



Department of Energy and Climate Change

THE ENERGY ACT 2008

Pre-consultation discussion paper
No. 2: on a methodology for
establishing an indicative fixed unit
price for the disposal of intermediate
level waste and spent fuel from new
nuclear power stations

OFFICE FOR NUCLEAR DEVELOPMENT

JANUARY 2009

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Section 1: Introduction

About this paper

- 1.1 This is the second in a series of three informal discussion papers being issued by the Office for Nuclear Development. The decision to produce these papers was set out in the Government Response to the Consultation on Funded Decommissioning Programme (FDP) Guidance for New Nuclear Power Stations¹.
- 1.2 Each of these papers addresses specific issues relating to the cost estimates for waste management, disposal and decommissioning and establishing an indicative fixed unit price for the disposal of intermediate level waste (ILW) and spent fuel from new nuclear power stations.
- 1.3 This paper discusses a methodology for establishing an indicative fixed unit price for the disposal of ILW and spent fuel from new nuclear power stations.
- 1.4 The first paper in this series, issued in October 2008², was on a methodology to determine how the fixed costs of building a geological disposal facility (GDF) should be apportioned to and shared between operators of new nuclear power stations. The third paper in this series will be on the Department of Energy and Climate Change (DECC) cost model and our updated estimates of total costs for waste management, disposal and decommissioning.
- 1.5 These papers are intended for discussion with stakeholders during autumn/winter 2008/09. This is not a formal consultation and we are not specifically seeking public views at this stage. However these papers are being made available on the Department's website and if interested parties wish to comment on the issues covered in these papers they may do so, and these comments will be taken into account as part of the development of the Government's policy on these issues. Comments can be sent by letter, fax or email (email preferred) to:

Informal papers on cost estimates and an indicative fixed unit price
Office for Nuclear Development
Department of Energy and Climate Change
Bay 125, 1 Victoria Street
London, SW1H 0ET
Fax: 020 7215 2842
Email: DecomGuidance@berr.gsi.gov.uk

- 1.6 There will be a formal public consultation on the issues covered by the three papers in spring 2009. The finalised approach will then be published alongside the finalised FDP Guidance in summer 2009.

¹ <http://www.berr.gov.uk/files/file47629.pdf>

² <http://www.berr.gov.uk/files/file48571.pdf>

Background

- 1.7 The first paper in this series set out the background to this series of papers. It described the policy framework set out in the White Paper on Nuclear Power³, which is being implemented through a framework created by the Energy Act, which received Royal Assent on 26 November 2008. The Act requires operators of new nuclear power stations to have an FDP, approved by the Secretary of State for Energy and Climate Change, in place before construction of a new nuclear power station begins and to comply with this programme thereafter.
- 1.8 The first paper also explained that there was a consultation on draft FDP guidance in early 2008⁴. The consultation document included background information on the Government's policy to set a fixed unit price for the disposal of ILW and spent fuel and a schedule for the Government to take title to and liability for these materials. The consultation also included for information an indicative timeline which set milestones for the publication of:
- a methodology to determine how the fixed costs of building a GDF should be apportioned to and shared between operators of new nuclear power stations;
 - a methodology for establishing an indicative fixed unit price for the disposal of ILW and spent fuel;
 - the DECC cost model, with updated estimates for the total cost of waste management, disposal and decommissioning.
- 1.9 In response to the level of interest shown by stakeholders during the FDP guidance consultation, the Government response to the consultation⁵ included a revised indicative timeline, to provide stakeholders with further opportunities to feed in views on these three subjects as work progresses. This paper is the second in a series of three papers intended to support discussions with stakeholders over autumn/winter 2008/09.
- 1.10 The first paper also set out an overview of DECC's cost modelling work and explained the rationale for the Government's work to model costs. This work is intended to help ensure that the Government can have confidence that operators of new nuclear power stations make adequate financial provision for waste management, disposal and decommissioning costs, by providing a benchmark against which to assess the estimates produced by the operators.

³ Meeting the Energy Challenge, A White Paper on Nuclear Power

<http://www.berr.gov.uk/whatwedo/energy/sources/nuclear/whitepaper/page42765.html>

⁴ Consultation on Funded Decommissioning Programme Guidance for New Nuclear Power Stations, URN 08/637, February 2008: <http://www.berr.gov.uk/files/file44486.pdf>

⁵ The Government Response to the Consultation on Funded Decommissioning Programme Guidance for New Nuclear Power Stations, URN 08/1246, September 2008: <http://www.berr.gov.uk/files/file47629.pdf>. The responses to the consultation are available at: <http://www.berr.gov.uk/whatwedo/energy/sources/nuclear/consultations/closed-response/fdp-responses/page48057.html>

2. Fixing a price and schedule for the disposal of ILW and spent fuel from new nuclear power stations

The policy to set a fixed unit price

- 2.1 The Government's policy, set out in the FDP consultation, is to set a fixed unit price for operators of new nuclear power stations for disposal of their ILW and spent fuel, and a schedule for the Government to take title to and liability for these materials.
- 2.2 In the Nuclear White Paper, we said that potential investors in new nuclear power stations need clarity on the maximum amount that they would be expected to pay for the Government to take responsibility for their future waste in a GDF. This cost certainty would enable them to take investment decisions and seek financing. Energy companies have indicated that they would be prepared to pay a significant risk premium over and above the expected costs of disposing of ILW and spent fuel, in return for having the certainty of a fixed upper price.
- 2.3 The Government would expect to set a fixed price per unit of ILW or spent fuel for disposal, to ensure that the total amount that operators pay is relative to the amount of ILW or spent fuel they produce. This price will be set at a level over and above expected costs and will include a significant risk premium. This risk premium should help to ensure that the operator bears the risks around uncertainty in waste costs and will provide the taxpayer with material protection against the eventuality that the actual costs of geological disposal exceed the projected costs. Should the actual costs of providing the waste disposal service prove to be lower than expected, these lower costs will not be passed on to nuclear operators, who would have gained from certainty of a fixed price and would not have been exposed to the risk of price escalation.
- 2.4 The fixed unit price the Government will set for operators for waste disposal will reflect the most up to date estimates of costs available at the date when the price is set and the level of certainty the Government has on those costs. Consequently, dependent upon the date of the nuclear power station's construction, operators of different power stations may be set different fixed unit prices for waste disposal. The fixed unit price related to any individual approved FDP will however be escalated over time in line with, for example, inflation.
- 2.5 The fixed unit price that the Government will set for operators of new nuclear power stations for disposing of their ILW and spent fuel will be based on an estimate of the costs of disposing of these materials in a GDF. This costing will include the following items:
- Estimate of costs of disposing of ILW and spent fuel in a GDF;
 - Significant risk premium to cover:

- the risk that the eventual costs of building a GDF to dispose of ILW and spent fuel are higher than estimated;
 - the risk that geological disposal facilities are not available when required by the agreed schedule for the Government to take title to and liability for the waste.
- 2.6 Estimates of the costs of disposing of ILW and spent fuel will be developed using data from the Nuclear Decommissioning Authority (NDA)'s Parametric Cost Model on the estimated costs of disposal facilities. The first paper in this series described that model and how it will be used.
- 2.7 We anticipate that operators will request that the Government provide them with a fixed unit price at the time they seek approval for their FDP. This will occur alongside the regulators' licensing and permitting processes. At this time, the Secretary of State would use the cost modelling methodology the Government has developed, together with information from the NDA's parametric cost modelling work, to determine the fixed unit price, including the appropriate risk premium. The risk premium will reflect the level of certainty the Government has with regard to estimated costs at the date the price is set.
- 2.8 To help future operators with their planning, the Government would expect to give operators a non-binding indicative price at an earlier date than when the Government would be willing to provide them with a final fixed unit price. The FDP consultation included a chart on an indicative process for submitting and following an FDP.

Defining the “unit” for the fixed unit price

- 2.9 The purpose of setting a fixed price per unit of ILW or spent fuel for disposal is to ensure that the amount that operators pay is relative to the amount of waste or spent fuel they produce. It is therefore important to be clear about the units to be used for setting a fixed unit price.
- 2.10 For ILW it might be sufficient to use a simple volume measure. For example the UK Radioactive Waste Inventory measures the volume of existing ILW in cubic metres. However a fixed unit price for spent fuel will need to take into account more detailed considerations around its disposal route and the impact of various assumptions around, for example, fuel burn-up and heat load. It will be important that the unit for spent fuel reflects the costs of disposal.
- 2.11 The Managing Radioactive Waste Safely (MRWS) White Paper⁶ said the following on the disposal of spent fuel:⁷

⁶ <http://www.defra.gov.uk/environment/radioactivity/mrws/pdf/white-paper-final.pdf>

⁷ The MRWS White Paper also considered high level waste (HLW) as there is a substantial HLW element to the existing waste inventory. The Base Case assumption for new build is that there will be no re-processing of uranium fuel and spent fuel will be disposed of after it has been used. Under this assumption, there will be no HLW from new nuclear power stations.

Because they generate heat, HLW and spent fuel (if classified as waste for disposal) require different disposal structures and layouts from ILW, LLW and other non-heat generating radioactive materials. There are a number of ways in which HLW and spent fuel could be packaged and contained, and research in this area is likely to present alternative models over the coming years. For example, one method that is planned to be used in Sweden and Finland, and could potentially be applicable in the UK to stocks of HLW and spent fuel, is based on sealing the waste in copper canisters with a cast iron internal frame for strength. These canisters are placed in individual deposition holes drilled in the floor of deposition tunnels and surrounded by bentonite clay, which expands on contact with water and so seals the space around the canister. Under appropriate conditions copper is extremely resistant to corrosion, and in a suitable geo-chemical environment such as this the canisters can be expected to maintain their integrity for hundreds of thousands of years. Following waste emplacement, the deposition tunnels would be backfilled and sealed.

- 2.12 The NDA's Parametric Cost Model estimates costs on a per canister basis and hence at present this is the basis on which unit costs of waste disposal are estimated. However, converting the amount of spent fuel generated by a new nuclear station to a number of canisters requires an understanding of the capacity of a single can. This capacity will be dependent upon a number of issues, notably the heat released by material in the can – this is a key parameter for safe disposal.
- 2.13 Also, the current disposal canister concept, as described above, is subject to change as it is not yet confirmed that this will be the disposal route finally adopted for the GDF. There are a number of alternative units that could be used for setting a fixed unit price for the disposal of spent fuel, which are less liable than the canister to change over time. These fall broadly into three categories, as outlined below.
- 2.14 **Quantity-based units:** such as tonnes of uranium or bundles of spent fuel. These units directly describe the spent fuel to be disposed of and it is straightforward to translate a quantity-based unit into a disposal concept such as the current copper canister assumption (the present maximum canister size is designed to take four PWR fuel assemblies, with a weight of just over two tonnes in total) . However a simple quantity-based unit offers no link to the heat loading of the can, as the heat generated by a quantity of spent fuel will depend upon its initial composition, total burn-up and conditions of irradiation and also on the duration of interim storage prior to disposal in a GDF. Hence it would need to be accompanied by detailed parameters describing the heat output and other characteristics of the fuel. These parameters would need to be set with reference to an assumption of the likely disposal route.
- 2.15 **Output-based units:** for example a price in pence per kWh. An output-based unit would be very simple to measure, though there would need to be calculation of how output translated into a quantity of spent fuel for the calculation of disposal costs, which would again need to be made with reference to a disposal concept. However there is in general a relationship between the power output by fuel and its characteristics after irradiation.

For example, higher burn-up, which is a consequence of generating increased amounts of energy from a given amount of fuel, implies greater heat output from the spent fuel and thus greater disposal costs.

2.16 **Activity-based units:** for example adopting the Becquerel (Bq) as a unit for costing disposal. The level of activity is one of the key characteristics of the spent fuel that influences its costs of disposal, for example higher burn up would imply a higher Bq level. However, as noted above, a key constraint is heat output, and the relationship between the activity of the material in Bq and the heat output of the spent fuel is complex, hence an activity-based unit might entail some complex calculations to produce estimated disposal costs.

2.17 Whichever unit is chosen, a unit cost of disposal can only be estimated with reference to an assumed disposal route, which at present is the copper canister described above. This means that in all cases there is a risk that a change to the disposal route might imply a change in the estimated costs of disposal after the fixed unit price has been set. This is one of the risks considered further in paragraphs 3.10 – 3.14 below.

3. Key considerations in a methodology for establishing an indicative fixed unit price

Requirements of a methodology

- 3.1 The fixed unit price will provide certainty to operators of new nuclear power stations on the costs of disposing of the ILW and spent fuel they will generate. In return for this certainty the Government will set the fixed unit price at a level that helps ensure that the operator bears the risks around uncertainty in waste disposal costs and provides the taxpayer with material protection.
- 3.2 A methodology that could be used to inform the fixed unit price set by the Secretary of State will need a number of components discussed further in this section, in particular:
- estimates of the costs of waste disposal and a high level of confidence required that costs will not exceed these estimates;
 - an approach to handling uncertainty in the size of the new build fleet, which is needed to handle the allocation of GDF fixed costs between legacy and new build wastes, as discussed in the first paper in this series.

Calculating a distribution of estimated waste disposal costs

- 3.3 Given the level of uncertainty around the costs of a GDF and the long time period between the setting of the fixed unit price and its payment, to provide protection to the taxpayer we will need a high level of confidence that the fixed unit price is set at a level that covers costs. It is expected that a distribution of estimated costs will be calculated, and some issues relating to the way in which that distribution might be produced are considered below.

Estimating waste disposal costs using the NDA's Parametric Cost Model

- 3.4 The cost of a GDF is subject to uncertainty. It is influenced by many different factors, including the inventory of waste, timings of waste arisings, the geology at the site in question and the detailed design of the GDF, which will be influenced by the geology of the chosen site and the final inventory for disposal.
- 3.5 NDA's Parametric Cost Model was described in the first paper in this series. It has been developed to generate a current best estimate of the costs of a GDF based on a series of factors and to model the cost impact resulting from changing those factors, including those described in paragraph 3.4. NDA, at the request of DECC, has developed a range of scenarios for geological disposal, which differ – for example in geology or inventory – from the scenario used to develop NDA's current best estimate and these have been used in the Parametric Cost Model to identify the cost impact of these scenarios.

Handling uncertainty in the Parametric Cost Model's estimates

- 3.6 The data from the Parametric Cost Model will be used by DECC to generate an estimate of the costs for the disposal of ILW and spent fuel from a new nuclear power station in a GDF. However, as stated above, those estimates are based on a series of assumptions and some allowance needs to be made for uncertainty.
- 3.7 One way of accounting for uncertainty in the total cost estimate is to make an assessment of the many uncertainties to which the inputs into the Parametric Cost Model are subject. One rigorous approach to managing uncertainty is to construct a comprehensive risk register, to assess the probability and consequence of each event, and to construct an overall risk estimate by combining individual values. Such an approach is often adopted to create probability-linked overall cost estimates in engineering projects where most or all of the inputs to the overall costs are known, and when there is good historic evidence on which to assess these input costs and the variabilities to which they are subject. Such a comprehensive assessment has not yet been completed for the GDF implementation programme.
- 3.8 An alternative approach is to use the methodology set out in HM Treasury "Green Book" guidance, which is designed to be used in circumstances such as these where a comprehensive assessment of risk is not possible. This allows estimated project costs to be adjusted for "optimism bias," which is defined in the Green Book as the "demonstrated, systematic, tendency for project appraisers to be overly optimistic."⁸ The Green Book offers guidance on possible optimism bias factors, based on an analysis of historic public sector project cost out-turns versus their original cost estimates.
- 3.9 Work continues on how to apply this guidance appropriately in the case of the overall GDF cost estimate. However in broad terms, the approach would be to take a central cost estimate based on calculations from the Parametric Cost Model and then to apply an optimism bias adjustment.

Handling wider uncertainties

- 3.10 As outlined in paragraph 3.5, we have developed a range of scenarios for geological disposal and used the Parametric Cost Model to identify the cost impact of these scenarios. We propose to adjust the estimated costs to reflect the uncertainty in these estimates, for example through an "optimism bias" adjustment as described in paragraph 3.8 above.
- 3.11 However, while the Parametric Cost Model can estimate the costs of various scenarios it does not estimate the probability of those scenarios. Some of the parameters going into the calculation of waste disposal costs – such as the geology in which the GDF is located, which has a significant impact on cost – are uncertain and will remain so until a site has been identified. These uncertainties are best represented by cost distributions which can be combined using Monte Carlo techniques to

⁸ [http://www.hm-treasury.gov.uk/d/5\(3\).pdf](http://www.hm-treasury.gov.uk/d/5(3).pdf)

generate an overall distribution for the expected waste disposal cost as estimated by the Parametric Cost Model.

- 3.12 Also, while an optimism bias adjustment can reflect uncertainties in the estimates generated by the Parametric Cost Model, there are further uncertainties relating to the model's assumptions and exclusions. For example the costings are based on an assumed disposal route (i.e. the copper canister, as discussed in paragraphs 2.11 – 2.17 above). It is possible that an alternative, and perhaps more costly, disposal route might finally be adopted. The Parametric Cost Model also assumes that the fixed costs of a GDF are unaffected by the volume of waste emplaced within it. It is possible that the inclusion of new build and other potential wastes currently excluded from the Parametric Cost Model might have an impact on GDF design and hence fixed costs. Other potential costs excluded from the Parametric Cost Model include post closure institutional control and any engagement or community benefits packages.
- 3.13 Hence while an adjustment for optimism bias can cover many of the uncertainties around the estimates of the costs of waste disposal generated by the Parametric Cost Model, there seems to be a need for some further contingency to allow for these wider uncertainties. This contingency might also be best represented by a cost distribution, which when combined with the distribution outlined in paragraph 3.11 above generates a final cost distribution for the estimated unit costs of waste disposal.
- 3.14 Figure 1 provides an illustration of how a distribution of estimated unit costs for the disposal of ILW and spent fuel might be generated.

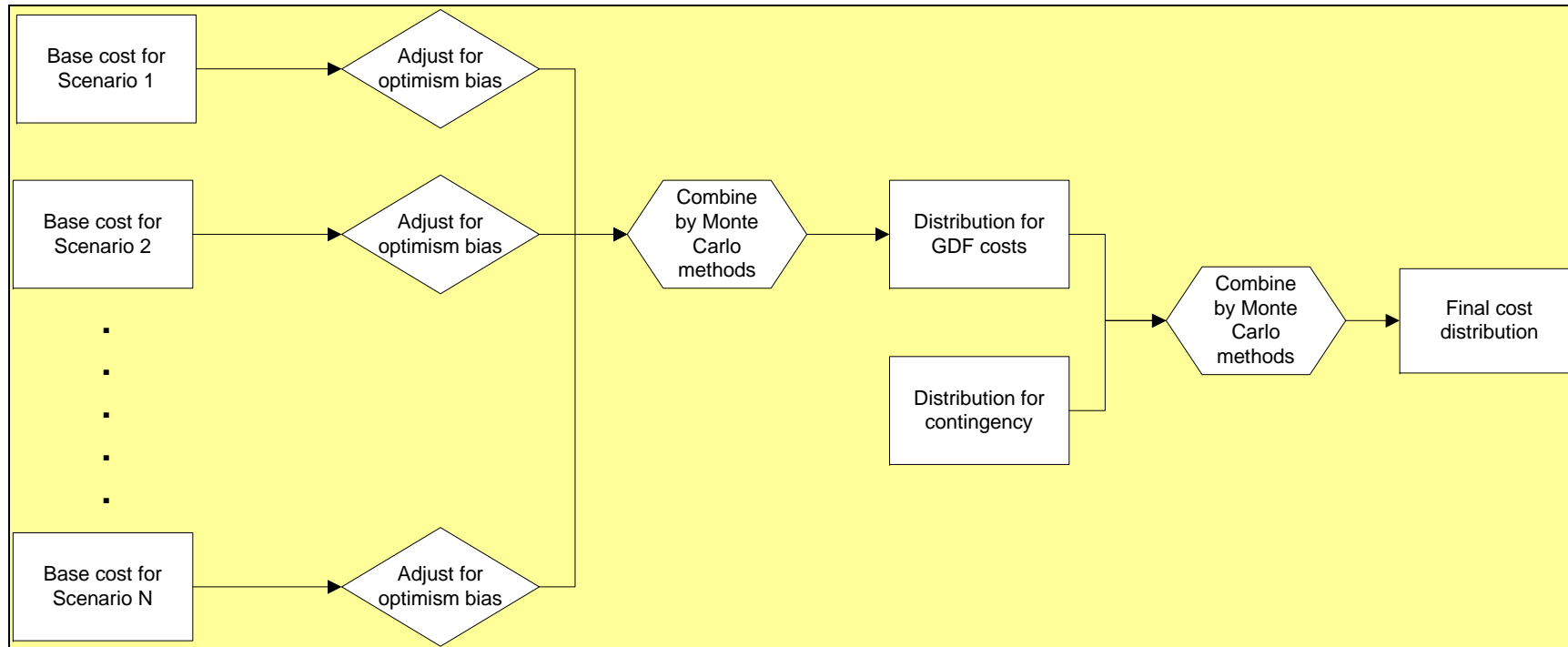


Figure 1: illustration of how a distribution of estimated unit costs for the disposal of ILW and spent fuel might be generated

The timing of the payment of the fixed unit price

- 3.15 This issue was also discussed in the first paper in this series. The assumption in DECC's current cost modelling work is that payments to cover the fixed unit price for the waste disposal service will be paid to the Government at the same time as title to and liability for each operator's waste is transferred to the Government.
- 3.16 Hence, on this assumption, new build's contribution to the fixed costs of a GDF is likely to be made some years after the fixed costs of the GDF are incurred. This means that the "real" value of the contribution to Government is lower than it would be if it were paid at the time the costs were incurred. This raises the question of whether there should be some form of "financing charge" applied to the fixed cost element of the fixed unit price, to reflect this.
- 3.17 There is range of approaches that could be taken to this question, for example:
- To apply a financing charge that aimed to recover capital costs over the entire period between the point in construction of the GDF when the main fixed costs are incurred (e.g. the construction of the access drift and shafts) and the transfer of new build waste for emplacement in the GDF. This would treat the new build operator's contribution to the fixed costs as though it were a payment that was due at the time the GDF was built, with interest being charged on that deferred payment until it was paid.
 - To apply a financing charge based on the approach that might be taken in the theoretical case that the Government were constructing a GDF solely to provide a waste disposal service for new build. In this case it would expect to recover all its costs including costs of capital, but if a GDF were to be constructed solely for the purposes of disposing of new build waste it would probably be built later, as it would not need to be ready until the waste from new build operators was ready for disposal.
 - To apply no financing charge, on the basis that the MRWS programme, which sets the framework for implementing geological disposal, envisages that a GDF will be built to manage the existing inventory of legacy and committed waste, regardless of whether or not there are any new nuclear power stations. Moreover the availability of space in a GDF and a filling schedule for new build wastes will be heavily influenced by legacy waste disposal issues.
- 3.18 Modelling work on this question continues. If it is concluded that there should be such an adjustment then in this eventuality more detail would be included in the public consultation on the issues covered by these three discussion papers in spring 2009.

The impact of uncertainty over fleet size

- 3.19 It will be for energy companies to build new nuclear power stations, therefore our cost modelling needs to allow for uncertainty in the size of the new build fleet. This uncertainty has an impact on our ability to estimate the unit costs of waste disposal in two ways.
- 3.20 Firstly, it was concluded in the first paper in this series that the assumption for DECC's cost modelling should be that a new build operator's share of the fixed costs of a GDF should be calculated in proportion to its share of estimated variable costs. This means that the contribution to the fixed costs per unit of ILW or spent fuel, and hence total estimated unit costs, is directly related to the amount of new build ILW and spent fuel created, and thus to the size of the new build fleet.
- 3.21 Secondly, the Government believes that it would be technically possible and desirable to dispose of new and legacy waste in the same GDF. However the FDP consultation acknowledged that the size of the new build programme, and the specification of the site chosen for the GDF, will have an impact on the feasibility of co-disposal. In the event that a second GDF were needed as a result of the new build programme becoming very large, this would imply a significantly greater total cost, although such cost would be spread over a larger nuclear programme.
- 3.22 Initial analysis shows that under an assumption of the co-disposal of legacy and new build wastes, unit waste disposal costs allocated to new build fall gradually as the size of the new build reactor fleet – and hence the total number of units of ILW and spent fuel – increases. This is because the unit variable cost of waste disposal is not affected by fleet size, but as the fleet size increases each unit's contribution to the fixed costs of the GDF reduces, as the total is spread more widely.
- 3.23 Similarly, in the theoretical scenario of there being a dedicated GDF for new build ILW and spent fuel, our initial analysis again shows that costs fall as the fleet size increases – but unit costs can be higher, especially where the new build fleet is small, as the total fixed costs of a GDF would be borne by a small number of operators.

Handling uncertainty over fleet size

- 3.24 There are a number of ways in which this uncertainty might be handled. Two of these approaches are considered in more detail below. In Option A, the methodology to set a fixed unit price would be based on a presumption of co-disposal, but we would retain the flexibility to revise this at a later date if there were reasons to consider that there was a significant risk that a second GDF might be needed. In Option B the methodology would make an estimation of the risk that a second GDF will be needed and would factor this in from the outset.

Option A

- 3.25 This approach would be based on a presumption of co-disposal, but we would retain the flexibility to modify the approach if circumstances change in the future. Under this approach, for the first proposed new nuclear power stations the fixed unit price would be based on an estimate of unit costs assuming the co-disposal of legacy and new build waste. The price would be based on a cautious estimate of costs, adjusted for uncertainty as described above and requiring a high level of confidence.
- 3.26 However the assessment of the likelihood of needing a second GDF would be kept under review. If a point were to be reached in the future which gave cause for the Government to reconsider its co-disposal assumption – either as a result of the new build fleet becoming very large or because of the specification of the site chosen for the GDF – the calculation of estimated costs would change accordingly and the new calculation would apply to any fixed unit prices that were set from that point onwards (but the changes would not apply retrospectively to any earlier fixed unit prices already agreed).
- 3.27 This approach would need to work within the constraint of uncertainty over the size of the new build fleet. Given that unit costs fall as the fleet size increases, it is important that the methodology does not overestimate the size of the new build fleet, as that would imply an underestimation of unit costs. The simplest way to avoid this risk would be to set the assumption on the known size of the new build fleet, and revise each time a new nuclear power station was given a fixed unit price, i.e. for the first proposed new nuclear power station, the cost estimate (and hence the fixed unit price) would assume a new build fleet of one reactor, for the second new reactor it would assume a fleet size of two and so on.
- 3.28 Under this approach early reactors might be set a fixed unit price somewhat higher than that set for later reactors. However, if at some point in the future as the reactor fleet grows it became necessary to amend the co-disposal assumption, later reactors might find that the estimated unit cost of waste disposal, and hence the fixed unit price, could increase, perhaps substantially. For early new reactors, once their price is fixed they are protected from this risk. There might be a case to add an additional element into the risk premium to reflect this.

Option B

- 3.29 One way in which a methodology could factor in the risk that a second GDF might be needed fully at the outset would be to use a “probabilised cost distribution.” This methodology would estimate the unit costs of waste disposal in the co-disposal scenario, and also in the theoretical event of a dedicated GDF for new build. As outlined above, for both distributions unit waste disposal cost fall as the size of the new build reactor fleet increases.

- 3.30 We consider that the likelihood of co-disposal proving not to be feasible is related to the size of the new build fleet – i.e. that it is negligible in the event of limited new build but increases in scenarios with a large new build fleet. This methodology would make use of this by assigning a value of zero to the probability of needing a second GDF in the event of a new build fleet being a small size, and a value of one in the event that the new build fleet is a very much larger size, and it would also assume that the probability increases linearly between these two points.
- 3.31 This approach enables the two cost distributions to be combined in a single probablised cost distribution, as illustrated in Figure 2. Under this distribution, as the size of the new build fleet increases, the probability of requiring a second GDF increases and therefore the distribution of estimated costs will switch from the co-disposal cost curve to the dedicated GDF cost curve.

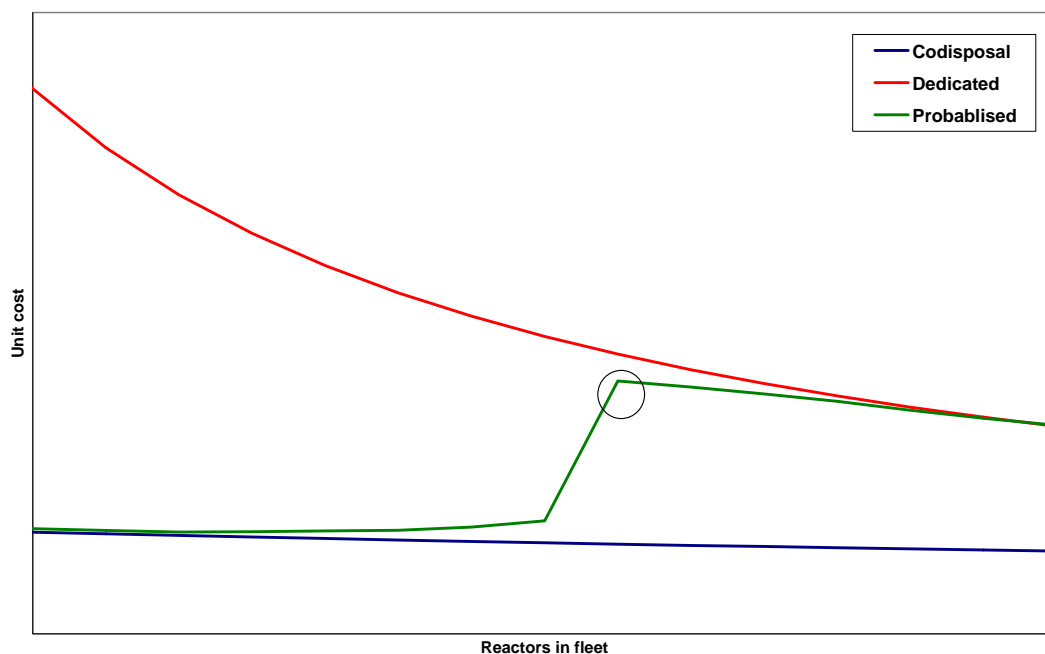


Figure 2: illustration of a probablised unit cost distribution for different sizes of new build fleet

- 3.32 This single probablised cost distribution has a maximum point – circled in Figure 2. This maximum cost estimate could be used to establish the fixed unit price and could be used for even the first reactors in the new build fleet.

Section 4: Conclusions and next steps

Summary of key points from this paper

- 4.1 This paper sets out current thinking on the methodology for establishing an indicative fixed unit price for the disposal of ILW and spent fuel. The key points, which will be the focus of our discussions with stakeholders on this topic, are that:
- With regard to the units to be used for setting a fixed unit price, for ILW it might be sufficient to use a simple volume measure. However a fixed unit price for spent fuel will need to take into account more detailed considerations around its disposal route and the impact of various assumptions around, for example, fuel burn-up and heat load.
 - A distribution of expected unit waste disposal costs will be developed and a high level of confidence will be required that a fixed unit price established by this methodology will exceed expected costs. This distribution needs to reflect the level of uncertainty in those estimates, and this might include an adjustment for “optimism bias” to allow for uncertainty in the estimates generated by the Parametric Cost Model and a contingency adjustment to allow for wider uncertainties.
 - A new build operator’s contribution to the fixed costs of a GDF is likely to be made some years after those costs are incurred. This raises the question of whether there should be some form of “financing charge” applied to the fixed cost element of the fixed unit price and there are a number of possible approaches to this issue.
 - Our cost modelling needs to allow for uncertainty in the size of the new build fleet. There are a number of ways in which this uncertainty might be handled, two of which are described here.

Next steps

- 4.2 This is the second in a series of three informal discussion papers being issued by the Office for Nuclear Development, for discussion with stakeholders during autumn/winter 2008/09. This is not a formal consultation and we are not specifically seeking public views at this stage. However these papers are being made available on the Department’s website and if interested parties wish to comment on the issues covered in these papers they may do so, and these comments will be taken into account as part of the development of the Government’s policy on these issues. Information on how to comment is set out in paragraph 1.5.
- 4.3 The third paper in this series will be on the DECC cost model and our updated estimates of total costs for waste management, disposal and decommissioning. The full consultation on the issues covered by the three discussion papers in the series will take place in spring 2009 and will reflect comments made on these three papers.