

Commission

"Euratom Research and Training Programme 2014 - 2018"

20 October 2016

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HORIZON 2020



COUNCIL REGULATION (EURATOM)

No 1314/2013 of 16 December 2013 on the Research and Training Programme of the European Atomic Energy Community (2014-2018) complementing the Horizon 2020 Framework Programme for Research and Innovation

General Objective of the Euratom Programme:

 to pursue nuclear research and training activities with an emphasis on continuous improvement of nuclear safety, security and radiation protection, notably to potentially contribute to the long-term decarbonisation of the energy system in a safe, efficient and secure way.



Euratom Programme 2014-2018

Indirect actionsDG-RTDFusion R&D
Programme€ 728 million
(45 %)

Indirect actions DG-RTD

Nuclear Fission, Safety and Radiation Protection

> € 315 million (20 %)

Direct actions JRC Nuclear Safety and Security

C 560 million (35 %)

Total budget: € 1603 million



COUNCIL REGULATION (EURATOM)

The Euratom Programme indirect actions shall have the following specific objectives:

(a) supporting safety of nuclear systems;

(b) contributing to the development of safe, longer term solutions for the management of ultimate nuclear waste, including final geological disposal as well as partitioning and transmutation;

(c) supporting the development and sustainability of nuclear expertise and excellence in the Union;

(d) supporting radiation protection and development of medical applications of radiation, including, inter alia, the secure and safe supply and use of radioisotopes;

(e) moving towards demonstration of feasibility of fusion as a power source by exploiting existing and future fusion facilities;

(f) laying the foundations for future fusion power plants by developing materials, technologies and conceptual design;

(g) promoting innovation and industrial competitiveness;

(h) ensuring availability and use of research infrastructures of pan-European relevance.





Main Features of Euratom Fission WP 2014-2015

- One Work Programme
- One Call
- Budget range per topic and per project
- Overall indicative budget for Euratom 2014 2015 Fission Work Programme – 103,2 ME
- Single stage evaluation procedure



WORK PROGRAMME 2014-2015

Clustering of the WP 2014-2015 Actions

- 1. Support safe operation of nuclear systems
- 2. Contribute to the development of solutions for the management of ultimate radioactive waste
- 3. Radiation protection
- 4. Cross-cutting aspects
- 5. Support the development of nuclear competences
- 6. Socio-economic aspects and other actions



Cluster 1: Support Safe Operation of Nuclear Systems

- Improved safety design and operation of fission reactors
- Tool for the fast and reliable prediction of severe accident progression and anticipation of the source term of a nuclear accident
- New innovative approaches to reactor safety



Cluster 2: Management of Ultimate Radioactive Waste

- EU concerted development of Member State research on radioactive waste management
- EU regulatory requirements for licensing geological repositories
- Supporting the implementation of the first-of-the-kind geological repositories



Cluster 3: Radiation Protection

• Integrating radiation research in the European Union (EJP)

Cluster 4: Cross-cutting aspects

- High density uranium fuel and targets for the production of medical radio-isotopes
- Transmutation of minor actinides (Towards industrial application)



Cluster 5: Support the Development of Nuclear Competences

- Education and training (Bologna and Copenhagen processes)
- Supporting access to Jules Horowitz reactor
- Regional initiative aiming at nuclear research and training capacity building



Cluster 6: Socio-economic Aspects and Other Actions

- Modelling and analysing the energy system
 Nuclear developments and interaction with society
- Fostering the network of National Contact Points
- Support to SNETP



Cluster 7: Security of supply of nuclear fuel for VVER reactors

 Supporting the licensing of Western nuclear fuel for reactors of VVER design operating in the EU



N° of Grants per cluster

Cluster	Definition	N° of Grants per cluster	Max Grant amount (€)
	Support Safe Operation of Nuclear Systems	7	26,643,246.75
	Management of Ultimate Radioactive Waste		
8	Radiation Protection		19,822,878.00
	Cross-cutting aspects		15,383,922.23
5	Support the Development of Nuclear Competences		5,823,673.00
	Socio-economic Aspects and Other Actions		
7	Security of supply of nuclear fuel for VVER reactors		2,053,913.00
Tot	al	23	90,182,619.23



Distribution of EC grant amount per cluster



- 1 Support Safe Operation of Nuclear Systems
- **3** Radiation Protection
- **2** Management of Ultimate Radioactive Waste
- **4** Cross-cutting aspects
- **5** Support the Development of Nuclear Competences
- **6** Socio-economic Aspects and Other Actions
- 7 Security of supply of nuclear fuel for VVER reactors



Budget distribution per cluster and Grants

Cluster	Cluster Definition		Acronyms	Max Grant
Gluster	Deminition	per cluster	Acronyms	amount (€)
1	Support Safe Operation of Nuclear Systems	7	FASTNET INCEFA - PLUS IVMR SAMOFAR sCO2-HeRo SESAME SOTERIA	2,831,910.00 2,550,128.00 4,831,454.00 3,466,896.50 2,791,561.25 5,200,000.00 4,971,297.00
2	Management of Ultimate Radioactive Waste	5	Cebama JOPRAD MIND Modern2020 SITEX-II	3,868,607.25 1,100,000.00 4,160,234.50 5,997,143.00 1,177,182.50
3	Radiation Protection	1	CONCERT	19.822,878.00 19,822,878.00
4	Cross-cutting aspects	2	HERACLES-CP MYRTE	6,387,960.23 8,995,962.00
đ	Support the Development of Nuclear Competences	4	ANNETTE BRILLIANT CORONA II VINCO	2,517,399.00 1,197,345.00 1,017,605.00 1,091,324.00
6	Socio-economic Aspects and Other Actions	3	HoNESt NUCL-EU 2020 SPRINT	3,052,269.00 500,000.00 599,550.00
7	Security of supply of nuclear fuel for VVER reactors	1	ESSANUF	2,053,913.00 2,053,913.00
		23		90,182,619.23



Budget distribution per CO & country

Cluster	Project Acronym	Coordinator Legal Name	Country of CO	Proj Maximum Grant Amount (€)
3	CONCERT	BUNDESAMT FUER STRAHLENSCHUTZ	DE	19,822,878.00
4	MYRTE	STUDIECENTRUM VOOR KERNENERGIE/CENTRE D'ETUDE DE L'ENERGIE NUCLÉAIRE	BE	8,995,962.00
4	HERACLES-CP	TECHNISCHE UNIVERSITAET MUENCHEN	DE	6,387,960.23
2	Modern2020	AGENCE NATIONALE POUR LA GESTION DES DECHETS RADIOACTIFS	FR	5,997,143.00
1	SESAME	AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE	ІТ	5,200,000.00
1	SOTERIA	COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	FR	4,971,297.00
1	IVMR	INSTITUT DE RADIOPROTECTION ET DE SURETE NUCLEAIRE	FR	4,831,454.00
2	MIND	SVENSK KARNBRANSLEHANTERING AB	SE	4,160,234.50
2	Cebama	KARLSRUHER INSTITUT FUER TECHNOLOGIE	DE	3,868,607.25
1	SAMOFAR	TECHNISCHE UNIVERSITEIT DELFT	NL	3,466,896.50
6	HoNESt	UNIVERSIDAD POMPEU FABRA	ES	3,052,269.00
1	FASTNET	INSTITUT DE RADIOPROTECTION ET DE SURETE NUCLEAIRE	FR	2,831,910.00
1	sCO2-HeRo	UNIVERSITAET DUISBURG-ESSEN	DE	2,791,561.25
1	INCEFA - PLUS	AMEC FOSTER WHEELER NUCLEAR UK LIMITED	UK	2,550,128.00
5	ANNETTE	RESEAU EUROPEEN POUR L'ENSEIGNEMENT DES SCIENCES NUCLEAIRES	FR	2,517,399.00
7	ESSANUF	WESTINGHOUSE ELECTRIC SWEDEN AB	SE	2,053,913.00
5	BRILLIANT	LIETUVOS ENERGETIKOS INSTITUTAS	LT	1,197,345.00
2	SITEX-II	INSTITUT DE RADIOPROTECTION ET DE SURETE NUCLEAIRE	FR	1,177,182.50
2	JOPRAD	AGENCE NATIONALE POUR LA GESTION DES DECHETS RADIOACTIFS	FR	1,100,000.00
5	VINCO	NARODOWE CENTRUM BADAN JADROWYCH	PL	1,091,324.00
5	CORONA II	KOZLODUY NPP PLC	BG	1,017,605.00
6	SPRINT	LGI CONSULTING SARL	FR	599,550.00
6	NUCL-EU 2020	AGENZIA PER LA PROMOZIONE DELLA RICERCA EUROPEA	IT	500,000.00
	Total			90,182,619.23



CLUSTER 1:

Project Acronym	Project Title	Projec t Durati on	Proj Maximum Grant Amount	Coordinator Legal Name	Country Beneficiaries of the project
FASTNET	FAST Nuclear Emergency Tools (FASTNET)	48	2,831,910.00	INSTITUT DE RADIOPROTECTION ET DE SURETE NUCLEAIRE	FR, AT, BE, CA, CZ, DE, DK, ES, FI, FR, IT, LT, NO, RO, RU, SE, SK, US
INCEFA - PLUS	INcreasing Safety in NPPs by Covering gaps in Environmental Fatigue Assessment	60	2,550,128.00	AMEC FOSTER WHEELER NUCLEAR UK LIMITED	UK, BE, CH, CZ, DE, ES, FI, FR, LT, UK
IVMR	In-Vessel Melt Retention Severe Accident Management Strategy for Existing and Future NPPs	48	4,831,454.00	INSTITUT DE RADIOPROTECTION ET DE SURETE NUCLEAIRE	FR, BE, BG, CZ, DE, FI, FR, HU, IT, LT, NL, PL, SE, SK, UK
SAMOFAR	A Paradigm Shift in Reactor Safety with the Molten Salt Fast Reactor	48	3,466,896.50	TECHNISCHE UNIVERSITEIT DELFT	NL, BE, CH, DE, FR, IT, MX
sCO2-HeRo	The supercritical CO2 Heat Removal System	36	2,791,561.25	UNIVERSITAET DUISBURG-ESSEN	DE , CZ, DE, NL
SESAME	thermal hydraulics Simulations and Experiments for the Safety Assessment of MEtal cooled reactors	48	5,200,000.00	AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE	IT , BE, CH, CZ, DE, FR, IT, NL, SE, SI
SOTERIA	Safe long term operation of light water reactors based on improved understanding of radiation effects in nuclear structural materials	48	4,971,297.00	COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	FR , BE, CH, CZ, DE, ES, FI, FR, SE, SI, UK



CLUSTER 2:

Project Acronym	Project Title	Project Duration	Proj Maximum Grant Amount	Coordinator Legal Name	Country Beneficiaries of the project
Cebama	Cement-based materials, properties, evolution, barrier functions	48	3,868,607.25	KARLSRUHER INSTITUT FUER TECHNOLOGIE	DE , FR, BE, CH, CZ, DE ES, FI, JP, NL, RO, UK
JOPRAD	Towards a Joint Programming on Radioactive Waste Disposal	30	1,100,000.00	AGENCE NATIONALE POUR LA GESTION DES DECHETS RADIOACTIFS	FR, BE, CH, CZ, FR, UK
MIND	Development of the safety case knowledge base about the influence of microbial processes on geological disposal of radioactive wastes	48	4,160,234.50	SVENSK KARNBRANSLEHANTERI NG AB	SE , BE, CH, CZ, DE, ES, FI, SE, UK
Modern2020	Development and Demonstration of monitoring strategies and technologies for geological disposal	48	5,997,143.00	AGENCE NATIONALE POUR LA GESTION DES DECHETS RADIOACTIFS	FR , BE, CH, CZ, DE, ES, FI, FR, IT, JP, NL, SE, UK
SITEX-II	Sustainable network for Independent Technical EXpertise of radioactive waste disposal - Interactions and Implementation	30	1,177,182.50	INSTITUT DE RADIOPROTECTION ET DE SURETE NUCLEAIRE	FR , BE, BG, CA, CH, CZ, DE, FR, HU, LT, NL, SE, SK



CLUSTER 3:

Project Acronym	Project Title	Project Duration	Proj Maximum Grant Amount	Coordinator Legal Name	Country Beneficiaries of the project
CONCERT	European Joint Programme for the Integration of Radiation Protection Research	60	19,822,878.00	BUNDESAMT FUER STRAHLENSCHUTZ	DE , AT, BE, BG, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IT, LT, LV, NL, NO, PL, PT, RO, SE, SK, UK



CLUSTER 4:

Project Acronym	Project Title	Project Duration	Proj Maximum Grant Amount	Coordinator Legal Name	Country Beneficiaries of the project
HERACLES-CP	HERACLES-CP: Towards the Conversion of High Performance Research Reactors in Europe	48	6,387,960.23	TECHNISCHE UNIVERSITAET MUENCHEN	DE, BE, FR,
MYRTE	MYRRHA Research and Transmutation Endeavour	48	8,995,962.00	Studiecentrum voor Kernenergie/Centre d'Etude de l'Energie Nucléaire	BE , BE, CH, DE, ES, FR, IT, NL, PT, SI



CLUSTER 5:

Project Acronym	Project Title	Project Duration	Proj Maximum Grant Amount	Coordinator Legal Name	Country Beneficiaries of the project
ANNETTE	Advanced Networking for Nuclear Education and Training and Transfer of Expertise	48	2,517,399.00	RESEAU EUROPEEN POUR L'ENSEIGNEMENT DES SCIENCES NUCLEAIRES	FR , BE, CZ, DE, ES, FI, FR, IT, NL, RO, SE, SI, UK
BRILLIANT	Baltic Region Initiative for Long Lasting InnovAtive Nuclear Technologies	36	1,197,345.00	LIETUVOS ENERGETIKOS INSTITUTAS	LT, LV, LT, PL, EE, SE
CORONA II	Enhancement of training capabilities in VVER technology through establishment of VVER training academy (CORONA II)	36	1,017,605.00	KOZLODUY NPP PLC	BG , BG, CZ, DE, ES, FR, HU
VINCO	Visegrad Initiative for Nuclear Cooperation	36	1,091,324.00	NARODOWE CENTRUM BADAN JADROWYCH	PL, CZ, FR, HU, SK



CLUSTER 6:

Project Acronym	Project Title	Project Duration	Proj Maximum Grant Amount	Coordinator Legal Name	Country Beneficiaries of the project
HoNESt	History of Nuclear Energy and Society	36	3,052,269.00	UNIVERSIDAD POMPEU FABRA	ES, BE, BG, DE, DK, EL, ES, FI, FR, LT, NL, PT, RU, SE, UK, US
NUCL-EU 2020	Connecting EURATOM National Contact Points in a pro-active network under EURATOM Programme in Horizon 2020	48	500,000.00	AGENZIA PER LA PROMOZIONE DELLA RICERCA EUROPEA	IT , CZ, EE, EL, PL, PT, SK
SPRINT	SNETP Programming for Research and Innovation in Nuclear Technology	48	599,550.00	LGI CONSULTING SARL	FR , BE, CZ, DE, FR



CLUSTER 7:

Project Acronym	Project Title	Project Duration	Proj Maximum Grant Amount	Coordinator Legal Name	Country Beneficiaries of the project
ESSANUF	European Supply of SAfe NUclear Fuel	26	2,053,913.00	WESTINGHOUSE ELECTRIC SWEDEN AB	SE, BE, CZ, ES, FI, SK, UA, UK



Fission - Euratom overview

	n° of financed projects	EC Contribution (€)	n° of participants	n° of participations
FP6	110	189,214,431.90	444	1218
FP7 & FP7+2	135	353,769,828.66	225	2106
H2020	23	90,182,619.23	235	419



Nuclear Safety – Topics 2016-2017

Improving safety of Generation II, III and IV reactors

• Topics NFRP 1, NFRP 2

Investigating the safety of closed nuclear fuel cycle options and fuel developments

• Topic NFRP 3

Research on the safety of small modular reactors and on materials for Generation IV reactors

• Topics NFRP 4, NFRP 5



Euratom Call 2016-17

Safe Operation of Nuclear Systems

Solutions responding to the new requirements of the amended Nuclear safety Directive

Challenges

- Safety and reliability improvements in Gen II and Gen III; addressing technology gaps with due consideration to the NUGENIA roadmap;
- Safety improvements of critical fast neutron Gen IV systems ESNII;
- Reprocessing and manufacturing of innovative fuels including MOX;
- Investigate safety features of SMRs;
- Materials behaviour in Gen IV environment progress predictive capability



Radioactive Waste Management Topics 2016-2017

Addressing key priority R&I issues for the first-of-the-kind geological repositories

• Topic NFRP 6

Research and innovation on the overall management of radioactive waste other than geological disposal

• Topic NFRP 7

Pan-European knowledge sharing and development of competence in radioactive waste

• Topic NFRP 8



Radioactive Waste Management Topics 2016-2017

Turn scientific consensus on geological disposal into engineering reality

<u>Challenges</u>

- Demonstrate technologies and safety for underground repositories;
- Develop techniques, processes and procedures leading to waste minimization;
- Help transfer expertise and technology from the most to the least advanced Member States



Radiation Protection – Topics 2016-2017

Impacts of low dose radiation exposure

• Topic NFRP 9

Support for careers in the nuclear field (including radiation protection)

• Topic NFRP 12

Cross-cutting support to improved knowledge on tritium management in fission and fusion facilities (including effects on people and the environment)

• Topic NFRP 14



Radiation Protection – Topics 2016-2017

Average exposure to radiation from medical diagnostic is about to exceed exposure from the natural radiation background

<u>Challenges</u>

- Reduce uncertainty on the effects of radiation at dose in the range of several folds the natural background radiation;
- Optimise exposure whilst not unduly restricting image quality, therapy efficiency and other benefits for society;
- Better exploit anonymised radiology data by the radiation protection research community in order to extrapolate knowledge to other radiation sources;
- Holistic approach to radiation protection focusing on integration of research to induce inter-team and inter-discipline synergies;
- Deepen knowhow on challenging radionuclides such as tritium;
- Ensure the transfer of competence in radiation protection to the new generation of scientists and experts across the EU.



Materials and Research Reactors Topics 2016-2017

Support for the optimised use of European research reactors

• Topic NFRP 10

Support for the EU security of supply of nuclear fuel for research reactors

• Topic NFRP 11

Fission/fusion cross-cutting research in the area of multi-scale materials modelling

• Topic NFRP13



Support for fission research & innovation investment projects

Example of project

- Construction or refurbishing of research infrastructure
- Specialised equipment or technology demonstrators

Euratom contribution EUR 20 million

Contribution from the European Investment Bank (EIB) Overall multiplier effect of around six EIB in-depth analysis of the project consortium composition and business plan

Contribution could be 'pooled' with those from Member States, associated countries and other contributions to particular projects



Euratom call 2016-2017 - Overview

Deadline 5 October 2016

- Sub-budget: EUR 55,45 million
 - NFRP 1 5
- Sub-budget: EUR 18,89 million
 - NFRP 6 7
 - NFRP 8
- Sub-budget: EUR 9 million
 - NFRP 9
- Sub-budget: EUR 8 million
 - NFRP 13 14
- Sub-budget: EUR 7,7million
 - NFRP 10
 - NFRP 11
- Sub-budget: EUR 6 million
 - NFRP 12

RIA – blue CSA- orange



Calendar

WP Publication:

October2015

Call Open:

Deadline:

Evaluation:

Info to the applicants:

GAs signed:

11 May 2016

5 October 2016

November 2016

January-February 2017

May 2017



Thank you for your attention