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

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

Walter Ambrosini and Pedro Dieguez Porras
President and Secretary General of ENEN
General information on ENEN’s beginning
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
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.)
List of ENEN Members

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

<table>
<thead>
<tr>
<th>ENEN Member</th>
<th>City, Country</th>
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<tr>
<td>Atominstitut der Oesterreichischen Universitaeten</td>
<td>Vienna, Austria</td>
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<td>Katholieke Universiteit Leuven</td>
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Vilnius, 14-16 October 2013
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 Educaiton 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
MEPhI
CICET
TokyoTech
FUKUI
JAEA
KKNU
ONPU

Potchefstroom, South Africa
Moscow, Russia
Obninsk, Russia
Tokyo, Japan
Fukui, Japan
Tokai, Japan
Kharkiv, Ukraine
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
IAEA
UNENE
WNU

Brussels, Belgium
Vienna, Austria
Canada
UK

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


- 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

Consolidation of European Nuclear Education, Training and Knowledge Management
CENETNOM

Programme for Education, Training and Research on Underground Storage PETRUS

Securing European Radiological Protection and Radioecology Competence to meet the Future Needs of Stakeholders EURAC-II

Consolidation of European Nuclear Education, Training and Knowledge Management
ENEN-II
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 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 TRASNUSAPE - 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)

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

- **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)
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 10\textsuperscript{th} 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 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

WP1
SURVEY AND COORDINATION OF NETWORKING IN NUCLEAR E&T AND VET IN THE NUCLEAR AREAS

WP2
DESIGN AND IMPLEMENTATION OF COORDINATED E&T and VET EFFORTS

WP3
GENERATIONAL TRANSFER OF EXPERTISE

WP4
CROSS BORDER TRANSFER OF EXPERTISE

WP5
ETI ACTIONS RELATED TO NUCLEAR SAFETY CULTURE

WP6
Coordinating the nuclearization of FUSION

WP7
INTERACTION WITH PLATFORMS and other BODIES

WP8
PROJECT MANAGEMENT

Contacts with Platforms, etc.

FuseNet asked to join to coordinate «nuclearization»

as IGD-TP, of course !!!
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
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.
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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