

Who will pay for decommissioning and waste disposal? Experience from the UK

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- 2005+: British Energy
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Britain's civil nuclear facilities

- 11 Magnox power stations completed from 1956-71. 7 are already closed and the other 4 will be closed by 2010. Owned by the government's Nuclear Decommissioning Agency (NDA)
- 7 AGR stations completed from 1976-89 and expected to close from 2011-23. Owned by a private company, British Energy
- 1 PWR station completed 1995 and expected to run till 2035. Owned by British Energy
- Various other experimental and fuel cycle facilities (8 main sites). Owned by NDA

Expected decommissioning costs

- 11 Magnox plants are each expected to cost between €1.2-2.5bn to decommission (undiscounted)
- The AGRs and the PWR are expected to cost a total of €7.4 to decommission (about €1bn per plant)
- The Sellafield site is the most expensive site and is expected to cost €47bn to decommission
- Operations at Sellafield include treatment of spent fuel; Mixed Oxide fuel fabrication; storage of nuclear materials and radioactive wastes
- Dounreay, site of a demonstration fast reactor and other facilities, is expected to cost €4bn to decommission
- The Sellafield and Dounreay sites will not be released for unrestricted use but the other sites might be
- The total decommissioning bill is nearly €100bn

Expected waste costs

- In 2004, British Energy's existing fuel liabilities totalled about €14.4bn
- Disposing of all existing (but not future) solid civil waste (low-, intermediate- and high-level) including waste generated by decommissioning might cost more than €120bn
- No real funds have ever existed to deal with much of this

Pre-privatisation

- Funds were collected by the CEGB and the SSEB to pay for decommissioning. In 1989, their value was €5.5bn
- A Magnox station was then expected to cost €360m to decommission, the AGRs, less
- The funds were unsegregated and existed as the assets of the company
- When the companies were privatised, no funds were passed on to the nuclear companies to pay for decommissioning

1990-96

- The nuclear plants could not be privatised in 1990 and were placed in 2 publicly owned companies, Nuclear Electric and Scottish Nuclear
- 10% of consumers' electricity bills (Fossil Fuel Levy, FFL) was paid to the companies as well as income from sale of electricity. €9bn was collected from 1990-96
- A government minister said the FFL was 'to pay for the decommissioning of old and unsafe stations'
- It was actually unassigned income that the companies could spend as they wanted
- A small amount went on decommissioning but about €4.5bn was spent on a PWR and €4bn was unspent

1996-2005: BNFL

- The Magnox plants were passed to BNFL (publicly owned fuel cycle company) with €3.6bn of the unspent subsidy (FFL)
- BNFL kept an identified internal unsegregated fund (Nuclear Liabilities Investment Portfolio, NLIP) that had reached a value of €5.8bn in 2005
- When BNFL was broken up and the liabilities passed to the NDA, the Treasury absorbed the NLIP

1996-2005: British Energy (old)

- The AGRs and the PWR were privatised in 1996 as British Energy and the FFL abolished
- Segregated fund set up (Nuclear Decommissioning Fund, NDF) to pay for decommissioning
- By end 2003, the fund was worth about €500m
- But it only covered stage 2 & 3 of decommissioning
- These are the most expensive stages in undiscounted terms but the stage 1 is much the largest in discounted terms
- This meant British Energy had to pay only about €25m per year into the fund despite the entire decommissioning liability being €7.4bn
- The company collapsed in 2002 and was eventually re-launched in 2005

2005+: NDA

- All UK's civil nuclear facilities were given to a new agency, NDA, in 2005
- This will be funded by tax-payers as expenses are incurred (up to 150 years forward)
- NDA will receive its funds on an annual basis from government

2005+: British Energy

- The company was saved by the government assuming British Energy liabilities of about €16bn
- The NDF was taken over by government and renamed the Nuclear Liabilities Fund (NLF)
- British Energy must pay at least €30bn per year into the NLF
- Government will pay any costs not covered by the NLF from income from tax-payers of the day
- NDA is expected to be given the job of managing the decommissioning process

Lessons

- Dealing with spent fuel is at least as important in cost terms as decommissioning
- Decommissioning costs have been dramatically underestimated. In 1989, the cost per Magnox was expected to be €360m, now it is €1.9bn
- Unsegregated funds will be lost
- If the company fails before the end of the life of the plant, future taxpayers will have to pay the unfunded costs
- Governments cannot be trusted with decommissioning funds: they will spend the money and leave only an IOU
- Long time-scales can make very large liabilities seem to disappear if 'discounted' liabilities are used: a liability of €1bn is worth only €52m if discounted at only 3% per annum

An ethical decommissioning scheme

- The ‘polluter’ must pay
- Funds should be created to pay for spent fuel disposal as well as decommissioning
- Estimates of decommissioning cost should err on the high side. Estimates will be speculative until waste disposal facilities exist
- A segregated fund must be created
- A positive rate of interest on existing funds should only be assumed for about 30 years forward
- The fund should have enough money in it when the plant begins operation that, with interest, by the end of the expected life of the plant, there is enough money to pay for decommissioning