The role of ENEN in attracting, developing and retaining nuclear talents

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Overview

ENEN Association
– Motivation for ENEN
– Objectives
– Members and Structure
– Selected Activities and Achievements

Project ENEN+
– Attract, develop and retain new nuclear talents

Summary
MOTIVATION FOR ENEN
Public perception of nuclear energy. In the past!

- respect
- dignity
- power
- cruelty
- exile
- status
Public perception of nuclear energy. Today!?

Caused by weakened or broken links?
(education-training-research-innovation–industry….)

[Handwritten diagram showing the relationships between respect, dignity, power, cruelty, exile, and status.]
Education vs. Training

Education
Why?
Knowledge
Research
Curiosity

Training
How?
Skills
Experience
Need

http://stage-gate.com/newsletter/nl_feb_2012.htm
Nuclear Workforce in EU: Structure

- Nuclear 16%
  - Nuclear-aware 10%
  - Nuclearised 74%
  - 27% Other graduates
  - 35% Engineers
  - 38% Technicians

Education ➔
Training ➔
Nuclear Workforce in EU

![Graph showing the number of nuclear power plants and the number of persons over time.](image)

- **Existing workforce (no replacement of retired)**
- **Number of operating NPP (40 years)**

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CREATION

The European Nuclear Education Network, ENEN Association, is an Association established as an international non-profit association under the French law of 1901, on 22 September 2003, as a result of the “ENEN project” funded by the European Commission.
OBJECTIVES, ENDORSEMENTS
OBJECTIVES

The main objective is the **preservation** and further **development** of expertise in the nuclear fields by higher Education & 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
European Union Council

“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.

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”.

December 1-2, 2008
MEMBERS AND STRUCTURE
ENEN Members in March 2017

70 Members from 25 Countries:
5 Research Centers, 6 Companies, 53 Universities and 6 international institutions
ENEN Members in March 2017

70 Members from 25 Countries:
5 Research Centers, 6 Companies, 53 Universities and 6 international institutions
ENEN Structure

General Assembly
Board of Governors

Secretary General
WG1  WG2  WG3  WG4  ..........  Day to day work

Teaching and Academic Affairs Area
Advanced Courses and Research Area
Training and Industrial Projects Area

Knowledge Management

Quality Assurance

Action 1
Action 2
Action 3
Action 4
......
ENEN Structure

Board of Governors of ENEN for 2017-2018:

**President**
Prof. Leon Cizelj
Prof. Filip Tuomisto

**Vice President**
Prof. Behrooz Bazargan-Sabet
Ms. Veronique Decobert
Prof. Pascal Anzieu
Dr. Michèle Cœck
Dr. John Roberts
Dr. Tzany Kokalova Wheldon
Prof. Joerg Starflinger

**Member of the Board**

Jozef Stefan Institute, Slovenia
Aalto University, Finland
Université de Lorraine
Westinghouse, Belgium
CEA-INSTM, France
SCK-CEN, Belgium
University of Manchester, United Kingdom
University of Birmingham, United Kingdom
Universitaet Stuttgart, Germany

SECRETARIAT

Mr. Pedro Dieguez Porras  
Mr. Thierry Desaleux

Secretary General  
Treasurer

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ENEN Communities 2017

Main Challenges:

Complexity of Nuclear

Ballanced cooperation and competition

- Nuclear engineering (ENEN)
- Radiation protection (ENETRAP)
- Geological disposal of radioactive waste (PETRUS)
- Nuclear security (ANNETTE)
- Fusion Engineering (ANNETTE)
- VVER community (CORONA)
- Medical Physics (ENEN+)
- Decommissioning (ELINDER)
- Gen IV Task force on Education and Training
- EERA JPNM Task force on Education and Training
SELECTED ACTIVITIES AND ACHIEVEMENTS
EMSNE Certification

European Master of Science in Nuclear Engineering (EMSNE)
European Nuclear Education Network
September 2014 – Present

PhD Event & Prize
Competitive and friendly presentation of research in Nuclear fields.
12 Finalists, of which 3 winners

Signature of Practical Arrangements with IAEA

2009
2013
2016

Networking
Education
Training
Knowledge Management

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Master level: European MSc in Nuclear Engineering

- Established under the European Commission since 2005
- Quality and international mobility at international level
- Common reference curricula and mutual recognition among ENEN members
- Promotes and facilitates mobility of students and teachers

Certifications

European Master of Science in Nuclear Engineering (EMSNE)
European Nuclear Education Network
September 2014 – Present
Master level : European MSc in Nuclear Engineering

• Requirements
  – At least 5 years university education (3+2, 4+1, or 5).
  – Master thesis
  – At least 60 ECTS (=entire academic year!) must be “purely nuclear”
  – 20 ECTS must be obtained from a “foreign” institution, member of the ENEN Association

• List of topics considered “purely nuclear”:
  – 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
EMSNE Certification

Since 2006 > 200 European M Sc in Nuclear Engineering

EMSNE 2016 ceremony held during the 60th IAEA General Conference in Vienna, Austria, on 29 September 2016.

Activities underway towards the European M Sc also in other nuclear topics!

(communities of ENEN)
European Master in Innovation in Nuclear Energy (EMINE)

• In the frame work of the European Institute of Technology – KIC InnoEnergy.
• Duration: 120 ECTS, two years.
• Language: English
• Mobility track:
  – First year: at UPC (Barcelona, Spain) or KTH (Stockholm, Sweden)
  – Second year: at Grenoble INP (Grenoble, France) or Paris (France)
• 30 Scholarships / year
PhD level: Annual ENEN PhD Event & Prize

- One-day event during an international conference
- 12 PhD students for 3 ENEN Prizes of 1,000€
- Hosted at:
  - 2nd at IYNC in Interlaken, Switzerland, 2008.
  - 3rd at International Youth Conference on Energetics 2009 in Budapest, Hungary, 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, 2012
  - 7th PhD event, Int. Conf. on Emerging Nuclear Energy Syst. (ICENES), in Madrid, 2013.
  - 9th ENEN PhD Event & Prize took place in the framework of the International Congress on Advances in Nuclear Power Plants, ICAPP2015, in Nice, France, 5-6 May 2015
  - 10th PHD event, European Nuclear Conference 2016, Warsaw, Poland, 9-13 October 2016
Signature of Practical Arrangements with IAEA

- “Promoting nuclear knowledge management, human resources development and capacity building in Europe through regional networking
- Sharing information and material in Europe between the IAEA and ENEN for the benefit of students and professionals
- Exploring opportunities to participate jointly in activities such as meetings, symposia, workshops
- Exploring opportunities for developing and sharing joint publications and material including e-learning contents”
- And others ...

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Signature of Cooperation Agreement with other IAEA’s regional networks  AFRA-NEST, ANENT and LANENT

Signed in September 2013
To be renewed in 2017
HIGHLIGHTS ON CURRENT PROJECTS
• OBJECTIVE: to develop and implement Education, Training and Information programmes strengthening competences required for achieving excellence in Nuclear Safety Culture.

• Project proposed by:
  – Commissioner for Research and Innovation
  – Commissioner for Energy
  ...after the Great East Japan Earthquake and Tsunami in

From January 2013 to June 2017!
Single Beneficiary of NUSHARE

Target Group 1
Policy decision makers & opinion leaders

Target Group 2
Nuclear Regulatory Authorities & TSOs

Target Group 3
Electric utilities, suppliers, & providers of Nuclear services
ANNETTE

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

- 4 years action
- Started in February 2016
- 25 partners
- EC Contribution 2.5MEuros
- Partners’s contribution: 0.7 MEuros

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CORONA II

• Development of a state-of-the-art regional training network for VVER competence (CORONA Academy)

• Supporting transnational mobility and lifelong learning amongst VVER operating countries
EC projects beyond EU

• Coordination of **ENEN-RU II project** - Cooperation with Russian Federation in Nuclear Education, Training and Knowledge Management: focus on the mobility of teachers and students (July 2014 – July 2017)

• Coordination of **EUJEP-2 project** (Japan) - Foster, organize and implement exchanges of European and Japanese Master level students with mutual recognition of credits (October 2014 – October 2017)
PROJECT ENEN+

ATTRACT, DEVELOP AND RETAIN NEW NUCLEAR TALENTS
Motivation for ENEN+ project

Remarkable results obtained since the launch of the European Fission Training Scheme (EFTS) initiatives in early 2000s.

It is recognized that the enrolment of students to nuclear disciplines has not yet reached the desired level.

ENEN+ proposes activities to substantially contribute to the revival of the interest of young generations in the careers in nuclear sector.
ENEN+ Objectives

• **Attract** new talents to careers in nuclear.
• **Develop** the attracted talents beyond academic curricula.
• Increase the **retention** of attracted talents in nuclear careers.
• **Involve** the nuclear stakeholders within EU and beyond.
• **Sustain** the revived interest for nuclear careers.

The ENEN+ focuses on the learners and careers in:
• Nuclear reactor engineering and safety,
• Waste management and geological disposal,
• Radiation protection and
• Medical applications.
ENEN+ Structure

WP 1: Attract secondary school pupils
WP 2: Increase attraction and retention (BSc, MSc)
WP 3: Attract and develop graduates (nuclearization)
WP 4: Develop beyond academic curricula (PhD, postdoc, life long)
WP 5: Consolidate and further develop EFTS
WP 6: Involve of stakeholders in EU and beyond
WP 7: Manage

Nuclear Engineering and Safety
Waste Management and Geological Disposal
Radiation Protection
Medical Applications
Expected Key Contributions of ENEN+

• Attractive e-materials on nuclear profession
• EU wide competition for high school pupils
• Support for learners in all career phases:
  – Career guidance
  – Support for mobility (funding & access)
• Voluntary accreditation (ECTS, ECVET≈SAT)
• Sustainable mobility fund
• Improved communication with industry and decision makers
• EU wide nuclear Education, Training and Knowledge Management strategy

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ENEN+: Partners

ENEN (EU, F)
Uni Lorraine (F)
AALTO (SF)
SCK•CEN (B)
UNED (ES)
CVR (CZ)
JSI (SI)
UPM (ES)
CIRTEN (I)
Uni Ljubljana (SI)
Tecnatom (ES)

Politech Bucarest (RO)
JRC (EC)
EM Nantes (F)
CEA/INSTN (F)
FORATOM (EU, B)
ENS (EU, B)
Westinghouse (UK)
EFOMP (EU, B)
EDF (F)
NUGENIA (EU/B)
ENEN+: Budget

Total costs: \(~3.2\) €  EC Contribution: 2.9 M€

Start October 1, 2017
SUMMARY
Summary

Nuclear energy should strive for the use of the best available people, science, knowledge, technologies and operational experience.

➡ Specialists in multidisciplinary and multicultural environment.
➡ Balanced approach to education and training & cooperation between stakeholders and nuclear fields (Mobility, Career guidance).
Thank you for your attention

www.enen-assoc.org

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PORTFOLIO OF CURRENT E&T PROJECTS

• ENEN PLUS: Coordinator: ENEN.
  • ENEN’s budget: 314,156 €. Project budget: 2,986,188 €
  • Grants’ budget: ~1,000,000 €.

• ANNETTE: Coordinator: ENEN.
  • ENEN’s budget: 192,000 €. Project budget: 2,517,399 €

• NUSHARE: Coordinator: ENEN.
  • ENEN’s budget: 200,000 €. Project budget: 994,460 €

• ENEN-RU II: Coordinator: ENEN.
  • ENEN’s budget: 171,000 €. Project budget: 530,000 €

• EUJEP-2: Coordinator: ENEN.
  • Project budget: ~180,000 €

• MEET CINCH: Coordinator: LEIBNIZ UNIVERSITÄT HANNOVER.
  • ENEN’s budget: 151,250 €. Project budget: 2,110,051 €

• CORONA II: Coordinator Kozloduy NPP
  • ENEN’s budget: 96,952 €. Project budget: 1,017,605 €
OTHER PROJECTS INVOLVING ENEN

• PETRUS III - Implementing sustainable E&T programmes in the field of radioactive Waste Disposal (2013 – 2016)
• FP7 GENTLE - Graduate and Executive Nuclear Training and Lifelong Education (2013 – 2016)
• FP7 CINCH-II - Cooperation in education and training In Nuclear Chemistry: focus on the European master's degree in nuclear and radiochemistry (2013 – 2016)
• FP7 EUTEMPE-RX - EUropean Training and Education for Medical Physics Experts in Radiology: (2013 – 2016)
• FP7 CORONA Establishment of Regional Center of Competence for VVER Technology and Nuclear Applications (2011 – 2014)
• ENEN III - Training schemes for Generation III and IV engineers. (2009 – 2013) – Use of ECVET system
• ENETRAP II - European Network on E&T in Radiological Protection: addressing mainly the nuclear safety authorities (2009 - 2012)