributions which will cover residual activities including transportation of some components to Japan.

Contracts of Association

The Contracts of Association, renewed under Euratom Seventh Framework Programme (2007-2011) and valid until the end of the current Euratom Framework Programme (2012-2013), between the Community and Member States or Euratom Fully Associated Third States or legal entities within Member States or Euratom Fully Associated Third States have an indicative budget that comprises financing of baseline support, with additional support for priority projects, training and career development fellowships and support actions; the indicative budget for these activities is shown in the table in section V of this work programme.

For career development fellowships (with a duration of 2 years), the maximum Community contribution will be up to EUR 54 300 per year and per researcher as a living allowance, up to EUR 6000 per year and per researcher for expenses related to the participation to research and training activities (meeting and conference attendance, participation in training actions, research costs, etc), with an additional flat rate of 3% of the direct costs for management activities and flat rate of 10% of direct costs as contributions to overheads, excluding costs for subcontracting. The use of the mobility agreement to support mobility of the participants for their training actions etc. will ensure the pan-European nature of the joint training actions. To ensure continuity of employment of the researchers and retention of the best candidates, the start date of the fellowships may be fixed as the date which is the deadline for the Associations to make their proposals.

European Fusion Development Agreement

The European Fusion Development Agreement (EFDA), concluded between the Community and organisations in, or acting for, Member States or Euratom fully Associated Third States, was renewed under the Euratom Seventh Framework Programme (2007-2011) and remains valid. The Community support covers research co-ordination activities, training and career development fellowships, support actions, JET S/T Orders implemented under the Contracts of Association, the JET Implementing Agreement (JIA), the JET Operation Contract, the Power Plant Physics and Technology (PPP&T) Implementing Agreement and the EFDA Host Support Agreement, secondment and assignment of staff. The indicative budget for EFDA, (including host support, JET Operation Contract and JET activities) is shown in the table in section V of this work programme.

Mobility Agreement and other multilateral agreements

The indicative budget for the Mobility Agreement and any other multilateral agreement concluded between the Community and associated organisations is shown in the table in section V of this work programme.

III.2 Nuclear Fission, Safety and Radiation Protection

- **Call Identifier:** FP7-Fission-2013
- **Date of publication:** 10 July 2012¹⁸
- **Deadline:** 13 November 2012, at 17.00.00, Brussels local time¹⁹
- **Indicative budget:** EUR 55 189 000²⁰

The table below provides indicative budgets for 2013 for activities defined in this work programme (excluding 'other actions' in section IV):

Group	Activities	Indicative budget repartition (EUR million)²¹
1	Fission-1	5
2	Fission-2	22
3	Fission-3	12
4	Fission-4	8
5	Fission-5	5
6	Fission-6	3.19
	Total	55.19

All budgetary figures in this work programme are indicative. Following the evaluation of the proposals, the final budget awarded to actions implemented through calls for proposals may vary:

- by up to 10% of the total value of the indicated budget for each call; and
- any repartition of the call sub-budgets may also vary by up to 10% of the total value of the indicated call budget.

- **Topics called:**

Activity/Area	Topic	Funding Scheme
Management of Ultimate Radioactive Waste	Fission-1	

¹⁸ The Director-General responsible for the call may publish it up to one month prior to or after the envisaged date of publication.

¹⁹ The Director-General responsible may delay this deadline by up to two months

²⁰ Under the condition that the draft budget for 2013 is adopted without modification by the budgetary authority.

²¹ Figures are rounded to two decimal points.

<i>Geological disposal</i>	<i>Fission-1.1.1</i> Preparatory Phase (PP) for the implementation of new modes of operation of integrated research programmes at European level for the development of solutions related to the management of ultimate nuclear waste	Maximum of one Coordination and Support Action (coordinating)
	<i>Fission-1.1.2</i> Support to the IGD-TP SRA and to advances and innovation research in the treatment and/or understanding of key basic and remaining scientific technical issues	Maximum of one Collaborative Project
Reactor Systems	Fission-2	
<i>Safety of existing nuclear installations</i>	<i>Fission-2.1.1</i> Preparatory Phase (PP) in support to an efficient EU integrated research programme on safety of existing nuclear installations	Maximum of one Combination of Collaborative Project, Coordination and Support Action
	<i>Fission-2.1.2</i> Consequences of combination of extreme external events on the safety of Nuclear Power Plants (NPPs)	Maximum of one Coordination and Support Action (coordinating)
<i>Advanced nuclear systems for increased safety</i>	<i>Fission-2.2.1</i> Preparatory Phase (PP) in support to the development of a federating body to ensure efficient EU coordinated research on Reactor Safety for the next generation of nuclear installations	Maximum of one Combination of Collaborative Project, Coordination and Support Action
<i>Cross-cutting aspects for nuclear systems</i>	<i>Fission-2.3.1</i> Support to the development of joint research actions between national programmes on advanced nuclear materials	Maximum of one Combination of Collaborative Project, Coordination and Support Action
<i>Advanced systems for non-electrical uses of nuclear energy</i>	<i>Fission-2.4.1</i> Support to the emergence of a possible European Research Initiative on co-generation	Maximum of one Coordination and Support Action (coordinating)
Radiation Protection	Fission-3	
<i>Quantification of risks for low and protracted exposures</i>	<i>Fission-3.1.1</i> Preparatory Phase (PP) in support to the Multi-disciplinary European Low Dose Initiative (MELODI) for its development as federating body to ensure cost-efficiency and high-performance of low-dose risk research in Europe	Maximum of one Combination of Collaborative Project, Coordination and Support Action
<i>Medical uses of radiation</i>	<i>Within scope of 3.1.1</i>	

<i>Emergency and post-accident management</i>	<i>Fission-3.3.1</i> Trilateral cooperation on Chernobyl studies	Maximum of one Coordination and Support Action (coordinating)
<i>National research activities in other areas</i>	<i>Fission-3.4.1</i> Support to the strengthening of pan-European research initiatives on the impact of radiation on the environment, including the food chain and the protection of non-human species	Maximum of one Combination of Collaborative Project, Coordination and Support Action
Infrastructures	Fission-4	
<i>Supporting infrastructures</i>	<i>Fission-4.1.1</i> Support to the MYRRHA research infrastructure for its development as a pan-European and world-level facility	Maximum of one Coordination and Support Action (coordinating)
	<i>Fission-4.1.2</i> Support to a pan-European Integrated Research Infrastructure Initiative for increased safety of nuclear systems at EU level	Maximum of one Combination of Collaborative Project, Coordination and Support Action
Human Resources and Training	Fission-5	
<i>Training of research workers</i>	<i>Fission-5.1.1</i> Euratom Fission Training Schemes (EFTS) in 'Nuclear Fission, Safety and Radiation Protection'	Maximum of 3 Coordination and Support Action (coordinating)
Cross-cutting Actions	Fission-6	
<i>Cross-cutting actions</i>	<i>Fission-6.0.1</i> Widening involvement in the 'Fission, Safety and Radiation Protection' Programme	Maximum of 3 Coordination and Support Action (coordinating)
	<i>Fission-6.0.2</i> Education / training / information towards the public	Maximum of one Coordination and Support Action (coordinating)
	<i>Fission-6.0.3</i> Towards a socio-economic analysis of FP7 Euratom actions	Maximum of one Coordination and Support Action (supporting, expert appointment letters)

- **Eligibility criteria:**

- The general eligibility criteria are set out in Annex 1 and in the guide for applicants. Please note that the completeness criterion also includes that part B of the proposal shall be readable, accessible and printable.
- Minimum number of participants²² as set out in the Rules for Participation:

²² MS = Euratom (EU) Member State; 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

Funding scheme	Minimum conditions
Collaborative project (also applicable for a combination of a CP with another funding scheme)	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.
Coordination and support action (coordinating type)	
Coordination and support action (supporting type)	At least 1 independent legal entity

- Only information provided in part A of the proposal will be used to determine whether the proposal is eligible with respect to the minimum number of eligible participants.

Proposals that do not conform to the eligibility criteria will be rejected at the eligibility stage and will not be evaluated by the independent experts.

- **Evaluation Procedure:**

- The evaluation criteria (including any weights and thresholds) and sub-criteria together with the eligibility, selection and award criteria for the different funding schemes are set out in Annex 1 to this work programme.
- Proposal page limits: Applicants must ensure that proposals conform to the page limits and layout given in the Guide for Applicants, and in the proposal part B template available through the electronic Submission Services of the Commission. The Commission will instruct the experts to disregard any pages exceeding these limits.
- The evaluation will follow a single stage procedure.
- Proposals will not be evaluated anonymously and may be evaluated remotely.
- At the end of the evaluation process, proposals will be ranked until the indicative budget for this call is exhausted. Hence there will be competition between topics and some topics may end up not being supported if proposals fail to reach a high enough standard. Proposals scoring above all evaluation thresholds, but for which sufficient funding is not available, will be put on a common reserve list for the whole call, from which proposals will be considered for funding if additional funds become available from any part of the call. To separate tied proposals, the score for criterion 3 may be given priority, followed by that for criterion 1. Depending on the strategic nature of the topic in question, the Commission may, in such cases, decide to reinsert topics not funded in next year's work programme.

- **Indicative evaluation and contractual timetable:** Evaluation: beginning 2013; grant agreement negotiation and signature: from spring 2013.

- **Consortia Agreements:** Beneficiaries are required to conclude a consortium agreement prior to the signature of the grant agreement.

- **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 2.

- **Use of flat rates for subsistence costs:**

In accordance with Annex 2 of this work programme, this call provides for the possibility to use flat rates to cover subsistence costs incurred by beneficiaries during travel carried out within grants for indirect actions. For further information, see the relevant Guides for Applicants for this call. The applicable flat rates are available on the Participant Portal at: http://ec.europa.eu/research/participants/portal/page/fp7_documents under 'Guidance documents for FP7/Financial issues/Flat rates for daily allowances'.

IV. OTHER ACTIONS FOR 2013

Contribution to the Organisation for Economic Co-operation and Development (Nuclear Energy Agency) / Secretariat for the Generation-IV International Forum (GIF)

USA, UK, France, Brazil, Japan, Korea, South Africa, Argentina and Canada signed the Generation-IV International Forum (GIF) Charter in July 2001, with the purpose of developing concepts for one or more nuclear energy systems that can be operated in a manner that will provide a competitive and reliable supply of energy, while satisfactorily addressing nuclear safety, waste, proliferation and public perception concerns. Switzerland signed the GIF charter in February 2002. Euratom signed the Charter on 30 July 2003 by a decision of the Commission pursuant to Article 101(3) of the Euratom Treaty. The Russian Federation and the People's Republic of China signed in November 2006. A Framework Agreement (FA) for collaboration on R&D of Generation-IV systems, setting the framework conditions for subsequent system and project arrangements, has also been concluded and all Charter signatories (except Argentina, Brazil and UK) have acceded to it. The Charter was originally for a duration of 10 years, and in 2011 the FA signatories unanimously prolonged this duration indefinitely. The FA depository is the OECD/NEA. The EU Council approved the accession of the Euratom to the FA in its Decision no. 14121/05, Brussels, 8 November 2005, and Euratom formally acceded in May 2006. Accession brings with it certain obligations, including the co-funding of the NEA's GIF technical secretariat activities. The level of this funding from each signatory was established by the GIF Policy Group at its meeting in Beijing, China, 23-24 October 2008, and revised at its meeting in San Diego, USA, 4-5 March 2009 and Lucerne, Switzerland, 6-7 October 2011.

Euratom contribution²³: EUR 150 000 for operation of the Secretariat to the end 2013, in the form of a 'subscription', in accordance with Article 108(2)(d) of the Financial Regulation and Article 160a of its Implementing Rules.

Funding scheme: Coordination and Support Action (supporting action)

Studies for the ex-post evaluation of Euratom Framework Programmes in the period 2007-2013²⁴

In accordance with Article 6(3) of the Council Decision on Euratom FP7 (2006/970/Euratom) and Article 6(2) of the Council Decision on Euratom FP 2012-13 (2012/93/Euratom), the Commission intends to launch in 2013 a number of studies which will provide an input to the panel of independent experts, to be appointed in 2014 for preparing the ex-post evaluation of the two Euratom Framework Programmes covering the period 2007-2013. The studies, covering both fission and fusion, will be prepared by experts with appointment letters.

Indicative budget²⁵: EUR 300 000.

Funding scheme: Coordination and Support Action (expert appointment letters)

²³ Under the condition that the draft budget for 2013 is adopted without modification by the budgetary authority.

²⁴ In accordance with Article 13 of the Rules for Participation.

²⁵ Under the condition that the draft budget for 2013 is adopted without modification by the budgetary authority.

Experts contracts

Group(s) of external experts could be established to provide analyses in policy relevant areas and to advise on or support the design and implementation of EU Research Policy.

Contracts will also be placed to independent experts for the evaluation of proposals.

Indicative budget²⁶: EUR 400 000.

Funding scheme: Coordination and Support Action (supporting action), expert appointment letters

²⁶ Under the condition that the draft budget for 2013 is adopted without modification by the budgetary authority.

V. BUDGET ²⁷

		Year 2013 Million EUR ²⁸
Calls	Call FP7-FISSION-2013	55.19
Experts, Evaluators	Evaluation of proposals, Project review External experts group(s)	0.40
Other	European JU for ITER (F4E)	865.51
	COA ('baseline support, and additional support under EFDA outside JET') (Fusion)	54.30
	EFDA ('JOC and JET orders') (Fusion)	13.44
	Mobility and other agreements (Fusion)	3.90
	Contribution to the Secretariat for the Generation- IV International Forum (Fission)	0.15
	Studies for the ex-post evaluation of Euratom Framework Programmes in the period 2007-2013 (Fusion, Fission)	0.30
Estimated Total Budget Allocation		993.19

All budgetary figures in this work programme are indicative.

The final budget proposed for the different actions in the Fusion theme may vary by up to 10% of the total value of the proposed budget for each action.

Following the evaluation of the proposals the final budget awarded to actions implemented through calls for proposals may vary:

- by up to 10% of the total value of the indicated budget for each call; and
- any repartition of the call budget may also vary by up to 10% of the total value of the indicated budget

The final budgets for evaluation, monitoring and review may vary by up to 20% of the indicated budgets for these actions. The final budget awarded for actions in the fission theme, not implemented through calls for proposals, may vary by up to 10% of the indicated budgets for these actions.

²⁷ Figures are rounded to two decimal points.

²⁸ Under the condition that the draft budget for 2013 is adopted without modification by the budgetary authority.

VI. INDICATIVE PRIORITIES FOR FUTURE WPs AND CALLS

The 2013 work programme is expected to prepare the implementation of Horizon 2020, which will place a stronger emphasis on joint programming actions and Public-Private Partnerships.

LIST OF ANNEXES

- 1) Eligibility and Evaluation Criteria for Proposals
- 2) Table for Forms of Grants and Maximum Reimbursement Rates for Projects Funded through the Euratom Work Programme

Annex 1: 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
- Additional eligibility criteria may be given in the work programme at the level of individual topics (see also the table under section III.2).

Evaluation criteria

The criteria against which proposals will be evaluated are set out in Articles 14 and 15 of the Rules for Participation. For the Specific Programme these are:

- 0- relevance to the objectives of the Specific Programme²⁹;
- 1- scientific and/or technological excellence;
- 2- the potential impact through the development, dissemination and use of project results;
- 3- 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. 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.

²⁹ **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.

Evaluation criteria → Funding scheme ↓	1. Scientific and/or technological excellence (relevant to the topics addressed by the call) (award)	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)
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 (staff, equipment) Efficient and long-term data management at EU level 	<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 Efficient and long-term data management at EU level 	<ul style="list-style-type: none"> Appropriateness of measures for spreading excellence, exploiting research potential, and disseminating knowledge, through engagement with and between stakeholders and the public at large.
Co-ordination & Support Actions	<ul style="list-style-type: none"> (not for SA) 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 (staff, equipment) 	<ul style="list-style-type: none"> Appropriateness of measures for spreading excellence, exploiting research potential, and dissemination of knowledge, through engagement with and between stakeholders, and the public at large.

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 Regulation³⁰ (Article 115) and its Implementing Rules³¹ (Articles 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.

³⁰ OJ L248 16.9.2002, p1

³¹ OJ L357 31.12.2002, p1

If the topic requires a funding scheme which is a **combination of a Collaborative Project and a Coordination Action** (covering integration, networking, transnational access and joint research, along the lines of the FP6 I3 – Integrated Infrastructures Initiatives), the evaluation criteria are:

<i>Evaluation criteria applicable to</i> Combination of collaborative research projects and coordinated and support actions		
1. S/T QUALITY ‘Scientific and/or technological excellence (relevant to the topics addressed by the call)’	2. IMPLEMENTATION ‘Quality and efficiency of the implementation and the management’	3. IMPACT ‘Potential impact through the development, dissemination and use of project results’
<ul style="list-style-type: none"> • Clarity of the objectives and quality of the concept. • Contribution of the overall project to the provision of integrated services and to the co-ordination of high quality research. • Quality and effectiveness of the Joint Research Activities and associated work plan: The extent to which the activities will contribute to quantitative and qualitative improvements of the services provided by the infrastructures. • Quality and effectiveness of the co-ordination mechanisms and associated work plan: The extent to which the Networking Activities will foster a culture of co-operation between the participants, and enhance the services to the users. • <i>(whenever appropriate)</i> Quality and effectiveness of the Trans-national Access and research services, and associated work plan: The extent to which the activities will offer high quality services, access to state-of-the-art research infrastructures, and will enable users to conduct high quality research. 	<ul style="list-style-type: none"> • Appropriateness of the management structure, the management procedures, and the implementation plan to achieve the objectives of the project. • Quality and relevant experience of the individual participants and quality of the consortium as a whole (including complementarity, balance, critical mass). • Appropriate allocation and justification of the resources to be committed (, staff, equipment), by task and participant. • Efficient and long-term data management at EU level 	<ul style="list-style-type: none"> • Contribution at the European level of the Joint Research Activities towards an optimum development of European capacities, knowledge and technologies. • Contribution at the European level of the collaborative arrangements put into place and the perspectives for their long-term sustainability, towards a structuring impact on the pool of research capacities in Europe. • <i>(whenever appropriate)</i> Contribution at the European level of the access and service activities towards an improved access to - and use of - the pool of research infrastructures and new opportunities of access and use for researchers from across the EU. • Appropriateness of measures envisaged for the management of intellectual property and for the dissemination and/or exploitation of project results.

The second column corresponds to the selection criteria in the meaning of Article 115 of the Financial Regulation (see previous table).

Annex 2: Table for Forms of Grant and Maximum Reimbursement Rates for Projects Funded through the Euratom Work Programme

Forms of Grant

The Euratom FP 2012-13 'Rules for Participation' stipulate 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 in the call for proposals, the reimbursement of eligible costs (including the different options for flat rates on indirect costs as established in Article 31 of the Rules for Participation) will be the only form of grant used³².

In accordance with Article 2 of the Commission Decision of 23 March 2009 under reference C (2009) 1942, the present work programme provides for the possibility to use flat rates to cover subsistence costs incurred by beneficiaries during travel carried out within grants for indirect actions. The applicable flat rates are available on the Participant Portal at: http://ec.europa.eu/research/participants/portal/page/fp7_documents under 'Guidance documents for FP7/Financial issues/Flat rates for daily allowances'. Please note this option is only available when stated explicitly in the call fiche.

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 ³³	100%	100%

³² 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.

³³ Including, inter alia training activities 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).