



The ENEN Association and its missions: an update looking beyond its 10th Birthday

*IGD-TP - 5th Exchange Forum
October 28 -30, 2014, Kalmar, Sweden*

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President and Secretary General of ENEN



General information on ENEN's beginning



HISTORY and DEVELOPMENT

European Commission – EURATOM
5th Framework programme

ENEN project in January 2002 – December 2003

Following declarations and policies on phasing out nuclear power plants, nuclear sciences and disciplines are facing:

- *decreasing interest and a reduced numbers of students*
- *no successors for retiring professors*
- *discontinuing nuclear related courses and closing faculties*

The “European Nuclear Engineering Network” project:

- *established the basis for conserving nuclear knowledge and expertise*
- *created a European Higher Education Area for nuclear disciplines*
- *facilitated the implementation of the Bologna declaration in the nuclear disciplines*



HISTORY and DEVELOPMENT

In order to ensure the continuity of the achievements and results of the ENEN project :

“The European Higher Education Area” in the nuclear field is formalised by creating the

European Nuclear **Education** Network, the “ENEN”

Association under the French law of 1901, on **22nd of**

September 2003.



ENEN Association - Objectives

The main objective is the preservation and further development of expertise in the nuclear fields by *higher* education and training

- Promote and further develop the collaboration in nuclear education and training of students, researchers and professionals
- Ensure the quality of nuclear education and training
- Increase the attractiveness for engagement in the nuclear fields for students, researchers and professionals
- Promote life-long learning and career development at post-graduate or equivalent level



It should be achieved by...

- Support to the Universities (exchange of students, lecturers, materials and information etc.)
- Making a bridge between the Universities and the End-users (industries, regulatory bodies, research centres, etc.)

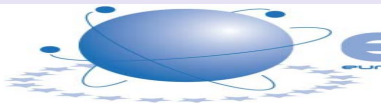


ENEN Members

List of ENEN Members

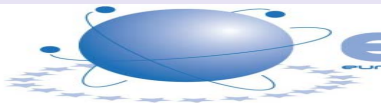
LIST OF ENEN MEMBERS (55 + 9 = 64 MEMBERS AS OF 1 MARCH 2013)

Atominstitut der Oesterreichischen Universitaeten	ATI	Vienna, Austria
Katholieke Universiteit Leuven	KUL	Leuven, Belgium
Université Catholique de Louvain	UCL	Louvain-la-Neuve, Belgium
Ghent University	UG	Ghent, Belgium
Université de Liège	ULG	Liege, Belgium
Université Libre de Bruxelles	ULB	Brussels, Belgium
Vrije Universiteit Brussel	VUB	Brussels, Belgium
Belgian Nuclear Research Centre	SCK•CEN	Mol, Belgium
Westinghouse Electric Company	WES	Brussels, Belgium
Czech Technical University in Prague	CTU	Prague, Czech
CV Rez, a.s.	CVR	Prague, Czech
Aalto University School of Science and Technology	AALTO	Helsinki, Finland
Lappeenranta University of Technology	LUT	Lappeenranta, Finland
CEA/INSTN Centre d'Etudes de Saclay	CEA/INSTN	Saclay, France
Institut National Polytechnique de Grenoble	INPG	Grenoble, France
Ecole des Mines de Nantes	EMN	Nantes, France
AREVA	AREVA	Paris, France
Centre National de la Recherche Scientifique	CNRS	Paris, France
Institut Régional Universitaire Polytechnique	IRUP	Saint Etienne, France
Institut Supérieur des Techniques de la Performance	ISTP	Saint Etienne, France
Technische Universitaet Muenchen	TUM	Munchen, Germany
Universitaet Stuttgart	IKE	Stuttgart, Germany
Institute of Nuclear Fuel Cycle, RWT Aachen University	INBK	Aachen, Germany
Karlsruhe Institute of Technology	KIT	Karlsruhe, Germany
J. W. Goethe Universität	IAPFU	Frankfurt, Germany
Ruhr Universität Bochum	RUBLEE	Bochum, Germany



ENEN Members

Institute for Safety and Reliability	ISAR	Munich, Germany
Aristoteles University	AUTH	Thessaloniki, Greece
Budapest University of Technology and Economics	BME	Budapest, Hungary
Consorzio Interuniversitario per la Ricerca Tecnologica Nucleare	CIRTEN	Pisa, Italy
SOGIN	SOGIN	Rome, Italy
Delft University of Technology	DUT	Delft, The Netherlands
AGH-University of Science and Technology	AGH	Krakow, Poland
University Politecnica Bucharest	UPB	Bucharest, Romania
National Institute "Horia Hulubei"	IFIN-HH	Bucharest, Romania
Slovak University of Technology in Bratislava	STU	Bratislava, Slovakia
University of Ljubljana	UL	Ljubljana, Slovenia
Jozef Stefan Institute	JSI	Ljubljana, Slovenia
Universidad Politecnica de Madrid	UPM	Madrid, Spain
Technical University of Catalonia - Barcelona Tech	UPC	Barcelona, Spain
Universidad Nacional de Educacion a Distancia	UNED	Madrid, Spain
ETS Institute Quic de Sarriá	IQS	Barcelona, Spain
Universidad de Sevilla	USE	Sevilla, Spain
Universidad Politecnica Valencia	UPV	Valencia, Spain
TECNATOM	TECNATOM	San Sebastián de los Reyes-Madrid, Spain
Uppsala Universitet	UU	Uppsala, Sweden
Royal Institute of Technology	KTH	Stockholm, Sweden
Chalmers University of Technology	CUT	Goteborg, Sweden
Swiss Federal Institute of Technology Zürich	ETH	Zurich, Switzerland
Swiss Federal Institute of Technology Lausanne	EPFL	Lausanne, Switzerland
University of Manchester	UM	Manchester, UK
University of Birmingham	UB	Birmingham, UK
Imperial College London	ICL	London, UK
Univesity of Hertfordshire	UH	Hatfield, UK
University of Central Lancashire	UCLAN	Preston, UK



ENEN Members

By concluding a Memorandum of understanding, the following Partners are considered as an ENEN Member, without a Voting right at the General Assembly.

Joint Research Centre of the European Commission
North West University
Moscow Engineering Physics Institute (State University)
Central Institute for Continuing Education and Training
Tokyo Institute of Technology
University of Fukui
Japan Atomic Energy Agency
V. N. Karazin Kharkiv National University
Odessa National Polytechnic University

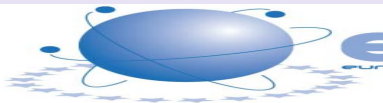
JRC	
NWU	Potchefstroom, South Africa
MEPhI	Moscow, Russia
CICET	Obninsk, Russia
TokyoTech	Tokyo, Japan
FUKUI	Fukui, Japan
JAEA	Tokai, Japan
KKNU	Kharkiv, Ukraine
ONPU	Odessa, Ukraine

LIST OF MOU PARTNERS (4 PARTNERS AS OF 1 MARCH 2013)

European Nuclear Society
International Atomic Energy Agency
University Network of Excellence in Nuclear Engineering
World Nuclear University

ENS	Brussels, Belgium
IAEA	Vienna, Austria
UNENE	Canada
WNU	UK

All these institutions benefit at different extents of the existence of ENEN and of its actions



THE ENEN ASSOCIATION

The European Nuclear Education Network is

*a non-profit international organization established on
22 September 2003 under the French Law of 1901*

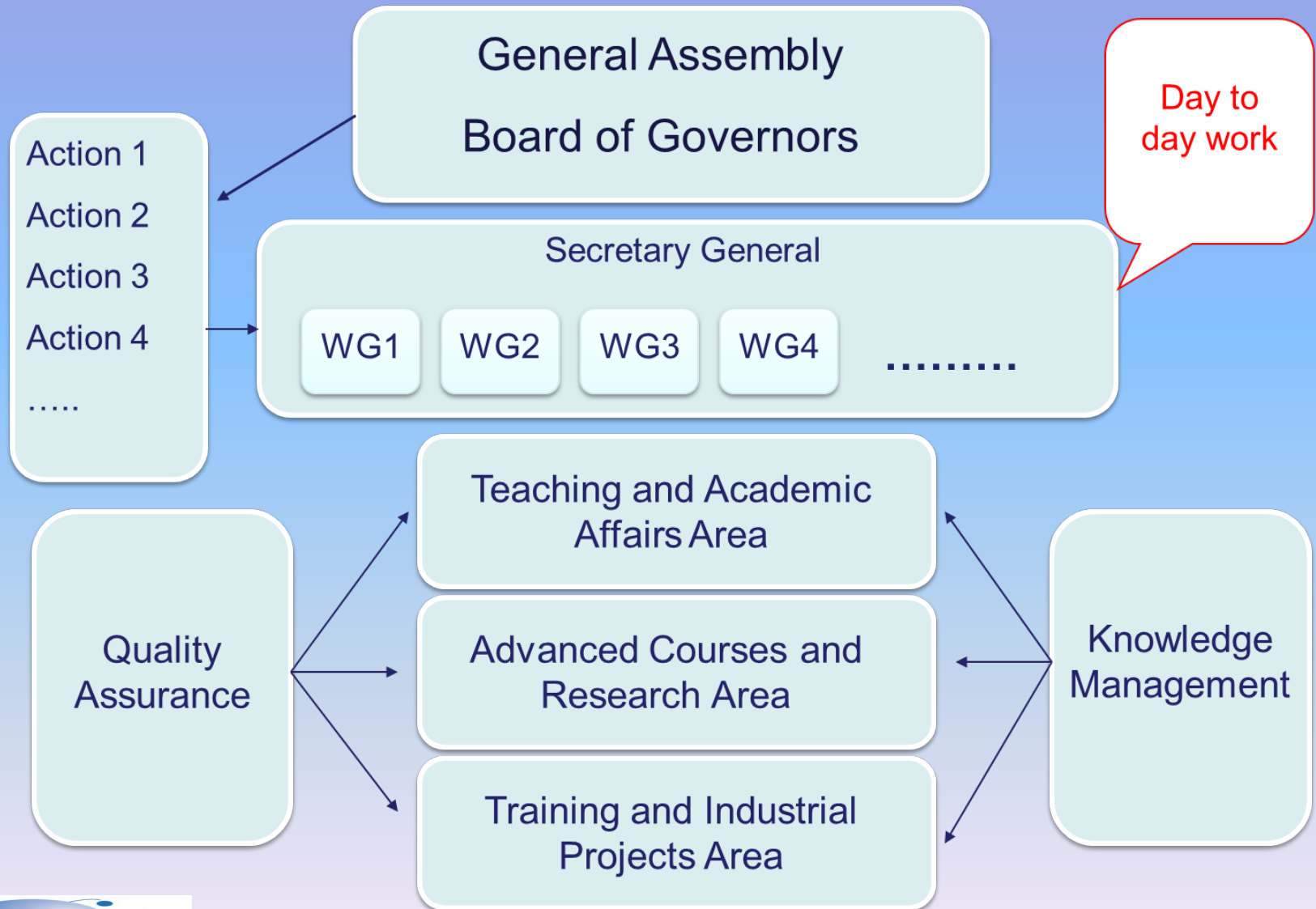
*Its mission is the preservation and further development of expertise
in the nuclear fields by higher education and training through:*

- promotion of networking for education and training in Europe
- favouring borderless mobility of students and teachers
- providing attractiveness for young and motivated students
- leading relevant EU Projects for E&T and R&D among which EFTS
- qualifying itself as a reference institution for the cross-cutting issue of E&T in the nuclear fields: a “bridge” academia ↔ stakeholders

*Involves 49 Universities or University clusters,
8 Research Institutions, 5 Industrial Bodies
and 2 International Agencies or Societies*



ENEN Structure

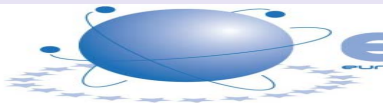


HISTORY and DEVELOPMENT

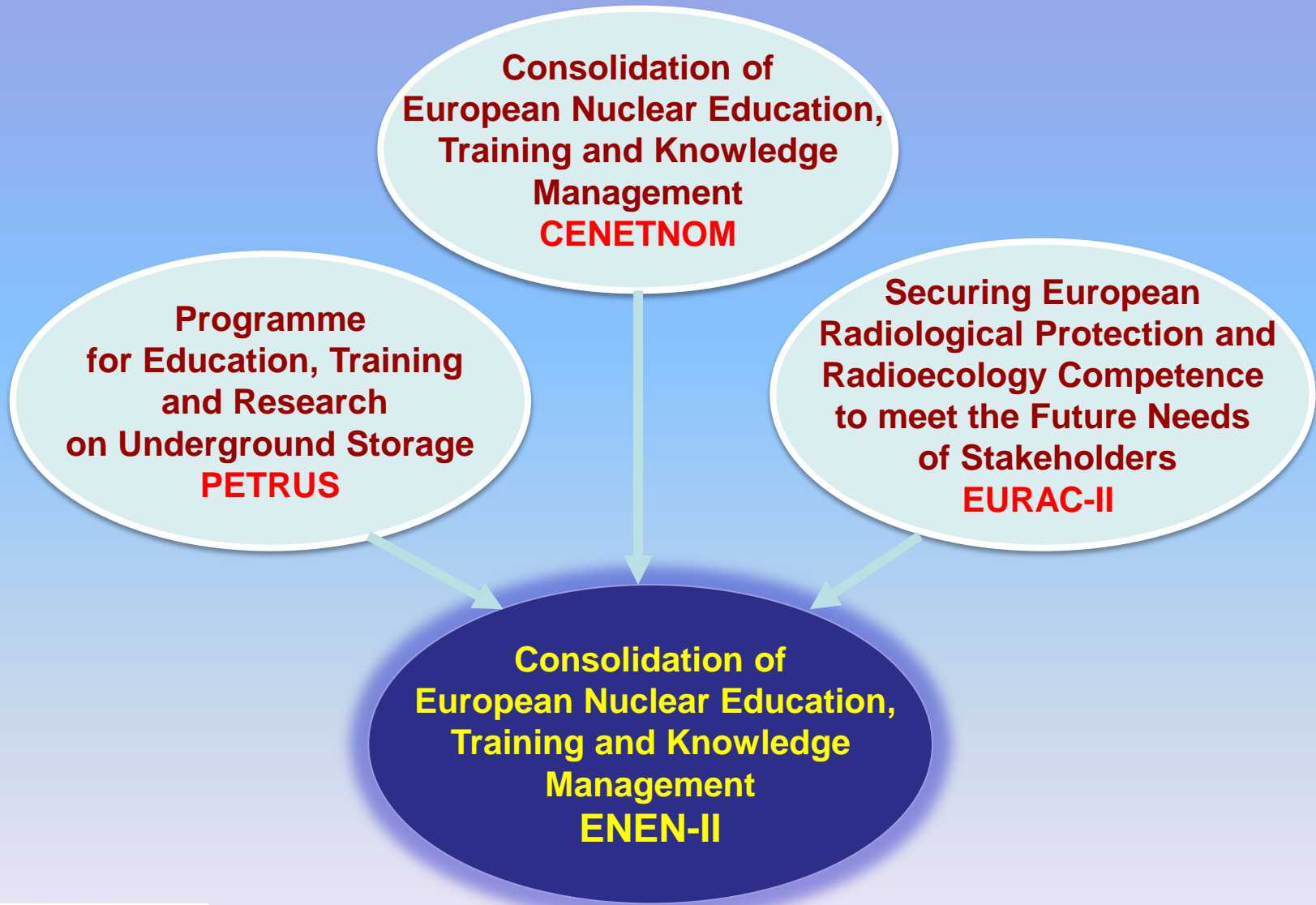
European Commission – EURATOM FP6

NEPTUNO project in Jan. 2004 – June 2006

- 35 partners continued and expanded the ENEN activities started in FP 5
- ENEN established and implemented the **European Master of Science in Nuclear Engineering**
- ENEN expanded its activities from education to training
- ENEN organised and coordinated training sessions and pilot courses
- ENEN expanded its activities to Knowledge Management



ENEN-II project Oct. 2006 – March 2009



6th FP ENEN-II project in 2006-2009

Work packages

- WP1: Integration of the Nuclear E&T and End Users Networks - Networking
- WP2: Development, Harmonization and Consolidation of Academic Nuclear Education.
- WP3: Facilitating and Supporting Research
- WP4: Professional Training Programs
- WP5: Nuclear Knowledge Management

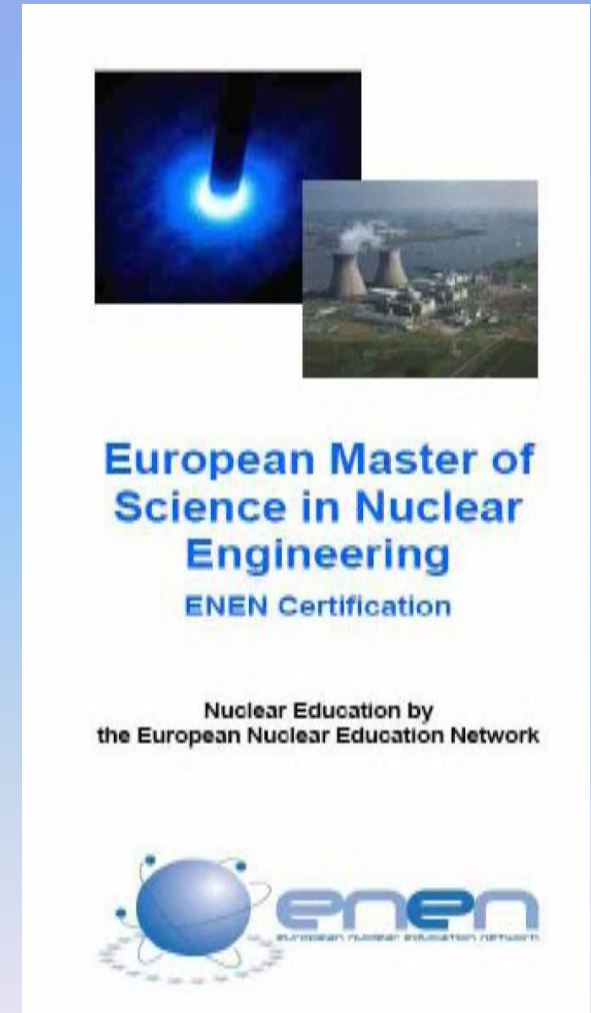


Description of main achievements



Master level : European MSc in Nuclear Engineering

- Established under the European Commission – EURATOM 5th FP **ENEN project** and 6th FP **NEPTUNO project**
- Common reference curricula and mutual recognition among ENEN members
- Promotes and facilitates mobility of students and teachers
- Definition and assessment of ENEN international exchange courses
- Implemented since 2005
- “ENEN Certificate” recognised among ENEN Members



Master level: European MSc in Nuclear Engineering

➤ List of topics

- Reactor engineering
- Reactor physics
- Nuclear thermal hydraulics
- Safety and reliability of nuclear facilities
- Reactor engineering materials
- Radiology and radiation protection
- Nuclear fuel cycle and applied radiochemistry

➤ Requirements

- At least 300 ECTS at university level
- At least 60 ECTS must be “purely nuclear”
- 20 ECTS must be obtained from a “foreign” institution, member of the ENEN Association
- Master thesis



EMSNE Award Ceremony



Students receiving the ENEN EMSNE certificate during the during the 58th General Conference of IAEA in Vienna, September 25th, 2014



Promotion of Activities at ENEN Members

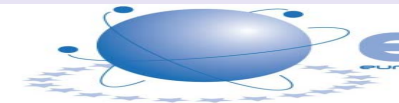
- *New Master in Switzerland*
- *Master of Sciences Nuclear Energy in France*
- *Master in Nuclear Engineering at UPC Barcelona*
- *EMINE Master under KIC InnoEnergy (UPC, KTH, Grenoble, Paris)*
- *PhD Level Courses*
- *Training Courses*



PhD level: Annual ENEN

PhD Event

- One-day event during an international conference
- 12-14 PhD students
- ENEN Prize and Alumni
 - 1st at International Youth Conference on Energetics 2007 in Budapest, Hungary, 1 June 2007
 - 2nd at International Youth Nuclear Congress (IYNC) in Interlaken, Switzerland, 23 September 2008 in collaboration with the EC JRC
 - 3rd at International Youth Conference on Energetics 2009 in Budapest, Hungary, 4-7 June 2009
 - 4th PhD event, ENC 2010, Barcelona June 2nd, 2010
 - 5th PhD event, ICAPP 2011, Nice May 4th, 2011
 - 6th PhD event, Inter. Conf. Nuclear Energy for New Europe in Ljubljana, September 6th, 2012
 - 7th PhD event, 16th Inter. Conf. on Emerging Nuclear Energy Systems (ICENES), in Madrid, Spain, 28-29 May 2013
 - **8th PhD event, 8th International Youth Congress, IYNC2014, Burgos, Spain from 9 – 10 July 2014 .**



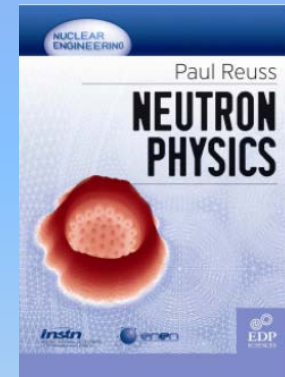
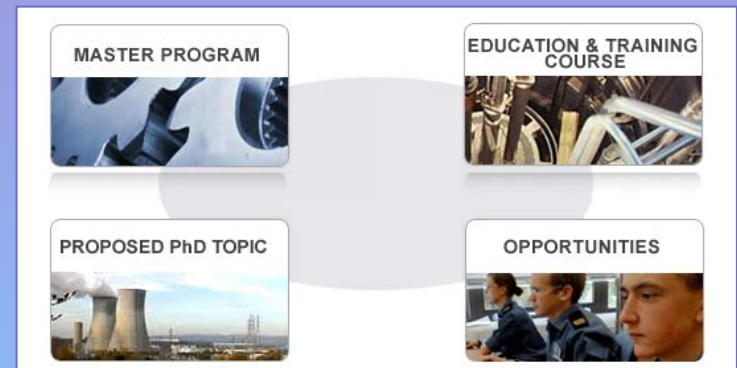
Knowledge Management ENEN publications and Database

Neutron physics

- First text book published under ENEN as a deliverable of ENEN II project.
- 18 chapters, 670 pages including exercises and solutions.
- Mainly for students young professionals and researchers.

Multimedia on Nuclear Reactor Physics

- Promoted and distributed by IAEA to 53 countries.
- About 800 slides.
- 4 languages.
- For education and training.



Ongoing European Projects



FP7 European Fission Training Schemes

Common certificate for professionals at European level

Participation in TRASNUSAFE - Nuclear Safety Culture: addressing mainly the health physics sector (November 2010 - October 2014)

Coordination of ENEN III - Training schemes for Generation III and IV engineers: addressing mainly the nuclear systems suppliers (May 2009 – April 2013) – ***Use of ECVET system***

Participation in ENETRAP II - European Network on E&T in Radiological Protection: addressing mainly the nuclear safety authorities (March 2009 - December 2012)



FP7 European Fission Training Schemes (cont'd)

Participation in PETRUS II and III - Implementing sustainable E&T programmes in the field of Radioactive Waste Disposal: focus on a “Competency-Based Curriculum” (January 2009 – January 2012, August 2013 – July 2016)

Single Beneficiary of NUSHARE – Project for sharing and growing **nuclear safety competence**: focus on 3 target groups (policy makers, nuclear regulatory authorities, industry) (January 2013 – December 2016)
– **TO BE DISCUSSED in the POST-FISA WORKSHOP #2**



Cooperation beyond EU (FP7)

Coordination of ENEN-RU and ENEN RU II - Cooperation with Russia in Nuclear Education, Training and Knowledge Management: focus on the mobility of teachers and students (November 2010 – October 2012) and (2014 – 2016)

Coordination of ECNET - Cooperation with China in Nuclear Education, Training and Knowledge Management: focus on the mobility of teachers and students (November 2010 – October 2012)

Bilateral Cooperation between Industrialised Countries (EACEA)

EUJEP - Project (Japan), now renewed as EUJEP 2

Foster, organize and implement exchanges of European and Japanese Master level students with mutual recognition of credits



Other Projects Involving ENEN

- **FP6 EUROTRANS** Project *EUROpean Research Programme for the TRANSmutation of High Level Nuclear Waste in an Accelerator Driven System* (2005 – 2010)
- **FP7 CORONA** Establishment of Regional Center of Competence for VVER Technology and Nuclear Applications (2011 – 2014)
- **FP7 CINCH-II** - Cooperation in education and training In Nuclear Chemistry: focus on the European master's degree in nuclear and radiochemistry (June 2013 – May 2016)
- **FP7 EUTEMPE-RX** - EUropean Training and Education for Medical Physics Experts in Radiology: (September 2013 – August 2016)
- **FP7 GENTLE** - Graduate and Executive Nuclear Training and Lifelong Education (January 2013 – December 2017)
- **FP7 PELGRIMM**: PELlets versus GRanulates: Irradiation, Manufacturing & Modelling (2012 – 2015)



Acknowledgement by the EU Council (1-2 December 2008)



The Council welcomes the existence within the European Union of coordinated teaching and training leading to qualifications in the nuclear field, provided notably by the **ENEN**. The Council hopes that, with the help of the EU, **ENEN** and its members will continue to develop the coordination of nuclear education and training in Europe.

Signature of Practical Arrangements with IAEA



2009



2013



Hearing at the EU Parliament

On February 12, 2014, ENEN was invited to participate in the hearing on the new nuclear safety directive, at the committee on industry, research and energy (ITRE), in the EU parliament

ENEN defended the support to the Education and Training in the nuclear field as a necessary contribution to assure the Nuclear Safety throughout Europe and beyond, together with the promotion of a healthy Nuclear Safety Culture

ENEN described the NUSHARE Project, as a service to the European citizens, aiming at enhancing and better spreading nuclear safety culture principles, in line with the emphasis on this aspect in the proposed amendments to the new “nuclear safety directive”.

<http://www.enen-assoc.org/en/about/the-10th-birthday-enen1.html>



Beyond the 10th Birthday: future perspectives



The service of ENEN and PETRUS

- ENEN is paying a service to European citizens in performing its missions to maintain and enhance a skilled nuclear workforce
- This service is a “cross-cutting” one that, though initially focused on Nuclear Engineering, is available also for other areas, including geological disposal, waste management and radiation protection
- The PETRUS Consortium is now considering letting ENEN coordinating its activities: this action (WP5 of PETRUS-III) was welcomed by ENEN by enthusiastically joining PETRUS-III
- This positive development is being broadened



The ANNETTE proposal

The *ANNETTE* Proposal has been submitted to the Euratom call under NFRP-10 within September 17th, 2014

It required an effort spent during last spring (for the first ideas) and last summer

The proposal is worth an EC request of 2.5 M€, with a total cost of about 3.2 €

An effort was made in order to involve a large number of participants (27), also owing to the focus on coordination of E&T in the nuclear fields (NS&E, RP, GD) of the first work package



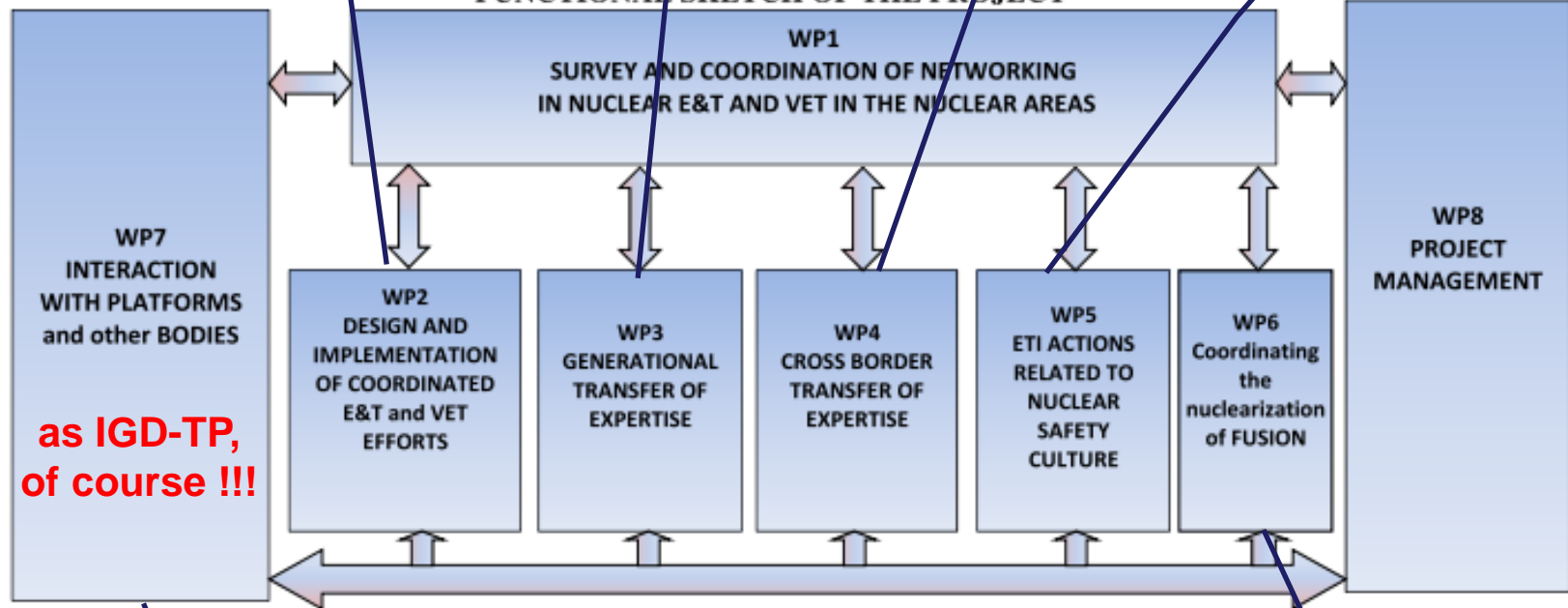
Master and
Summer
School for
CPD

Production
of teaching
material

ECVET
application
in industry

Initiatives for
NSC
enhancement

FUNCTIONAL SKETCH OF THE PROJECT



as IGD-TP,
of course !!!

Contacts with
Platforms,
etc.

FuseNet asked to
join to coordinate
«nuclearization»

THE MOTIVATIONS FOR ANNETTE

The ANNETTE proposal was motivated by contacts with different environments:

“Should we be comparing notes and learning from ENEN or should we be integrating and sharing resources?” MELODI Education and Training Forum 2013, Brussels, 8 October 2013

“The objective is to integrate the PETRUS consortium into the ENEN’s structure in order to ensure the permanent structural management...”
DoW of the ongoing PETRUS-III project (in particular in WP5)

Similar stimuli made ENEN reflect on the need for better harmonisation of actions in nuclear E&T

ANNETTE
Advanced Networking for Nuclear Education and Training
and Transfer of Expertise

Proposed logo:



A POSITIVE DYNAMICS ALREADY STARTED

- Joint E&T actions in NS&E, RP, WM and GD are envisaged
- The idea was proposed to **MELODI** and **IGD-TP**, receiving an early endorsement; **EHRO-N** also supported it and recently we received endorsements from **SNE-TP**, **FORATOM** and **ENS**, the **GENTLE** project, **ESARDA**, together with the **NUGENIA** label
- Colloquia with **IAEA** revealed the large potential for extending this action beyond European borders in due time
- The joining of **FuseNet** testifies for a further need of jointness in managing existing interfaces FUS-FISS



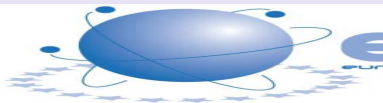
A UNIQUE OCCASION

In summary, whatever the fate of ANNETTE, founded or not, we are in front of a unique occasion:

TO JOIN E&T EFFORTS IN SEVERAL NUCLEAR FIELDS

ENEN is available with its structures, to be possibly renewed and adapted as necessary, to host a broader coordination than possible up to now

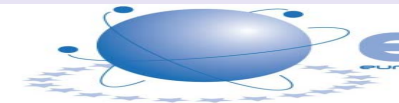
The contacts already had with IGD-TP in the occasion of ANNETTE are very promising in this regard, though a more extended discussion must be made



WHY ENEN CAN BE USEFUL TO IGD-TP AND VICEVERSA

- ENEN has the legal structure of an Association and is the crossroad of multifold experiences in E&T
- The ten years of experience in the E&T field are a result of the broad capabilities of its present Members
- The structuring in working groups provides a flexible pattern for enhancing harmonisation and cooperation
- Broadening the contacts and/or the Membership of ENEN will be beneficial for the Association to strengthen it and diversify its range of experience

A REAL WIN-WIN SITUATION !



So, let's tighten our relations...
Thank you for your attention !

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