NUCLEAR EDUCATION NETWORKS AND PROGRAMMES IN EUROPE

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Threat in terms of nuclear skills, education and training:

- Turbulent public opinion on nuclear energy, fuelled by both so called environmental organizations, as well as by incompetent analyses of the major nuclear accidents.
- High cost of new nuclear installations, further escalated by increasing demands for nuclear safety and security.
- Political and economical support to renewable sources of power without real analysis of impact and costs.
- Effort of some politicians and political parties to attract votes by antinuclear rhetoric.
- Retirement of the strong “nuclear generation“ from 50’s and 60’s of the last century.
However, serious analyses of needs cannot fully exclude nuclear power in favour of gas and renewables. And, moreover, education and training in nuclear sciences and competences should include also further themes in addition to nuclear power, e.g.:

- Measurement and dosimetry of ionising radiation
- Radiation protection and safety
- Radiation in environment and cosmic radiation
- Application of radiation in radiotherapy, radiodiagnostic and nuclear medicine
- Application of radiation in industry and in research
- Construction, operation and safety of various nuclear installations (particle accelerators, large radiation sources, etc.)
Effort in Europe to maintain and strengthen the quality of education in the nuclear area:

If you look on “nuclear education Europe” in Google, you find approximately 64 000 000 results. However, what is relevant from the point of view of international collaboration and what is actually relevant at all?

- EU programmes, especially Euratom, but also activities of the Joint Research Centre and DG Energy.
- European Nuclear Education Network (ENEN)
- Other networks of educational and scientific institutions (including CHERNE).
- The European Nuclear Society’s Education and Training Platform.
- IAEA activities in nuclear education and training.
- National activities in nuclear education and training.
Euratom broad outlines of the Work Programme 2018

Availability and use of research infrastructures for education, training and competence building
Type of action: CSA (Coordination and Support Action)

Rationale:
Action in accordance with Articles 3.2.c, and 3.2.h of the Regulation on the Euratom Research and Training Programme (2014-2018):

• "supporting the development and sustainability of nuclear expertise and excellence in the Union";
• "ensuring availability and use of research infrastructures of pan-European relevance".

Key issues:
• Develop and deploy human resources and mobility, student research experiences, intersemester courses for graduate and post graduate students, scientists and technicians.
• Availability and use of research and training infrastructures.

Expected impact:
• Strengthen mobility of young scientists, researchers and experts.
• Promote mobility and facilitate the use of research infrastructures for education, training and competence building in the nuclear domain.
• Optimise development and use of existing and future nuclear research and training infrastructures.
The European Nuclear Education Network, ENEN
(http://www.enen-assoc.org)

- a non profit international organization established on 22 September 2003 under the French Law of 1901.
- The mission of ENEN is the preservation and the further development of expertise in the nuclear fields by higher education and training.
- 53 European institutions are members of ENEN with voting rights at the General Assembly.
- 6 institutions from outside Europe are considered ENEN Member, without voting rights at the General Assembly.
- 7 international institutions are considered ENEN Member, without voting rights at the General Assembly.
The general objectives of the ENEN Association are defined as follows:

With respect to the Academia:

• to develop a more harmonized approach for education in the nuclear sciences and nuclear engineering in Europe;
• to integrate European education and training in nuclear safety and radiation protection; and
• to achieve better co-operation and sharing of academic resources and capabilities at the national and international level.

With respect to the End Users, such as nuclear industries, research centers, regulatory bodies and nuclear applications:

• to create a secure basis of skills and knowledge of value to the EU;
• to maintain an adequate supply of qualified human resources for design, construction, operation and maintenance of nuclear infrastructures, industries and power plants; and
• to maintain the necessary competence and expertise for the continued safe use of nuclear energy and applications of radiation and nuclear techniques in agriculture, industry and medicine.
The Members are public or private corporate bodies meeting the following criteria:
- universities
- research organisations,
- regulatory bodies
- nuclear industry, and
- any other organisations involved in the application of nuclear science and ionising radiation.

who:
- provide academic or professional education and training in the application of nuclear science and ionising radiation, and/or commit themselves to support the ENEN Association,
- have a firmly established tradition of relations with some of the members in the fields of education, research and training, and
- are based in the European Union or in one of its associated or candidate member countries.

The income of the ENEN Association is made up of:
1. Contributions by the Members. The amount shall be determined every year by a resolution of the General Assembly.
2. Grants.

The non-payment of the contribution fee for two consecutive years shall be considered equivalent to resignation and the defaulting Member shall be automatically excluded by the Board of Governors, after a last written reminder requesting payment has not been followed by a payment.
The membership fee structure approved by the General Assembly of ENEN in 2017 is:

Membership fee of 1.000 EUR:
- Universities,
- Small and Micro enterprises (less than 50 employees and less than 10 MEUR turnover),
- Small research centers and public nonprofit institutions (less than 250 employees and less than 50 MEUR turnover).

Membership fee of 3.000 EUR:
- Medium enterprises (less than 250 employees and less than 50 MEUR turnover),
- Research centers and public non-profit institutions (above 250 employees and 50 MEUR turnover).

Membership fee of 5.000 EUR:
- Industry, enterprises (above 250 employees and 50 MEUR turnover).
The European Master of Science in Nuclear Engineering (EMSNE) is a Certificate delivered by the European Nuclear Education Network Association, with the endorsement of all its members, in order to certify the highest quality standards of Nuclear Engineering Education and the European dimension pursued achieved by the EMSNE laureate (application fee 100 EUR).

Summary of the requirements:
- At least 5 years university education (3+2, 4+1, or 5).
- At least 60 ECTS must be “purely nuclear”
- 20 ECTS must be obtained from a “foreign” (different country) institution, member of the ENEN Association
- Master thesis

List of topics “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 …
The ENEN PhD Event & Prize is an action to support the Research and Science in the nuclear fields promoting the works of the young scientists and researchers who start their career finishing their PhD. It takes place on a yearly basis.

The ENEN PhD Event consists of up to 12 PhD presentations nominated by ENEN Members and selected by the ENEN PhD Prize Jury. The participants will make a presentation of their research work for 25 minutes followed by 5 minutes questions and discussion.

For the 3 ENEN PhD prizes ENEN Association will grant 1000 EUR to the winners to cover the expenses to attend an international conference and present the result of research work (upon receipt of justification documents such as conference fee, travel, accommodation and meals).

For the 12 finalists PhD researchers the ENEN Association will support travel expenses with a lump sum of 650 EUR, as well as registration fee of the conference where the event will be hosted.

The ENEN PhD Prize is awarded to the best three presentations.

Applicants should be either
- PhD students studying or working at the ENEN Members in any nuclear field, or
- those who completed their PhD studies at an ENEN Member after the application deadline of the previous ENEN PhD Event.
CENEN – Czech Nuclear Education Network

- A voluntary academic association, whose principal activity is to provide high-quality and sustainable education in the field of nuclear engineering by the effective cooperation of universities and commercial partners.

- The transfer of information between students and academic staff is being improved by organizing workshops, seminars and discussions with experts from the Czech Republic and abroad.

- Foreign cooperation is being extended thanks to the inclusion of ENEN, the European Nuclear Education Network, and cooperation with WNU – the World Nuclear University.

- The CENEN association was founded on 3rd May 2005, and since then the membership has grown to 17 members from academic institutions, with 4 associated commercial partners.

- More details including the equipment of laboratories of members:
  - [http://www.cenen-net.eu/sites/default/files/laboratore_small_en_0.pdf](http://www.cenen-net.eu/sites/default/files/laboratore_small_en_0.pdf)
BNEN, the Belgian Nuclear Higher Education Network
(http://bnen.sckcen.be)

- BNEN organises a one-year (60 ECTS) master-after-master programme in nuclear engineering.

- BNEN is organised through a consortium of six Belgian universities and the Belgian Nuclear Research Centre, SCK•CEN.

- The primary objective of the BNEN programme is to educate young engineers in nuclear engineering and its applications and to develop and maintain high-level nuclear competences in Belgium and abroad.

- BNEN catalyses networking between academia, research centres, industry and other nuclear stakeholders.

- All teaching activities take place at SCK•CEN. Courses are organised in English and in a modular way; teaching in blocks of one to three weeks for each module allows optimal time management for students and lecturers, facilitates registration for individual modules, and allows easy access for international students.
The European Nuclear Society’s Education and Training Platform

http://www.euronuclear.org/1-education-training/index.htm

• The exchange of experience and expertise, the sharing of capabilities and resources and networking between stakeholders, is crucial for the development of an efficient education and training offer that is geared to providing the highly-skilled workforce that a dynamic and fast-evolving sector demands.

• With that in mind, the European Nuclear Society (ENS) has established the Education and Training (E&T) Platform. It provides an overview of available university courses, as well as the training and education programmes offered by industry and other institutions. The E&T Platform places special emphasis on collaboration between stakeholders, on the sharing of available infrastructure and resources and on the promotion of existing networks.

• The Platform is closely linked to ENS’ bi-annual conference on Education and Training, NESTet, and will continue to evolve thanks to the input it receives from the conference. Another significant contribution to the Platform is made by ENS’ members in 23 countries and by its 60-strong corporate membership.

• ENEN Database on 1. Education and Training courses, 2. Master Programmes, 3. Proposed PhD Topics, 4. Opportunities (Scholarship, Postdocs, Internship, Job opportunities) - . The information of the database is provided by ENEN Members and partners (not really complete).

If you are interested in adding data from your organisation, contact: sec.enen@cea.fr
The establishment of sustainable education and training programmes is fundamental for the safe, secure and efficient development of the nuclear field. The IAEA offers a wide spectrum of activities in support of education, training, human resource development and capacity building:

- interregional, regional and national training courses and workshops;
- assist visits and review services; mentoring programmes;
- networks of managers and specialists for sharing good practices;
- publications that accumulate best international practices;
- supply of training materials and training tools; and
- internship programmes for the younger generations.

They cover such diverse areas as nuclear safety, radiation protection, human resource management, sustainable energy development, emergency preparedness and response, and technical cooperation.
Thank you for your attention.