



Notes for the Hearing of ENEN at the

Committee on Industry, Research and Energy (ITRE)

Brussels, 12 February 2014

The ENEN Association

The European Nuclear Education Network (ENEN) 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.**

In 2013, the Association celebrated its 10th Birthday, after a decade of continuous achievements:

- in the promotion of networking for education and training in European Countries;
- in favouring borderless mobility of students and teachers;
- in providing attractiveness for young and motivated students to undertake careers in the nuclear field by different initiatives (e.g., the several student exchanges for courses and MSc thesis works, the European Master of Science in Nuclear Engineering certification and the yearly PhD events);
- in leading or taking part in relevant EU Projects for E&T and R&D among which Euratom Fission Training Schemes (e.g., ENEN, ENEN-II, NEPTUNO, ENETRAP-II, ENEN-III, EUJEP, ECNET, CINCH, GENTLE, CORONA, PETRUS-II, PELGRIMM, ENEN-RU, TRASNUSAFE, NUSHARE); TRASNUSAFE aims at designing and validating two training schemes on nuclear safety culture, one for managers of the industrial sector, the other for managers of the medical sector;
- in qualifying itself as a reference institution for the cross-cutting issue of education and training in the nuclear field in front of relevant technological platforms (e.g., SNE-TP, IGD-TP and MELODI).

In 2008, the existence of the Association was recognised by the EU Council with words that are for ENEN Members a further stimulus to accomplish its missions as a service to European citizens:

"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. The Council insists that the appropriate conditions must be created for mutual recognition of nuclear professional qualifications throughout the European Union. The Council encourages the Member States and the Commission to establish a "review of professional qualifications and skills" in the nuclear field for the European Union, which would give an overall picture of the current situation and enable appropriate solutions to be identified and implemented." (EU Council, December 1-2, 2008)

Today, the Association consists of 64 Members or partners through MoUs, including 49 Universities or University clusters, 8 Research Institutions, 5 Industrial Bodies and 2 International Agencies or Societies.



Present Needs for Education and Training in the Nuclear Fields in Europe

A recent report by the European Human Resources Observatory - Nuclear (EHRO-N)¹ states that:

“The supply of nuclear engineering students and students having had a nuclear energy-related subject in their studies (between 1800 and 2800 in the EU-27 graduated in 2009) cover some 45%-70% of the demand for nuclear experts by the nuclear energy sector in the EU-27 (on average 4000 per year by 2020). This is true if one assumes that all the relevant graduates mentioned are looking for an employment in the nuclear energy sector. A worrying observation is that by 2020 nearly 50% of nuclear experts employed today will retire (the retirement rate for other engineers is much lower).”

Admittedly the report was mainly based on data related to the pre-Fukushima period. It must be recognised that the volatility or the clear adversity of policies in relation to nuclear energy being presently enforced in several Countries of the European Union are worsening the picture of this already unsatisfactory situation, causing lower attractiveness of nuclear careers and creating considerable difficulties to maintain expertise in the field of education and training for nuclear matters. In this situation, Europe is facing the risk to see its competitiveness in the nuclear field decrease in front of non-European Countries seriously engaged in developing carbon-free energy sources. This must be considered remembering that nuclear energy accounts at the moment for about 28% of the electricity production in Europe.

In relation to nuclear safety, it must also be pointed out with clarity that the volatility of energy policies has a deleterious impact on the capability to keep competences in the field of education and training, undermining the systematic process that can nurture a healthy nuclear safety culture in the future workforce. While nuclear safety culture is mainly deployed at an industrial level, being **“defined as the core values and behaviours resulting from a collective commitment by leaders and individuals to emphasize safety over competing goals to ensure protection of people and the environment”**², education starting from University desks is necessary to instil the basic concepts about safety, in order to guide the future professionals in their whole career.

Considering the interconnection of the electrical grids in Europe, making production and consumption of energy a transnational issue, also in view of the potential borderless impact of nuclear accidents and of the present objective of borderless mobility for E&T and employment, it is reasonable to conceive the promotion of education, training and research in the nuclear field as an inescapable cross-border commitment not to be discontinued in any European Country, no matter its sovereign decisions in relation to their energy mix. The need to manage radioactive wastes produced from non-power applications in every Country makes this promotional attitude

¹ V. Simonovska, U. von Estorff, Putting into Perspective the Supply of and Demand for Nuclear Experts by 2020 within the EU-27 Nuclear Energy Sector, European Commission, JRC Scientific and Policy Reports, 2012.

² INPO, Traits of a Healthy Nuclear Safety Culture, INPO 12-012, Revision 1, April 2013



towards nuclear studies (e.g., related to safety, radiation protection and geological disposal) an even more obvious need.

Moreover, discontinuing education in the nuclear field, when it occurs, represents an enormous waste of resources and a serious limitation to competitiveness in the periods in which manpower is suddenly requested to build new plants or design the future ones. As a feature common to the whole energy sector, in the nuclear field long-sighted and stable decisions must be taken and kept for a sufficient time (in the order of many decades) to let the complex processes assuring human resources take place and reach maturity: sudden energy policy changes are certainly the enemy of any serious activity, including education. Indeed, a healthy **nuclear safety culture** needs a basic awareness of the nuclear processes and of the way in which nuclear technology can be deployed, putting safety at the first place in the list of the important goals to be achieved. This is a basic motivation to remind to all national authorities that supporting education and training in the nuclear field is necessary to assure nuclear safety throughout Europe and beyond.

Nuclear Safety Culture

Another interesting definition of this concept is: ***“Safety Culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance”***³.

Despite the slightly different definitions of the concept of nuclear safety culture that can be found in documents that introduced and developed it, it is anyway recognised that ***“Nuclear safety is a collective responsibility. The concept of nuclear safety culture applies to every employee in the nuclear organization, from the board of directors to the individual contributor. No one in the organization is exempt from the obligation to ensure safety first.”***⁴ The same reference from which this sentence is drawn suggests that the “traits of a healthy safety culture” can be subdivided into different categories:

- **Individual Commitment to Safety** (Personal Accountability, Questioning Attitude, Effective Safety Communication)
- **Management Commitment to Safety** (Leadership Safety Values and Actions, Decision-Making, Respectful Work Environment)
- **Management Systems** (Continuous Learning, Problem Identification and Resolution, Environment for Raising Concerns, Work Processes)

Examining in detail all these requirements, **it is clear that professionals at any level and even a wider community of stakeholders in nuclear safety, need appropriate education, training and**

³ SAFETY CULTURE, A report by the International Nuclear Safety Advisory Group, SAFETY SERIES No. 75-INSAG-4, INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, 1991 and also KEY PRACTICAL ISSUES IN STRENGTHENING SAFETY CULTURE, INSAG-15, INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, 2002

⁴ INPO, Traits of a Healthy Nuclear Safety Culture, INPO 12-012, Revision 1, April 2013



information to acquire the knowledge, skills and personal attitudes that are needed to behave according to this paradigm, useful also for other technologies: nothing concerning safety should be left to improvisation.

The NUSHARE Project

The NUSHARE project (Project for Sharing & Growing Nuclear Safety Culture Competence) originated as a Euratom Education, Training and Information (ETI) initiative proposed by the Cabinets of Commissioner Mrs. Máire Geoghegan Quinn (Research and Innovation) and Commissioner Mr. Günther Oettinger (Energy) after the Great East Japan Earthquake on 11 March 2011. This initiative is in collaboration with DG ENER and DG JRC as well as DG EAC and DG DEVCO. It is a "Support action" of 4 years duration, launched under the modified Euratom work programme 2012 (adopted on 25 June 2012) through a "grant to named beneficiary" (i.e., the ENEN Association) and started early in 2013.

The objective of NUSHARE is to develop and implement Education, Training and Information (ETI) programmes aimed at strengthening nuclear safety culture in the nuclear sector and at sharing relevant best practices at the European level. Special attention is paid to safety culture competences in nuclear power plants and other nuclear installations, but other nuclear activities and security culture aspects will also be treated.

Three target Groups are considered for these training schemes:

- **Target Group 1:** Policy decision makers and opinion leaders at the level of national or regional governments, parliaments, international organisations (including EC), scientific communities (including relevant medical specialists) involved in crisis management as well as journalists and other opinion leaders;
- **Target Group 2:** Nuclear Regulatory Authorities and Technical Safety Organisations at the level of staff members of those organisations;
- **Target Group 3:** Electric utilities and systems suppliers at the level of responsible personnel, in particular managers, of organizations operating nuclear facilities (electric utilities) and of suppliers of such facilities (vendors, engineering companies).

The Project is structured into two phases:

1. **First phase:** estimated duration: 16 months / Development of concepts and basic programmes (NUSHARE ETI Catalogue and Action Programme)

In this first phase, the project will:

- establish the status of existing ETI programmes in EU member states which may contribute to achieve the NUSHARE objectives;



- identify those priorities for possible new actions under the NUSHARE umbrella which are expected to provide most added value compared to the current status, taking the available financial resources of the project into account.

This phase will include important events, as:

- the **Stakeholders' Meeting** (Brussels, March 13-14, 2014), aimed to inform a wider community of experts about NUSHARE objectives and NUSHARE programmes under development and to elicit: a) views on the needs of the target groups, b) expressions of interest in closer links to NUSHARE for the further definition and the implementation of these programmes, c) potential contributions to their further (EU wide) dissemination during the following years of the project;
- a **Special Event**, to be organized after completion of the 1st phase of the project with the aim of informing the public and the media about the NUSHARE programmes and the accompanying Action Programme (i.e. the planned implementation).

During the latter event, the first official version of the “NUSHARE Catalogue” of ETI Programmes will be presented. The event shall be organized with the participation of high-level representatives at both national and EU levels. Its preparation will include a campaign to raise the awareness of media with respect to the subject.

2. Second phase: estimated duration up to 3 years / Execution of the proposed action program, including pilot courses and actual courses delivery.

Final Considerations and Recommendations

- Thanks to the continuing support of the European Commission, ENEN has become a resource at the service of European citizens to preserve and enhance E&T in the nuclear field.
- The worries motivating the creation of ENEN, e.g., the threat to the competitiveness of the European Union in the nuclear energy field, are still justified and suggest a renewed commitment in the post-Fukushima era.
- The existence in EU of around 140 nuclear power plants, the production of the 28% of electricity by the nuclear energy source, the construction of new nuclear power plants going on in a number of EU Countries, the future needs for decommissioning and replacement of operating units with new designs and the need to treat and dispose of radioactive wastes from power and non-power applications of nuclear energy represent strong motivations to ask to all the European Countries not to discontinue but to enhance education and training efforts in the nuclear field, no matter the specific energy mix chosen by each Country in its sovereignty (e.g., in the amended Article 7 of the Directive 2009/71/EURATOM).



- In view of keeping an adequate level of nuclear safety culture, the above provision must be considered essential, owing to the long time and the huge resources needed to accumulate and deploy adequate competences in such a high level technology field.
- Efforts like the one of ENEN to harmonise and obtain mutual recognition of competences acquired in the nuclear field should be accompanied by provisions to overcome the regulatory barriers that make difficult the cross-border mobility of experts and technicians.
- Similarly, specific means should be established to ease and support the mobility of students and trainees in the nuclear fields, to take profit of the local infrastructures and teaching traditions at different institutions. Classical exchange schemes (e.g., the ERASMUS and the Leonardo da Vinci ones) could be not sufficient for this purpose and new schemes could be considered.
- The stability of policies at least at EU level is necessary to develop harmonised education and training schemes; ENEN, offering its service to EU, trusts in this stability of policy that made the Association grow and perform its missions in the last decade.
- The NUSHARE Project, as a service to the European citizens, aims at enhancing and better spreading nuclear safety culture principles, in line with the emphasis on this aspect in the proposed amendments to the “nuclear safety directive”. ENEN accepted to undertake this highly visible and critical endeavour in view of the benefits that it will bring to the safe development of nuclear energy in Europe.

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