

# Response to the Innovation, Universities, Science and Skills Committee inquiry into nuclear engineering

## Key Points

- A wide range of nuclear skills and expertise, and substantially increased numbers of individuals with these skills, are required if future nuclear activity undertaken by the UK (including decommissioning, expansion, etc) is to be successful.
- A lack of these skills may also mean that the UK does not have the expertise needed to design new nuclear facilities.
- A lack of indigenous nuclear technical skills would diminish the UK's ability to be an intelligent customer since economic, technical, and security judgements might be flawed.
- There is a growing recognition of the importance of nuclear security. Maintaining the expertise to deliver nuclear security should be included in assessments of the UK's requirement for nuclear skills.

## Nuclear engineering case study

1. In 2007, the Royal Society published *Strategy options for the UK's separated plutonium*. One of the recommendations of this policy report was that the Government should ensure that its strategic thinking about UK energy needs and the safe disposal of nuclear waste is informed by a review of the staff and training needs in nuclear science and technology. The Government needs to know what future options could be missed through skills shortages and whether it would be desirable economically to import these skills from overseas. The Society therefore welcomes this review of the UK's engineering capacity to build a new generation of nuclear power stations and carry out planned decommissioning of existing nuclear power stations.
2. If a new nuclear power station is built in the UK, much of the technology will have to be imported as the UK no longer has the capacity to deliver it. The UK may also have to import much of the expertise to deliver and install it as the number of nuclear engineers in the UK has been in decline for many years. The recently launched National Skills Academy may go some way to address this, but a new nuclear plant will put additional demands on the need for nuclear engineers who are already required for the decommissioning and disposal of radioactive waste.
3. Design work has now started on new Generation IV reactors optimised to further minimise waste, improve safety and proliferation resistance, and decrease the building and running costs of nuclear energy systems. The Generation IV International Forum (GIF) is currently considering six reactor types. GIF membership comprises: Argentina, Brazil, Canada, China, EU via the European Atomic Energy Community (EURATOM), France, Japan, Russia, South Africa, South Korea, Switzerland, UK and USA. In October 2006, the former Department of Trade and Industry (DTI) withdrew from active membership of the GIF charter, although it still retains 'non active' status. This action reflected a refocusing of DTI's priorities following the Energy Review towards near term objectives, and means that the new Department for Business, Enterprise and Regulatory Reform (BERR) will no longer provide the annual funding of up to £5 million for UK researchers to participate in GIF. The European Atomic Energy Community (EURATOM) is an active member of GIF, so UK researchers could participate through the EU Framework Programme 7. This will require researchers to find up to 50%

of the required funding for the research either from their own resources or by obtaining a customer that is willing to provide these funds (RS 2007).

4. The change in the UK's GIF status and the loss of direct involvement with these developing technologies will affect the UK's capacity and willingness to implement Generation IV reactors, as the necessary nuclear engineering skills would have to be imported. A concern is therefore that a lack of indigenous technical skills in the future will mean that the UK would not be an intelligent consumer as economic, technical and security judgements might be flawed. It would also make any assessment whether Generation IV fast reactors should be used in future to dispose of the UK's stockpile of separated plutonium much harder to undertake. New nuclear build that redevelops the UK nuclear power capacity and nuclear engineering skills base would increase the possibility of Generation IV reactors being introduced in the UK in the long term.
  
5. There is a growing recognition of the importance of nuclear security. In December 2007, the Society held a two day workshop that explored innovative ways to detect the illicit trafficking of nuclear and other radiological materials. It brought together 70 leading scientific and policy experts from the UK, USA, Russia, Israel and several other European countries. Workshop participants were concerned that there may not be sufficient skills and expertise available to sustain nuclear and radiological detection research and development activities in the future, and so more people need to be trained in the area of nuclear security. Some participants felt that a possible global revival in nuclear power would help create new job opportunities and university places for relevant nuclear scientists and engineers. Maintaining the expertise to deliver nuclear security should be included in assessments of the UK's requirement for nuclear skills.

## References

Royal Society (2007) Strategy options for the UK's separated plutonium. Royal Society: London.

Royal Society (2008) Detecting nuclear and radiological materials. Royal Society: London.

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