



Hidden subsidies and new nuclear | June 2010

According to government, operators of new nuclear plants will be made to pay their 'full share' of waste and spent fuel disposal.¹ The Conservative-Liberal Democrat coalition has recently confirmed there will be no taxpayer support for new build and that 'public subsidies include contingent liabilities.'² The government's method of ensuring this is setting a fixed unit price (FUP) for new build waste and spent fuel disposal. Under the controversial FUP, reactor operators will set aside money over the plant's lifetime to cover all the costs of disposal. In theory, the FUP will be set high enough, and contain a sufficient risk premium, to guarantee that the public will not have to pay to deal or dispose of new build waste in the future.³ However, the recent consultation document⁴ on the FUP confirms what we have long suspected, that the FUP will lead to a back door subsidy for new atomic reactors.

To explore the possible extent of this subsidy Greenpeace commissioned independent nuclear expert Ian Jackson⁵ to undertake an impartial assessment of the FUP scheme, using the government's own pricing methodology as set out in the consultation, to examine where potential subsidies might lie and what the taxpayer exposure could be. Jackson's interactive Fixed Unit Price Simulation (FUPSIM) and the accompanying research report reveal the enormous level of subsidy likely to be required for nuclear waste and spent fuel disposal from new build. The FUPSIM model is unique in that for the first time it allows the public free and open access to explore the true costs of disposing of radioactive wastes, based on the government's own figures and using the most accurate computer modelling programme currently available. The report's main conclusions are:

- **Spent fuel disposal is 44% of EPR reactor build cost:** the full price charged by the government to utilities for disposal of spent fuel from a new nuclear power station will be about £1.2bn for an AP1000 or £1.5bn for an EPR.⁶ This is equivalent to 32% of the turnkey construction cost of an AP1000 or 44% of an EPR and is substantially higher than the assumptions underpinning the 2008 Nuclear Energy White Paper.
- **Levelised disposal costs are higher than they appear:** the true levelised cost (£/MWh) for spent fuel disposal is about £1.90/MWh but the effective levelised cost is reduced by 70% to around £0.57/MWh through financial engineering similar to an endowment mortgage.
- **Early transfer reduces disposal cost by £1 billion per EPR:** utilities can transfer ownership of spent fuel to the government decades before it may be disposed of in a repository. The 2080 transfer price is discounted to £515m for an EPR to avoid a full future disposal liability of £1.53bn, a difference of £1.015bn per EPR. There are good reasons for not discounting prices when faced with nuclear liability cash flows that are very long term. The discounted pricing assumes that £515m cash paid in 2080 is worth £1.53bn in 2130, but this may not necessarily be true in the real world.
- **Stock market pays for nuclear waste disposal:** paying for spent fuel relies upon accrued interest funding around 70% of the total disposal cost. The utility would typically pay around 30% of the disposal cost over a 60 year period but rely upon compound interest earned during the next 50 to 100 years to make up the shortfall, transferring most of the funding risk to the stock market.
- **Utility profits by £0.4bn from EPR spent fuel transfer:** utilities could make a profit of nearly £500m between the value of the spent fuel investment fund at 2080 and the discounted early transfer price charged by government in 2080.
- **Spent fuel disposal price may rise to £1.9bn for an EPR:** the profit margin between the disposal price charged to utilities and the actual cost of disposal is effectively a project risk premium. The risk premium charged by government for spent fuel disposal is around 42% for an AP1000 or 58% for an

EPR. This suggests that disposal prices may need to increase by between 42 to 58% in order to raise the overall risk premium level to a sensible 100% above the NDA's marginal disposal cost. This would mean that the government price for disposal of spent fuel may rise to around £1.5bn for an AP1000 or £1.9bn for an EPR.

- **Switching to actual disposal costs rather than fixed unit prices:** the only way to guarantee utilities pay the full costs of disposal is to charge them the actual cost. Estimating realistic disposal prices 100 years into the future is fraught with difficulty. Moreover under present financial conditions stock market returns will not be sufficient to pay for the majority of a utility's spent fuel liabilities.
- **Disposal costs may be underestimated:** FUPSIM and DECC use different approaches to modelling costs of disposing of spent fuel from new reactors. Essentially FUPSIM predicts higher full share marginal disposal costs than DECC. Put another way, the extra (marginal) costs of spent fuel disposal appear to have been underestimated by government.
- **Problems with probabilistic modelling:** DECC's pricing model is based on a parametric cost model that uses unpublished NDA costs for a range of different repository and nuclear power scenarios and then combines these using probabilistic techniques. These may not be very well suited to financial modelling of first-of-a-kind nuclear facilities. For example the government's 2001 financial assessment of the business case for the Sellafield MOX Plant (SMP) concluded that there was a 97% probability that the net economic benefit would be greater than zero and that the average benefit was expected to be +£216m.⁷ By April 2009 SMP had lost £1.263bn.⁸

Further undermining government claims to be able to protect taxpayers from future nuclear waste cost increases is its inability to reliably estimate decommissioning, waste management and disposal costs incurred over 100 years in the future. DECC concedes that estimates for these costs have increased substantially since 2007. In fact they have virtually doubled because 'important assumptions have been revised'. DECC notes that *'The scope of the costs covered by the 2007 estimate did not include all the aspects of waste management currently anticipated for new nuclear power stations in the UK. In particular the source data on which it was based will not have taken account of the requirement for an extended period of interim storage for spent fuel and ILW prior to disposal in a GDF, nor the costs of encapsulation of spent fuel for disposal.'*

Greenpeace conclusions

- The FUP is part of a package made by the previous government to promote new nuclear and protect the industry from bearing the full costs of waste management and disposal from new build. This package is totally inconsistent with a promise not to subsidise new nuclear power.
- FUP risks leaving the taxpayer liable for potentially enormous costs in the future. Unless other more effective mechanisms governing the apportioning cost of new build spent fuel management and disposal are put in place the taxpayer will be at risk of footing the bill for new nuclear.
- If the government is now proposing to subsidise new nuclear, a policy shift of fundamental proportion, it must publicly re-consult on the basic premise of whether to support new nuclear build, or not.

Greenpeace demands

- The government must **scrap the FUP**.

1 express.co.uk/posts/view/30666

2 timesonline.co.uk/tol/news/politics/article7127202.ece

3 nuclearwasteadvisory.co.uk/page.asp?ld=33

4 DECC, *Consultation on a Methodology to Determine a Fixed Unit Price for Waste Disposal and Updated Cost Estimates for Nuclear Decommissioning, Waste Management and Waste Disposal* bit.ly/DECC-FUP

5 jacksonconsult.com/ianjackson.html

6 FUPSIM modeled @ 60 year reactor lifetime, reactor start-up 2020, reactor closure 2080, NDA repository disposal 2130, Quantity FUP £1.1m/tU, Output FUP 0.19p/kWh.

7 bis.gov.uk/files/file19285.pdf

8 services.parliament.uk/hansard/Commons/ByDate/20090402/writtenanswers/part009.html