



FP7 Euratom Indirect Actions “Fission & Radiation Protection”

**European Commission
DG Research Unit J2
Deffrennes Marc**



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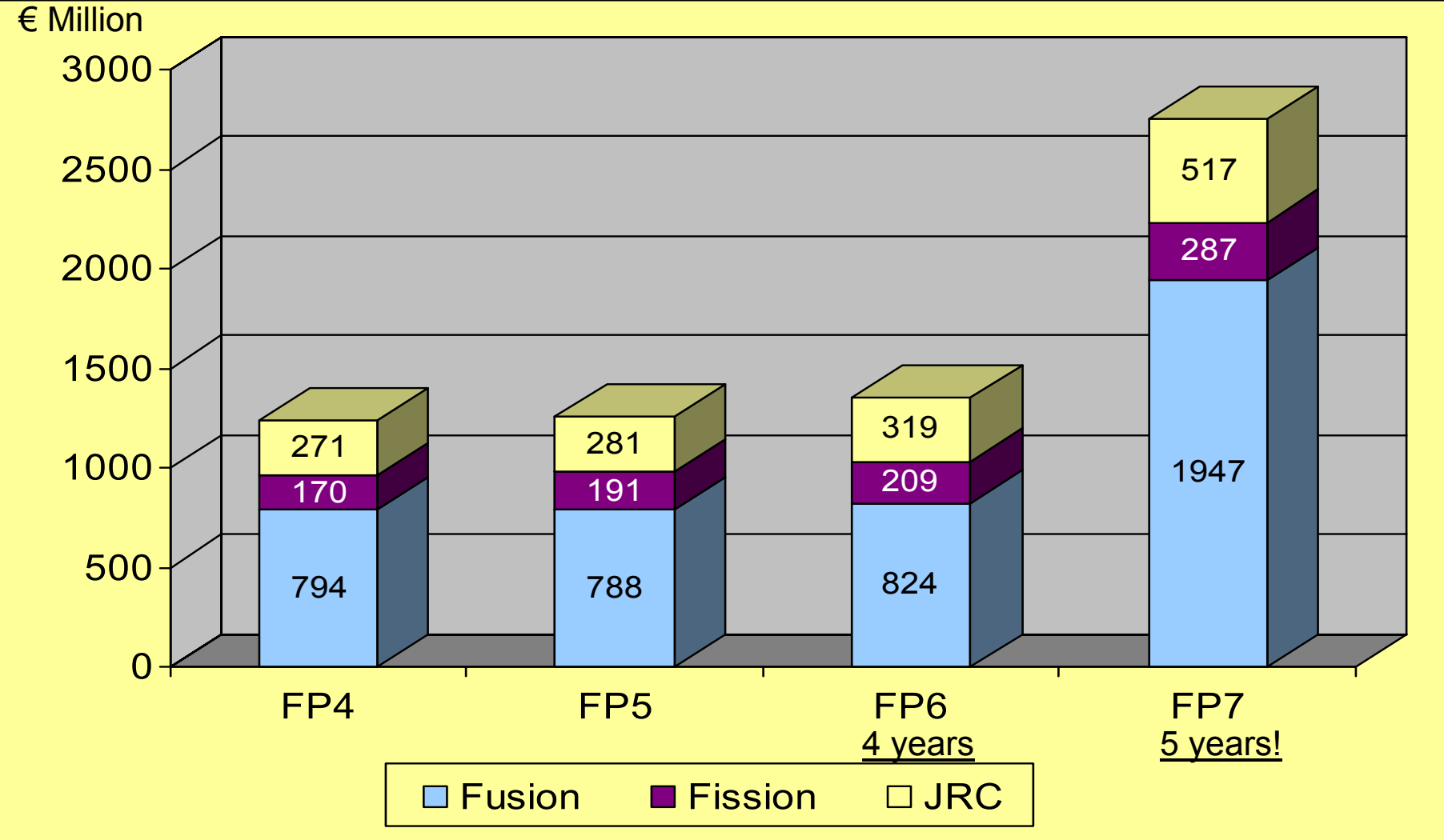
Nuclear Power ???

Quoting the Euratom Research Programme:

Nuclear power is the principal carbon-free source of base load electricity in the EU, totalling 135 GWe and accounting for 1/3 of the electricity generation. It plays a key role in limiting the EU's emissions of greenhouse gases, and makes an important contribution to improving the Union's independence, security and diversity of energy supply. Research on current issues such as safety, waste and radiation protection therefore figures prominently, as does R&D on the potential of future systems in line with Community policy, to investigate a broad portfolio of future energy sources and carriers.



Euratom research budget





Euratom Specific Programme Fission & RP areas of activity

C
A
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D

Management of radioactive waste:

- Geological disposal
- Partitioning & Transmutation

S
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P

Reactor systems:

- Nuclear installation safety
- Sustainable nuclear systems

Radiation protection:

- Risk from low doses
- Medical uses of radiation
- Emergency management

Key horizontal activities:

- Research infrastructures
- Human resources, mobility & training



Euratom Fission Programme key issues for implementation

- **Flexibility of the Programme to respond to results of on-going research, emerging issues and political priorities – plan: one call/year**
- **Limited number of Funding Schemes: NoE; CP; CA/SA - training embedded in the projects**
 - Some form of continuity with FP6
- **Enhanced coordination with national & industrial programmes essential**
 - Technology Platforms can help in the future
- **International cooperation a key overall policy objective**



Euratom WP2007 Fission preparation

- **End 2004: 4 CCE-Fi working groups**
- **Status of on-going major FP6 projects**
- **FISA2006 March 2006**
- **Consultation Day 22 June 2006**
- **Ad hoc stakeholders inputs**
- **ISC launched 13 Oct 2006**
- **Programme Committee CCE-Fi 7 Nov 2006**
- **Provisional Adoption in December 2006**
- **Call for Proposals launched on the 22 December 2006**
- **Adoption (Confirmation) early 2007**



Euratom WP2007 Fission general remarks

- **One fixed deadline call of €49M - Deadline 2nd May**
- **Only CPs (see Euratom guide for applicants!) and CA/SA**
- **No Open Call**
 - Support for human resources to be channelled through major projects, with training schemes planned for WP2008
 - “Catch-all” SA cross-cutting topic
- **Single budget line**
 - Every attempt to prevent evaluation bias: excellence is key criterion
- **Indication of possible topics for following years**
- **Open to international cooperation**
- **NCP network may be reinforced, including international cooperation dimension**



Activity in WP2007 (1/6) – Radwaste Management

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



Radwaste Management AREA: Geological Disposal

- Phenomenology and Perf Assessmt: *collaborative project(s)*
 - In-situ expts on diffusion of radnucl in clay, transport in high pH
 - Gas generation in waste and its transport, feedback on design
 - Modeling tools for long time periods simulation, beyond expts

- Technology demonstration of safe repository operation: *collaborative project*
 - Mechanical demonstrators to solve key issues of repository operation – emphasis on licence application
 - Scope: safe on-site handling / transport of waste packages, feasibility of construction of seals and plugs, analysis of reversibility, strategies for the monitoring of repositories



Radwaste Management AREA: Partitioning and Transmutation

- Partitioning processes for viable recycling strategies:
collaborative project(s)
- Select and develop already mature aqueous separation processes (seeking compatibility with fuel fabrication & viable recycling strategies) + go beyond current state of the art in pyro-chemical separation – view to full demo at pilot level
 - Scope: most promising aqueous separation, exploratory R&D on new molecules, pyro-chemistry, PIE if necessary, detailed engineering & systems studies leading to the demo at a pilot level



Activity in WP2007 (2/6) – Reactor Systems

... aim to ensure the continued safe operation of existing installations and, as a contribution to enhancing diversity and security of supply and combatting global warming, to explore the potential of more advanced technology to deliver an even safer, more resource-efficient and competitive exploitation of nuclear energy.



Reactor Systems AREA : Nuclear Safety

→ Numerical coupling of safety-relevant phenomena: *collaborative project*

- Development and qualification of core physics and thermal hydraulics numerical simulation tools for reactor safety computations and experimental validation of these tools

→ Prediction of irradiation effects on reactor internals and/or claddings: *collaborative project*

- Development and qualification of multi-scale simulation tools to predict the combined effects of irradiation and corrosion on internals and/or claddings and experimental validation of these tools

Both projects: coupling of models, sensitivity / uncertainty analysis for best estimate approaches, experimental validation, setting up of users groups, leading to an European pole of excellence for computation in areas of reactor safety and residual lifetime prediction



Reactor Systems

AREA: Nuclear Safety

- Advanced safety assessment methodologies: *coordination action*
 - Develop best practice guidelines for the performance of Level-2 PSA methodologies with a view to harmonisation at EU level

- The man-machine-organisation (MMO) interface and plant safety management: *support action*
 - Improve understanding of the human factor in the operation of nuclear installations and develop techniques to quantify and improve the “softer” aspects of safety
 - Analyse the safety implications of increased automation of industrial processes and operation in control room (digital I&C)



Reactor systems

AREA: Advanced Systems

- Innovative fuel and cladding for Generation IV systems:
collaborative project
- Development and qualification of innovative fuel and cladding in the framework of GIF, with emphasis on increased efficiency of EU research in support to GIF by focussing on cross-cutting and generic issues applicable to more than one reactor system
 - Should reinforce collaboration between national R&D programmes: pooling of the expertise and experimental facilities. International collaboration with research organisations outside the EU



Activity in WP2007 (3/6) – Radiation Protection

... aim to maintain and improve the standards of protection for the safe use of radiation in medicine and industry. Underpin the Community policies for responding rapidly and effectively to emerging needs. Help resolve the controversy over the risk of low and protracted doses.



Radiation Protection AREA: Risk of low Doses

- Non-cancer effects: *collaborative project(s)*
 - Understand the mechanisms of and quantify the risks for non-cancer health effects resulting from exposure to low and protracted doses, in particular cardio- and cerebro-vascular diseases
- Prospective cohort of medically exposed children: *support action*
 - To assess feasibility of establishing a trans-national cohort for longer term follow-up of those exposed in infancy or childhood to significant medical exposure



Radiation Protection AREA: Medical Uses

- Enhanced safety and efficacy in the medical uses of radiation:
collaborative project(s) and/or coordination actions
 - Enhance the safety (both for patient and medic) and efficacy of the uses of radiation in diagnosis and therapy through new technological developments and achieving a proper balance between the benefits and risks of radiation



Radiation Protection AREA: Emergency Management

- Optimal approaches for monitoring: *collaborative project*
 - To develop a methodology for optimising the design of monitoring systems for timely and effective decision making in an emergency



Activity in WP2007 (4/6) – Infrastructures

... aim at supporting the design, refurbishment, construction and/or operation of key research infrastructures, where there is an EU added value (critical mass, replacement of ageing facilities). Consolidate the cooperation and transnational access to research infrastructures to maintain innovation and safety in the European nuclear sector, including through a contribution to training.



Infrastructures

AREA: Support for Infrastructures

- Networking of URLs: *coordination or support action*
 - Develop the pooling of facilities and expertise in underground research for radioactive waste disposal
- Support to new research infrastructures of pan-European interest: *collaborative project*
 - To support development of mature RIs identified through ESFRI roadmap process
- Databases and tissue banks: *collaborative project(s) and/or coordination/support actions*
- Radiobiology infrastructures: *support action*



Infrastructures

AREA: Access to infrastructures

- Trans-national access to large infrastructures: *support action(s)*
 - To promote access for researchers to infrastructures that provide essential and unique services to the European research community



Activity in WP2007 (5/6) – Human resources, mobility & training

... aim to maintain the required high level of expertise and human resources and guarantee the earliest possible availability if suitably qualified researchers, engineers and technicians through coordination of education and training, common qualification schemes and mobility.



Human resources, mobility training AREA: Training and Mobility

- These actions will be implemented largely via the inclusion of appropriated work packages and other initiatives in the major projects under the various activities



Activity in WP2007 (6/6) – Cross-cutting topics

- Treatment & disposal of irradiated graphite: *collaborative project*
- Materials for transmutation technologies and advanced reactors: *collaborative project(s)*
 - Development and qualification of high temperature and irradiation resistant materials for advanced fission reactors (GIF) and transmutation systems
- Database of competences and facilities: *coordination action*
- Actions supporting programme implementation and other activities: *support action(s)* – “catch-all topic”
- Transnational co-operation NCPs and Third Countries contacts: *coordination action*



Possible topics in WP2008+

- Disposal of long-lived low- & intermediate-level waste
- Issues related to the governance of spent fuel and radwaste
- Support for the secretariat of TP on geological disposal

- Plant lifetime management
- Severe accident analysis
- Innovative concepts and processes for nuclear energy that fit into GIF
- Support to the NEA's GIF scientific secretariat activities
- Support for the secretariat of Sustainable Nuclear Fission-TP

- Further low-dose / medical uses research, possible NoE in radioecology

- Fast neutron spectrum test facility or transmutation device (ESFRI)
- Geological disposal and URLs

- Harmonisation of nuclear education and training schemes across EU
- Euratom fission training schemes

Euratom WP2007 summary

- **Radwaste management**

- Operational safety of geological repositories
- Partitioning processes

- **Nuclear systems**

- Safety of existing reactors
- Gen.IV systems

- **Radiation protection**

- Non-cancer low dose effects
- Safe medical uses of radiation
- emergency management

- **Infrastructures**

- Support to ESFRI roadmap projects
- Access to and pooling of infrastructures

- **Human resources**

- Training schemes (2008)

- **Cross-cutting**

- Materials for Gen.IV & transmutation technologies
- DB of competencies

One call of €49M

More Information

- FP6 projects on website

http://ec.europa.eu/research/energy/fi/fi_pubs/article_1186_en.htm

- FP7 on the CORDIS website:

www.cordis.europa.eu/fp7

- Euratom FP7, SP, WP2007, Call Fiche
- Guide for Applicants
- Rules for Participation