EURATOM Actions

IN SUPPORT TO

EDUCATION & TRAINING in Nuclear Fission and Radiation Protection

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E & T and Radiation Protection - in the heart of Euratom since the TREATY establishing the European Atomic Energy Community_(EURATOM) was signed in Rome in 1957

In its 1st Title the Treaty defines the **Community tasks (Art.1**) and **how they are to be performed (Art.2)**

There are eight points of the Art. 2, and the first two are:

a) PROMOTION of RESEARCH & TRAINING

b) Establishing UNIFORM BASIC SAFETY STANDARDS for POPULATION and WORKERS' PROTECTION, and **SUPERVISING their APPLICATION**

…

1957 (Rome)Treaty establishing the EUROPEAN ATOMIC ENERGY COMMUNITY

- **Nuclear Energy Development, including Research Activities** (Art. 4-11)
- **Health and Safety** (Art. 30-39)
- **Safeguards (Guarantees for Peaceful Use)** (Art. 77-85)
- **External Relations** (Art.101-106)

1957 (Rome)Treaty establishing the EUROPEAN ATOMIC ENERGY COMMUNITY

Annex I
FIELDS OF RESEARCH CONCERNING NUCLEAR ENERGY REFERRED TO IN ARTICLE 4 OF THIS TREATY

I. Raw materials

II. Physics applied to nuclear energy

III. Physical chemistry of reactors

IV. Processing of radioactive material

V. Applications of radioisotopes

VI. Study of the harmful effects of radiation on living organisms

VII. Equipment

VIII. Economic aspects of energy production

Thanks to the **European Atomic Energy Community** efforts

EU has the **most advanced** legally binding **regional framework for nuclear safety in the world.**

- **2011 EURATOM Directive**: Community framework for the responsible and safe **management of spent fuel** and **radioactive waste**

- **2013 EURATOM Directive: Basic Safety Standards for protection against the dangers arising from exposure to ionising radiation**

- **2014 EURATOM Directive:** Community framework for the nuclear **safety of nuclear installations**

The contracting parties of the International Atomic Energy Agency – IAEA committed themselves to achiving standards comparable to those laid down in the 2014 Nuclear Safety Directive (Vienna Declaration, 2015)

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Many EURATOM actions aim at supporting MSs in the transposition of the EURATOM Directives in their national legislations

e.g. regarding the radiation protection area:

EURTOM Projects **ENETRAP II & ENETRAP III**
development of the European **reference training schemes ('reference standards') and specialised training modules** for
Radiation Protection experts working in **medical** sector, geological waste disposal and nuclear power stations

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To follow: **A short review of EURATOM actions in Radiation Protection (RP) and in E & T relative to RP**

EURATOM Research and Training Programme 2014-18

complementing the H20220 FP: Council Regulation No 1314/2013 (EURATOM H2020)

Objectives:

a. supporting safety of nuclear systems

b. contributing to the development of safe longer term solutions for the management of ultimate nuclear waste. Incl. final geological disposal and partitioning & transmutation

c. supporting the development and sustainability of nuclear expertise and excellence in the Union

d. Supporting radiation protection and development of medical application of radiation incl. secure & safe supply & use of radioisotopes

…. (points **e** and **f** regard fusion power)

g. promoting innovation & industrial competitiveness

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

European Commission

EURATOM programme - structure

Indirect actions
DG-RTD

Fusion R&D Programme

H2020: € 728 million (45 %)

Indirect actions
DG-RTD

Nuclear Fission and Radiation Protection

H2020: € 315 million (20 %)

Direct actions
JRC

Nuclear Safety and Security

H2020: €560 million (35 %)

EURATOM Programme 2014-18 complementing Horizon 2020:
Total budget: € 1603 million (Council Regulation of 16 Dec. 2013)

EURATOM Fission – budget structure (approx.)

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~ 20% **Waste management and disposal**

~ 40%

Reactor systems safety

- Safety of existing nuclear installation
- Advanced nuclear systems for increased safety
- Partitioning, Transmutation and fuel cycle
- Cross-cutting aspects

~ 20% **Radiation protection**

~ 20%

Research infrastructures
Training and mobility
Cross-cutting

Grand Total:
Euratom Fission
~ 50 Mi€ / Year

European Commission

In EURATOM H2020 Programme

3 projects funded so far related to Radiation Protection:

CONCERT - European Joint Programme for the Integration of Radiation protection research
Euratom grant: 20 million (29 million tot. cost)

MEDIRAD – Implications of medical Low-dose radiation exposure. Euratom grant: 10 million (10 million. tot. cost)

TRANSAT (TRANSversal action for tritium)
Euratom grant: 4 million (5 million total cost)

European Commission

In EURATOM FP7 & FP7+2 28 projects funded related to Radiation Protection (out of 48 projects funded in total).
European Atomic Energy Community contribution: EUR 353.770.000 (24% of total budget for projects)

-ALLEGRO (risks to healthy tissues rel.to use of radiation therapy)
-ANDANTE (mulidisciplinary evaluation of specific risk of radiation therapy)
-BREAST CY (optimisation, comparison to standard x-ray therapy)
-CARDIORISK (cardiovascular risk rel.to low radiation doses)
-CEREBRAD (cognitive & cerebro-vasc.effects of low dose radiation)
-CHILD-MED-RAD (cohort studies of children with medical diagnostic exposure
-CO-CHER (cooperation on Chernobyl health research)
-COMET (panEuropean Instrument for radioecology)
-Dark.Risk (studies on a cohort of Serbian children, quantification of risk)
-DETECT (radiological & nuclear emergency management and rehabilitation)

European Commission

EURATOM FP7 & FP7+2 28 projects in Radiation Protection

-EpiRadBio (epidem.& radiobiologic. assessment of low & protracted exposure)
Euratom grant: 6 million (10 million tot. cost)
-MADEIRA (optimisation of radiation therapy)
-NERIS-TP (preparedness to radiological and nuclear emergency
-OPERRA (open project for the European Radiation Research Area)
Euratom grant: 8 million, 12 mmillion tot.cost)
-ORAMED (optimisation of radiation protection of medical staff)
-PREPARE (tools and platforms for radiological emergencies 'response)
-PROCARDIO (cardidovascular risk from exposure to low-dose radiation)
-RENEB (European network in Biodosimetry)
-RISK-IR (radiation risk assessment -stem cells and tissues kinetics)
-SEDENTEXCT (safety & efficacy of new dental X-ray modality)
-SOLO (epidemiological studies of exposed Southern Urals populations)
-STAR (strategy for allied radioecology)
-STORE (access to tissues and data from radiobiological experiments)
-ARCH (agenda for research on Chernobyl health consequences)

European Commission

***All Research Projects invited to dedicate min. 5% of their budget to* Education and Training, some projects dedicate much more**

E.g. in FP7:

OPERRA - Open Project for the European Radiation Research Area

DoReMi - Low Dose Research towards Multidisciplinary Integration (ended in 2015) included strong Education and Training elements (over 500 students attracted to courses organized project partners under DoReMi)

MELODI - Multidisciplinary European Low Dose Risk Research Initiative set up a working group for Education and Training

Similar request in the EURATOM ***H2020 Programme*:**

Education & Training dimension is present in many projects addressing other topics

e.g. in WP 2014-15 strong **E&T** components in:

SOTERIA, INCEFA-PLUS, FASTNET, JOPRAD, SITEX-II, CEBAMA,, NUCL-EU, ESSANUF, CONCERT allocated great budget for funding E&T (courses and travel grants), 8 courses already funded, 14 will be funded in the next Call

in WP 2016-17 strong **E&T** components in:

McSAFE, TeaMCables, NOMAD, NARSIS

EURATOM funds also the actions dedicated exclusively to Education and Training.

within the Framework Programme 7

16 Projects addressing HUMAN RESOURCES, MOBILITY and TRAINING with EC contribution: 14,7 Mi€ aiming at

"Supporting the retention and further development of scientific competence and human capacity, in order to guarantee the availability of suitably qualified researchers, engineers and employees in the nuclear sector over the longer term"

European

Overview of projects in E & T: 7FP

- CINCH, CINCH-II, Cooperation in education In Nuclear Chemistry
- CORONA, Establishment of a Regional Center of Competence for VVER Technology and Nuclear Applications
- EAGLE Enhancing educAtion, traininG and communication processes for informed behaviors and decision-making reLatEd to ionizing radiation risks
- ECNET , EU-CHINA Nuclear Education and Training Cooperation
- GENTLE, Graduate and Executive Nuclear Training and Lifelong Education
- ENEN-III, European Nuclear Education Network Training Scheme
- ENEN-RU II, ENEN COOPERATION WITH RUSSIA IN NUCLEAR EDUCATION, TRAINING AND KNOWLEDGE MANAGEMENT
- ENETRAP-II, ENETRAP-II, Europen Nuclear Education Network Training Schemes

Overview of projects in E & T: 7FP - continue

- PETRUS II, Towards an European training market and professional qualification in Geological Disposal
- PETRUS III, Implementing sustainable E&T programmes in the field of Radioactive Wastes Disposal
- TRASNUSAFE, Training schemes on nuclear SAFETY CULTURE
- ECNET, EU-CHINA Nuclear Education and Training Cooperation
- EURECA, Cooperation between EU and Canada in Education, Training and Knowledge Management on Super-Critical Water Reactors
- EUTEMPE-RX, EUropean Training and Education for Medical Physics Experts in Radiology
- NUSHARE, Project for sharing & growing nuclear safety CULTURE COMPETENCE

These projects contributed to:

- **Review, comparison, assessment** and **validation** of **portfolios of learning outcomes** in terms of ***knowledge, skills*** *and* ***competences*** related to **specific jobs** in nuclear sector, (in synergy **with expert associations and regulators**), such as:
  - **Fluid System Construction and Commissioning Engineer" (ENEN III)**
  - **"Radiation Protection Expert" (ENETRAP II)**
  - **"Safety Analysis Expert for Deep Geological Disposal" (PETRUS II)**
  - **"Medical Physics Expert" (EUTEMPE-RX), …,**

to ensure compatibility between different vocational education and training schemes in the nuclear area, Europe-wide

Overview of projects Euratom in E & T FP7

- **Developing new specialised schemes or modules of training** (relating to waste management, medical sector, nuclear power plants),

- **Application of ECVET (European Credit for Vocational E&T) principles in nuclear sector - allowing accumulation of competences, no matter where and how acquired *(essential e.g. to cross-border mobility of nuclear specialists)***

- Paving the way to **mutual recognition of *certificates* and *titles*** by **various countries** and by International Labour Organisation

Education & Training - H2020

Work Programme 2014-15 in Nuclear Fission & Radiation Protection

- **Topic addressing the "Bologna and Copenhagen processes": Further implementation, of the E&T EU policies** with **focus on lifelong learning and cross-border mobility**. To accelerate and optimise the **development of nuclear competences** with a special focus on **safety culture and radioactive waste management**.

Two projects are funded:

1. **ANNETTE** **Euratom grant: 2.500.000, duration: 4 years**
2. **CORONA II** **Euratom grant: 1.000.000, duration: 3 years**

ANNETTE **25 high profile partners (academia, regulators, industry, links to Technology Platforms). Coordinator: ENEN European Nuclear Education Network**

OBJECTIVES

- coordination of E&T in UE (cross-linking among universities)

- dealing with gaps/overlaps, specific actions for European Master Programme and for Continuous Professional Development (CPD)

- producing specific TEACHING MATERIAL

- creating additional E&T possibilities incl. **a wide offer of e-learning, blended e-learning and MOOCs - Massive Multimedia Open Courses to facilitate life-long learning** and **upgrade of professional qualifications**

- **aiming at increasing accessibility,** tackling deficit of teachers in some areas and deficit of students in others**, attracting wider audience, generating more interest in nuclear carriers**

CORONA II Consortium: 8 partners from Bulgaria, France *(ENEN),* Germany, Spain, Czech republic, Hungary, Russia. Coordinator: Kozloduy NPP PLC (Bulgaria)

Continuation of FP7 Project.

OBJECTIVES: working towards unifying the existing VVER-related training schemes and creating a permanent VVER Training Association - Regional Centre of Competence (CORONA Academy)

- Topic addressing Capacity building for Research & TRAINING at Regional level

BRILLIANT Baltic region - exchange of knowledge, competences and infrastructure, … nuclear safety and radiation safety

VINCO Central Europe: **V4G4** - capacity building in nuclear technologies

Work Programme 2016-17 in Nuclear Fission & Radiation Protction

Topic: Support for careers in the nuclear field. Further implementation in nuclear and relevant industrial & medical sectors of "Euratom Fission Training Schemes"- EFTS, based on ECTS and ECVET mechanism. Grant programmes to support the participation of students

Two projects will be funded:

1. MEET-CINCH development of teaching packages for high schools and MOOCs on nuclear chemistry and radio-chemistry, development of new education and training approaches based on remote teaching and flipped classroom concept. Provide ECVET course modules adapted to end-users needs

2. ENEN plus Revival of the young generation interest in nuclear sector careers, including REACTOR SAFETY, RADIATION PROTECTION and MEDICAL APPLICATIONS. Establishment of a mobility fund for European students, researchers and learners


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Thank you
for your attention!