

Position Paper

Maintaining Nuclear Competence within the EU

ENS Higher Scientific Council Statement

The ENS Higher Scientific Council (HSC) is concerned about the current negative developments within some Member States of the EU and the consequential reduced perspectives in the field of nuclear energy technology, education, research and development. The HSC believes that the use of nuclear energy provides an essential contribution to the secure, clean and affordable energy supply for electricity generation, and that this will remain for at least the rest of this century.

The HSC, therefore, strongly recommends that within the EU the resources that are allocated to nuclear education and training and to nuclear R&D reflects the increasing globalization of nuclear power and the needs of Member States that will have nuclear power or decommissioning programmes for decades to come.

In addition, the HSC recommends that the nuclear industry should actively encourage the setting up of knowledge transfer mechanisms to ensure that the knowledge, know-how and experiences of the current generation of professionals within the industry is not lost to the young people entering nuclear careers. Mobility programmes to support and encourage young professionals to work across the EU to gain wider experience of nuclear power operations should be set up. These activities should help young professionals working in the nuclear technology field to expand long-life networks and business connections and thereby be better prepared for the challenges of the 21st century.

Background

Use of Nuclear Energy in Europe –Education, Training and R&D

The use of nuclear energy for electricity production within the European Union is mixed with some countries planning to enhance the use of nuclear energy, some aiming to maintain their current programmes and others intending to withdraw from the use of nuclear energy and decommission their nuclear facilities. Irrespective of whichever path is being taken the provision of suitable qualified and experienced people to undertake

the necessary tasks associated with the design, construction, commissioning, operation and decommissioning, is of vital importance not only to the safety and security of the nuclear industry, but also to its sustainability.

The uncertainty within the European Union over the use of nuclear energy over the past thirty years as a result of a combination of worries caused by nuclear accidents and the abundance of cheap gas has resulted in the stagnation of the nuclear industry in many countries. This stagnation and the perceived lack of a long-term future has had an adverse impact on the attractiveness of the nuclear industry to young engineers and scientists. The lack of interest from young people in the industry and the lack of support from some Member States and from the EU as a whole has had a consequential knock-on effect in the universities, higher education colleges and technical training schools. The number of universities and colleges delivering nuclear education programmes has declined.

A consequence of all this is that the age distribution of the workers in the nuclear industry is now biased toward the upper end with many likely to retire in the next 10 years. This presents all Member States with nuclear power programmes with a problem irrespective of which trajectory they are on. Even countries planning to withdraw from nuclear power and decommission their plants will need nuclear engineers and scientists for many decades to come to safely decommission the nuclear power plants, manage the spent fuel and radioactive waste.

The current state of affairs presents the EU with a number of challenges:

1. How to capture the knowledge of those in the nuclear industry who will retire in the next decade so that all their experience and the lessons learned by the nuclear industry will not be lost.
2. How to make the nuclear industry attractive to young engineers and scientists so that the aspirations of Member States; whether to expand their use of nuclear power, maintain their current programmes or withdraw from nuclear power and decommission their nuclear power stations and other nuclear facilities; can be met for decades into the future.
3. How can the decline in the nuclear education and training programmes be reversed and universities and colleges be persuaded to develop and deliver the necessary nuclear engineering and science programmes to provide the nuclear workforce of the future.

Meeting these challenges will not be easy, it will take commitment and resources.

The Renaissance Challenge

At the beginning of this century the growing recognition of climate change and the need to decarbonize the generation of electricity was becoming obvious. The perception of nuclear power changed and it became seen as a major source of "CO₂ free" electricity

production. Many countries initiated new nuclear programmes to cope with the future electricity needs. However, the short timescales needed to deliver the new power station programmes highlighted a number of challenges. It was immediately obvious that there were insufficient manufacturing facilities to meet the potential demand and it was also obvious there would be skill shortage not only in the supply chain but also to design, construct, commission, operate the new facilities, and to decommission the old plants.

Organizations such as NEA, IAEA, and the JRC, published a number of reports [1-8] indicating the loss of knowledge and experience due to ageing and retirement of staff. In the UK because of its extensive nuclear programme lasting over 6 decades the challenge was not only to decommission its old nuclear power stations and other fuel cycle related sites, but also to maintain its existing programme and deliver a new nuclear power programme. The COGENT sector skills council, in conjunction with the National Skills Academy for Nuclear, produced three excellent reports on the skills needed to deliver the UK's nuclear programme up to 2025. [9,10 and 11]

The Fukushima Effect

The accident at Fukushima had mixed implications for the EU. Some accepted, without being complacent, that the accident could have been avoided and that their nuclear power plants and the nuclear safety regulatory frameworks were sufficiently robust. Others, such as Germany, Switzerland and Belgium, in spite of successfully using nuclear power for some 50 years, decided to shut-down earlier or not extend their nuclear power plants lifetime. These decisions have caused young engineers and scientists in the affected countries to again question the attractions of a future in nuclear power. Young, talented people are not surprisingly leaving for other sectors.

The EU Member States that have turned their backs on nuclear power are contributing to the demise of nuclear R&D and education within Europe. However, the situation is not uniform across the EU and some Member States have recognized the dangers, such as the report from the Science and Technology Committee of the House of Lords [12] in the United Kingdom. The UK has also recognized the need to rebuild its specialist nuclear related education and training [13] to meet the projected skills shortfall.

European Energy Needs

Europe depends on nuclear energy for 27% of its electricity generation [14]. If Europe is to maintain its standard of living, meet the challenges from climate change and the need to reduce greenhouse gas emissions, together with the increasing global demand for fossil fuel, the contribution from nuclear power will have to increase throughout the rest of this century. The challenge to maintain European prosperity and at the same time reduce dependency on fossil fuels will only be met by an appropriate mix of affordable energy sources. Nuclear energy is a proven, reliable and affordable means of generating

electricity without having an adverse impact on climate change. On a global scale the use of nuclear energy is increasing. The projected growth in the use of nuclear energy in the developing world will make the large-scale use of nuclear power a reality as developing countries increase their prosperity. Europe should welcome this as a positive contribution to the protection of our planet and be prepared to contribute to this growing market opportunity.

The continued, safe and secure, use of nuclear energy to support both European and global electricity supply will require well-educated and trained people with a deep knowledge of nuclear related technologies for decades to come. The continued supply of such people will require Europe to have comprehensive science and engineering education capability and robust nuclear R&D programmes at national and EU levels.

Funding Challenges

The lack of enthusiasm for the use of nuclear energy for electricity production in some parts of the EU has meant that nuclear fission energy related budgets are being cut. Nuclear fission R&D budgets within Europe which have effectively been reduced in the past decade are now under more pressure because of the lack of political commitment and realism regarding the need for the use of nuclear power to ensure that Europe has an adequate energy infrastructure in the coming decades.

References

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