

ENERGY FORESIGHT
PROPOSAL TO THE NUCLEAR DECOMMISSIONING AUTHORITY
DECEMBER 2005

CONTENTS

1. EXECUTIVE SUMMARY
2. INTRODUCTION
3. PROPOSAL FOR ENERGY FORESIGHT PHASE 2
4. FUNDING REQUEST
5. APPENDICES
 1. Details of Pilot Phase
 2. OU Evaluation Report - Summary
 3. Letter from Dr. Sue Ion - British Nuclear Energy Society
 4. Phase 2 Expenditure Detail
 5. Memo: Phase 3 Roll-out
 6. Memo: Phase 3 Assumptions

1. EXECUTIVE SUMMARY

This proposal sets out the project plan and funding request for the refinement and next stage of roll-out of the successful Energy Foresight pilot programme. The proposed roll-out is focussed on the NDA priority areas.

Energy Foresight has been devised to support the Key Stage 4 National Curriculum aspects of Radioactivity, including consideration of the moral, ethical and environmental issues around the use of nuclear energy and the related problems of legacy decommissioning and long term waste management. The aim is to

- stimulate interest in science generally (and nuclear science in particular) as a subject for further study, including at university level;
- change students' (and teachers') attitudes to, and perceptions of, nuclear issues and encourage positive interest in the nuclear sector as a source of future employment.

The project relates directly to the NDA's strategic interest in the availability of the long term skills required for legacy decommissioning and long term nuclear waste management. It reflects the recommendations of the Nuclear Skills Group Report (2002) which identified three actions as key to addressing the sector's long term skill needs, ie

- Promote the sector to encourage recruitment
- Underpin essential learning pathways
- Underpin educational establishments that support those pathways

It focuses particularly on the on the last of these actions and the fact that, unless steps are taken substantially to increase the number of students with a basic knowledge of, and interest in, nuclear issues, there is no way in which the sector can satisfy its future requirements not just for graduates and post graduates but for people with the basic technical skills required to support decommissioning and other operational activities.

Energy Foresight has already been piloted in 130 schools (mainly in the North West). This first phase has been very successful, as witnessed by evaluations carried out by the Open University. In particular, students' knowledge and views regarding nuclear had been significantly improved (Interim Report - January 2005).

"There were significant shifts in favour of physics after the Energy Foresight experience in terms of interest, opportunities to discuss issues of importance, and helpfulness in understanding 'myself and the world'."

"Levels of agreement with the proposition that although nuclear waste management is a problem, a safe and sustainable solution will be found, increased significantly with all groups."

"There were significant increases in students' awareness of jobs in the sectors featured in the Energy Foresight resources There were also notable increases in employment opportunities, particularly in relation to 'technical' positions."

The programme now needs to be refined to reflect the learning from the pilot, to add new material to support the Scottish curriculum, and to highlight the work and needs of the NDA via a new film.

In addition to these new materials, it is intended to complete the roll-out with a further 1985 schools to reach a total of 2115 by mid-2009 (50% of all secondary schools in the UK, but still biased towards those areas with the large nuclear presence).

To ensure that this activity gets kick-started as a matter of urgency it is proposed that **Phase 2** of the programme, comprising development of new materials and an initial incremental roll-out of 300 schools is started immediately, funded by the NDA. This phase would run from now till mid-2008.

The remaining 1685 schools (using the materials from Phase 2 plus some further new materials) would comprise **Phase 3**, with roll-out commencing in 2006/7 (overlapping with Phase 2) and running through to mid-2009. To fund this phase, additional funding will be sought from the nuclear industry and the energy sector more generally, from relevant Regional Development Agencies in England, and Highlands & Islands Enterprise and other relevant public bodies in Scotland.

This proposal requests £750,000 from the NDA to fund Phase 2 of the programme, which will include production of the new materials and kick starting the national roll-out from the current 130 to 430 schools. This Phase 2 roll-out will be focused on those areas with a large nuclear presence, ie the North West (and especially Cumbria), North East, South West, and Scotland. It will be implemented over the period January 2006 to mid-2008.

2. INTRODUCTION

INDUSTRY BACKGROUND

2006 will see the publication of two key strategic reviews with huge implications for the nuclear industry – the report from CoRWM on long term waste management and the Government's review of energy policy. Both these reviews are likely to underline the need to recruit extensively into the industry in coming years.

The Nuclear Skills report in 2002 estimated that by 2017 the industry would need to recruit up to 30,000 people – and over 10% of available science graduates – just to account for retirement and growth in clean up work. In addition, any decision to go for new build will inevitably increase demand, not only for special nuclear skills but for skilled technicians in the other disciplines - including engineering, building and construction - that are required to support the NDA's clean up programme. Delivery of the NDA's long term strategy therefore requires immediate action to increase the output of students from schools with basic skills and knowledge required for nuclear employment and motivation to join the industry. Vocational training and initiatives at university level cannot succeed unless the basic supply of raw material is available.

ENERGY FORESIGHT CONCEPT

The aim of Energy Foresight is to provide a framework to help students increase their understanding of radioactivity and related issues. In particular, it aims to

- stimulate interest in science generally (and nuclear science in particular) as a subject for further study, including at university level
- change students' (and teachers') attitudes to, and perceptions of, nuclear issues and
- encourage positive interest in the nuclear sector as a source of future employment.

In order to meet these overall aims, it contains themes that consider

- the key scientific ideas about radioactive materials
- the concepts of risk, its assessment and management
- the risk/benefit analysis that informs public policy-making and personal choices,
- the acquisition of skills that enable the student to take a critical approach to media information, and
- the specific career opportunities that working with radioactive materials offers

The programme supports the delivery of the Key Stage 4 National Curriculum in the aspects of Radioactivity, and also the moral, ethical and environmental issues around the use of nuclear energy and the related problems of legacy decommissioning and long term waste management.

It comprises a full portfolio of teaching support materials including films, workbooks and teaching notes, together with a one day course of teacher training in the delivery of the programme. The programme is delivered in school via weekly 1 hour lessons over a period of 1 term.

BACKGROUND TO THE PHASE 1 PILOT

Phase 1 of the programme, which commenced in December 2004, involved 130 schools of which 100 were in the North West region and 30 in the London area and included:

- 3 BBC films of 20 minutes duration each, addressing
 - *Radiation and Health*
 - *Power Production*
 - *Radioactive Waste*
- Support material
 - student activity sheets
 - teacher notes
- Website, with additional resources
- Teacher training

Funding for this first phase was provided primarily from the North West Development Agency (£600k) supported by a number of other governmental and commercial organisations i.e. DfES, DTI, BNFL, RWE Nukem, and Cumbria LSC - in total £700k.

The pilot implementation has been highly successful, as witnessed by the feedback from pupils and teachers in the independent evaluations carried out by Patricia Murphy's team at the Open University. Appendix 2 reproduces the key Findings and Recommendations of the Final Report. The evaluation confirms that Energy Foresight has provided a stimulus to pupils to consider working in the nuclear industry:

"After using the resources with students the teachers reported the resources were good or excellent in developing awareness of roles and jobs in all the relevant areas and considered they fairly represented alternative positions in the power debate."

Recommendation 4 from the report recommends further development the programme materials:

"Typically school subjects fail to give students insights into the nature of different jobs and what they entail and what their social purposes are. Research has found girls and boys lack awareness of science-related careers."

"The way that the Energy Foresight approach involved people in specific careers talking about their use of science was a major strength of the resources. The Programmes made working practices explicit. Further Programmes that extend this aspect would be invaluable especially if more emphasis was given to the relationship between working practices and their scientific basis."

Sue Ion, President of the British Nuclear Energy Society has also supported and fully endorsed Energy Foresight, writing to all interested parties in the nuclear industry in August 2005 (Appendix 3):

"I believe Energy Foresight is an extremely important project which holds out the prospect of changing perceptions of nuclear both as a power source and as an industry offering worthwhile and rewarding career prospects".

3. PROPOSAL FOR ENERGY FORESIGHT PHASE 2

Given the success of the pilot phase, it is proposed to continue the roll-out of the programme so that, ultimately, it will be implemented in 2115 schools across the UK - 50% of the total secondary schools. However, in order to kick start the programme and ensure that the speediest impact is made in those areas potentially providing recruits to support the NDA's activities, this second phase of the programme is now proposed to extend the roll-out to a further 300 schools in and around the key areas of nuclear industry activity. To support this, additional and updated material will be developed, focussed on the activities of the NDA and radioactive waste management. Through these actions, it is intended that there will be a growing and informed potential workforce with a positive attitude to the employment opportunities in the nuclear decommissioning industry.

ROLL-OUT

Following on from the pilot phase which was focussed mainly on the North West area to support Cumbria, it is now proposed to extend the depth of coverage in the North West and increase the catchment area to include Scotland, the North East and South West. The selection of schools to take part in all future phases of the programme would be made in conjunction with the NDA to provide best fit with the NDA's likely future needs.

SCHOOLS	PILOT 2004/5	PHASE 2			OVERALL TOTAL
		2006/7	2007/8	TOTAL	
NW	100	80	40	120	220
NE	-	40	-	40	40
SW	-	40		40	40
SCOTLAND	-	60	40	100	100
LONDON	30	-	-	-	30
TOTAL	130	220	80	300	430

ENLARGED CONTENT

A number of refinements and additions are proposed for Phase 2 to reflect the detailed evaluation of the pilot, changes in the schools' curriculums, and projected developments in Government policy. These refinements will include:

- Films
 - An additional film is to be made highlighting the importance and scale of the nuclear decommissioning programme, the role of the NDA and the industry build up to support the work.
 - The *Radioactive Waste* film will be updated to reflect the CoRWM report recommendations and their implications for the nuclear industry.
 - Support Materials - updated with new material to support the new and updated films, and to reflect the experience of the pilot obtained from direct feedback and the OU Evaluation, particularly addressing any gender differences

Website - updated in line with revised and new support material

Scotland - because the pilot was originally designed for the three new science curriculums in England, additional content and formatting will be required to meet the needs of the Scottish curriculum.

DELIVERY

The proven delivery method from the pilot and previous programmes will be adopted for Phase 2 of Energy Foresight.

Programme management will be the responsibility of Energy Foresight, who will structure the programme, produce the films and support materials, identify and train appropriate teachers in the chosen regions and monitor and ensure the effectiveness of the programme. We would propose to engage the services of the Open University again to carry out the evaluation.

Energy Foresight will arrange training on a regional basis for the teachers from the selected schools, either directly or via additional trainers depending on the timing and numbers involved. Teachers trained in the 130 schools of the pilot will be updated for the new content. Given the extent of changes that are anticipated to address the Scottish curriculum, the training for the initial tranche of 20 schools in Scotland will be monitored closely as a pilot.

In parallel we will assist in building the relationship between the Nuclear Academy and feeder schools throughout the country to further reinforce the possibility of careers in the industry. Wherever possible and relevant, Energy Foresight will work with other programmes aimed at encouraging interest in Science and Engineering as a career path, so as to provide a continuum of development opportunities for all ages.

PHASE 2 COSTS

In summary, costs for the 3 years of the programme leading to an additional 300 schools participating are as follows:

Financial Year	2005/6	2006/7		2007/8	TOTAL
£	JAN 2006	APR 2006	SEPT 2006	APR 2007	
Films (inc. updates)	██████	██████	-	-	██████
Support Material	██████	██████	-	██████	██████
Website	-	██████	██████	██████	██████
Project Management and Evaluation	██████	██████	██████	██████	██████
Consultancy	-	██████	-	-	██████
Teacher Training (350 schools)	-	-	██████	██████	██████
Teacher Update (130 Pilot Schools)	-	-	██████	-	██████
Overheads	██████	██████	██████	██████	██████
TOTAL	██████	██████	██████	██████	750,000

The costs are front loaded to ensure that films, materials and trained teachers are available to support the introduction of the new 21st Century Science curriculum for England, to be implemented from September 2006. The materials will also be updated to support the curriculums of the AQA (who have already agreed to include Energy Foresight in their resource lists), EDEXCEL, OCR, and WJEC awarding bodies.

4. FUNDING REQUEST

This proposal requests the NDA to approve funding of £750,000 for Phase 2 of the Energy Foresight programme.

Whilst Phase 2 continues the programme roll-out to a total of 430 schools, it is our intention to seek matching funding from other bodies for Phase 3 at the earliest opportunity. An additional [REDACTED] would enable 50% of all UK secondary schools to be brought into the programme by 2009 - a total of 2115 schools. In total we would look to raise [REDACTED] (including the £750k from the NDA), with contributions from the nuclear industry and the RDAs with a nuclear presence (positive interest already shown by the East of England and the South West).