

Western Power Distribution

Consultation on potential changes to the Use Of System Methodology

July 2006

1. Summary

1.1 The purpose of this consultation is to:

- Summarise responses to our first consultation published in January 2006 (available from our web site at <http://www.westernpower.co.uk> under Information for Major Energy Users/Methodology)
- Detail the proposed method for setting future use of system charges and explain why it better meets the relevant licence objectives
- Seek views on the proposed method and the charging assumptions behind it.

1.2 This consultation also includes indicative prices for both WPD licence areas i.e. South West and South Wales, and information on how to obtain a spreadsheet which allows the user to undertake some sensitivity analysis around the key assumptions. It also includes a draft methodology statement reflecting the proposed methodology.

1.3 WPD are proposing to use a hybrid Long Run Incremental Cost (LRIC) and Distribution Reinforcement Model (DRM) approach to future use of system pricing - LRIC being applied to EHV networks and the DRM to lower voltage networks.

1.4 WPD welcomes responses and comments on any aspect of this consultation and in particular to the specific issues identified. Views are invited by 25th August 2006. Please send responses electronically to wpdpricing@westernpower.co.uk. All responses not marked as confidential will be published on the WPD website.

1.5 Our objective is that the revised charging method becomes fully operational from the April 2007 tariff revision.

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Appendix 1 - Draft Methodology Statement

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2. Introduction

2.1 WPD began work on the development of longer term charging structures in early 2005. Since April 2005 WPD has been undertaking a joint structure of charges research project with Bath University and this has identified different methods for charging for distribution assets.

2.2 This document:

- Summarises responses to our first consultation published in January 2006 (available from our web site at <http://www.westernpower.co.uk> under Information for Major energy Users/Methodology)
- Details the chosen method and why it better meets the relevant licence objectives
- Seeks views on the chosen method and the charging assumptions behind it.
- Includes indicative prices for both WPD licence areas i.e. South West and South Wales, and
- Includes information on how to obtain an excel spreadsheet which allows the user to undertake some sensitivity analysis around the key assumptions.
- Includes a draft methodology statement reflecting the proposed methodology

Structure of this document

2.3 This paper is structured as follows:

Section 1 - Summary

Section 2 - Introduction

Section 3 - Outline of current charging arrangements

Section 4 - Responses to the January consultation

Section 5 - Proposed charging arrangements

Section 6 - Proposals versus Licence obligations

Section 7 - Impact on prices

Section 8 - Spreadsheet model

Section 9 - Next steps

Timetable and Responses

2.5 WPD welcomes responses and comments on any aspect of this consultation and in particular to the specific issues identified. We would expect this consultation to be of particular interest to DNOs, suppliers, distributed generators, customers and their representatives. Views are invited by 25th August 2006. Please send responses electronically to wpdpricing@westernpower.co.uk. All responses not marked as confidential will be published on the WPD website.

2.6 Once responses have been received WPD will consider what changes are required to our methodology before submitting a revised methodology

statement to OFGEM. Our objective is that the revised charging method becomes fully operational from the April 2007 tariff revision.

3. Charging Arrangements - Existing arrangements

- 3.1 Our DUoS charges are based on the 500MW Distribution Reinforcement Model (DRM). The DRM uses an approach outlined by TA Boley and GJ Fowler in 1977 for cost reflective retail tariffs in England and Wales. The details of our current approach are contained in our use of system methodology statement, available from our web site at <http://www.westernpower.co.uk> under Information for Major Energy Users. The following gives an overall summary.
- 3.2 This model contains assets at modern equivalent prices (current costs) which are based on a scaled representation of the WPD network. Yardstick costs (£/kW) are calculated from the DRM for each voltage and transformation level.
- 3.3 The DRM model measures the costs of an additional 500MW of capacity at the time of peak demand and averages this cost across users at each voltage level. Therefore, the DRM represents most closely an average cost for customers at given voltage levels at peak demand within the marginal 500MW increment.
- 3.4 The model is used to determine yardstick costs by customer class. The contribution of a customer group to peak demand (the coincidence) is the method by which costs are divided between groups, taking into account diversity factors and load profile. This method is used because consumption for non half hourly (NHH) metered customers is not measurable at times of peak. Coincidence factors based on load research therefore form the basis for different tariffs to take account of different usage at peak.
- 3.5 Charges for EHV connected customers contain a site specific element associated with connection assets. At present EHV customer prices do not match the output of the model and these are covered by a transitional arrangement within the methodology.
- 3.6 An adjustment is made to the yardsticks to reflect the degree that connection contributions have already paid for part of the network.
- 3.7 Charges for generators are based on an assessment of the likely system costs associated with the connection of generators expressed in terms of £/kW. This is converted to charges at different voltage levels by using yardstick weighting from the 500MW DRM.
- 3.8 Charges from the above method are then uniformly scaled to achieve the required revenue. The current level of scaling required is around 15%.

4. Responses to January Consultation

4.1 The purpose of the January consultation was to:

- Summarise the work that WPD has been doing on reviewing its UoS Methodology
- Seek views on the type of methodology that is most appropriate to meet our licence obligations
- highlight key parameters and assumptions in the alternative methods being considered and seek views on the appropriateness of these assumptions, and
- Seek views on how the methods should be further developed where known issues have yet to be accommodated

4.2 There were 11 responses

- 3 from EHV connected demand customers
- 5 from Suppliers (all 'large')
- 3 from Distributors (no IDNOs)
- There were no responses from
 - Generators (although all the Suppliers that responded have generation interests)
 - Trade Associations
 - Academics/Consultants
 - Energywatch

4.3 All the non confidential responses are available from our web site at <http://www.westernpower.co.uk> under Information for Major Energy Users. The following summarises the responses received.

4.4 A supplier did not agree with Ofgem's view that models aligned with forward looking long run incremental costs was a valid basis for a fundamental review of methodology and believes that it has not been demonstrated that there are any issues with the existing approach

4.5 WPD response: the need for a review has been accepted by all Distributors and we believe that both methods outlined in the January consultation are more cost reflective. See section 6.

4.6 Another supplier believed that the result of consultations by distributors will be difficult to rely on as they are less likely to get responses than those from Ofgem

4.7 WPD response: we agree this is an issue, however we understand that Ofgem would want to be assured that users had been adequately consulted and would undertake their own consultation if necessary

4.8 Concern from a large customer, a supplier and a distributor that WPD are progressing too fast and that we should follow the other distributors. Another supplier was concerned that if distributors implement different solutions then

implementation costs would be higher. 2 suppliers were also concerned that billing system changes will be needed

- 4.9 WPD response: we have spent 14 months on our cost attribution work so far compared to the 3 to 6 months allocated in the COG work plan. Whilst agreeing that there are benefits in a common methodology, methodologies are not a joint licence requirement like the DCode or DCUSC. We do not believe that the methods presented will require changes to billing systems or processes
- 4.10 2 large customers and a supplier did not agree that the same method need be used for demand and generation, whilst another 2 suppliers believed that consistency was needed to demonstrate non-discrimination/cost reflectivity
- 4.11 WPD response: we are uncomfortable with demonstrating non-discrimination without a consistent methodology
- 4.12 2 large customers and 2 suppliers did not believe that they could comment on principles without first seeing the resulting prices
- 4.13 WPD response: we understand the problem faced by respondents, but felt it was beneficial to consult on principles at an early stage. Further work was required before publishing example prices if they were to be useful. This consultation contains example prices.
- 4.14 However, these same large customers and one of the same suppliers concluded that neither the ICRP or LRIC approach better met the licence objectives generally on the grounds of the methods being complex and dependent on assumptions which would be difficult to validate. This supplier also believes that an allocation of costs is more cost reflective than a model of future investment. Another supplier did believe that both the ICRP and LRIC methods could better meet the objectives at EHV but was concerned about HV and LV networks.
- 4.15 WPD response: we continue to believe that these methods can better meet our licence objectives, but accept that we will need to justify this further if these methods are to be implemented. Section 6 considers this further.
- 4.16 2 distributors and 2 suppliers highlighted the need for transparency of data/background to assumptions and concern over sensitivity of model to assumptions
- 4.17 WPD response: The key assumptions in the LRIC model are starting loads, load growth, security factor and reinforcement cost. All forward looking models and business plans have to be based on best estimates of these parameters.
- 4.18 2 large customers expressed concern that a forward looking model could be cost reflective when 30% of investment is associated with reinforcement

- 4.19 WPD response: we believe this is part of the revenue reconciliation issue that we accept needs further work. Section 5 details the proposed revenue reconciliation method.
- 4.20 A large customer was also concerned that forward looking models ignore historic contributions and that as the ICRP/LRIC model only appears to be practical at EHV it should not be used. 2 suppliers and a distributor, however, felt that locational prices have merit but are likely to be impractical at lower voltages
- 4.21 WPD response: we understand the concern regarding contributions. Unfortunately, an historic contribution has no impact on future investment decisions. We accept that further work is needed on how to treat lower voltage networks and our proposals are detailed in section 6.
- 4.22 2 suppliers and a distributor expressed concern that scaling to required revenue would mask cost reflectivity – based on a belief that the model would produce charges representing 10% of required revenue
- 4.23 WPD response: we agree that reconciliation to required revenue is a significant issue for all methodologies, however dispute that these methodologies will always provide charges covering only a small percentage of required revenue.
- 4.24 A supplier stated that adoption of a model similar to that used by National Grid would be wrong as the National Grid method has problems
- 4.25 WPD response: we do not intend commenting on the merits of National Grid's methodology applied to their network
- 4.26 A supplier and a distributor were concerned that time of day issues were not addressed and that the method did not consider all future cost and the possibility of constraining generation
- 4.27 WPD response: the method has been further developed to take account of summer loadings and the impact of generation at these times. It now addresses the time of peak usage of each asset in determining the price.
- 4.28 In summary, the responses to our January consultation indicated that more work was required on:
- Definition of data being used
 - Basis of necessary assumptions
 - Lower voltage networks
 - Time of use issues
 - Reconciliation with allowed revenue
 - Presenting the case that a revised method better meets our Licence objectives

- 4.29 We continue to believe that both the ICRP and LRIC approaches better meet the Licence objectives at the EHV level than the existing methodology mainly due to the locational price being more cost reflective. We also believe that the LRIC method better meets the licence objectives than the ICRP method as it takes into account the utilisation of the network in setting locational prices.
- 4.30 Whilst work has been undertaken to apply the LRIC method to lower voltage networks, we do not intend to expand this approach to the HV and LV network at this time. This work and the reasons for continuing to apply the DRM to HV and LV networks is detailed in section 5.

5. Proposed Arrangements – LRIC (Long run incremental cost) and DRM

Overall Process

- 5.1 The proposed arrangements for implementation for the April 2007 price setting round, is to calculate charges for the EHV network using a long run incremental cost (LRIC) method and for lower voltages to use a distribution reinforcement method (DRM). These are outlined below.
- 5.2 The boundary between the two methods is the lower voltage side busbar of the EHV to HV transformation.
- 5.3 The LRIC method calculates the brought forward (or deferred) reinforcement cost as a result of the addition of an increment of demand or generation at each node. The objective is to link the impact of the behaviour of a user to reinforcement of the assets they utilise.
- 5.4 An initial load flow is used to determine the time it would take for each asset to reach its capacity assuming underlying utilisation levels and growth rates. Given these timings, and the future reinforcement costs, a net present value of the future reinforcements cost for the network is calculated using a discount rate equal to the cost of capital assessed by Ofgem as part of the 2005-2010 price control (i.e. 6.9%).
- 5.5 For each node, an increment of demand/generation is added and a new load flow generated. The evaluation of the net present value of the future reinforcement is repeated for the network with this increment present. The difference between the initial and incremental study represents the impact on future reinforcement investment and this is represented as an annual £/kW, and £/kVAr, at each node by multiplying the difference by an annuity factor.
- 5.6 The above analysis is undertaken for both winter loading conditions and summer loading conditions using the appropriate ratings for the season. The winter study determines the price for demand and the summer study the price for generation.
- 5.7 A full AC load flow is used in the methodology. The increment used is 0.1MW and 0.1MVar. The kW and kVAr increments are applied separately. The assets used to calculate the locational price are those that see a change in flow greater than 1 kW or kVAr as a result of the increment.
- 5.8 The modelling of the impact of generation increments does not include any allowance for fault level or voltage constraints.

Calculations

- 5.9 If a network component has a capacity of C , and supports a power flow of D , then the number of years it takes to grow from D to C for a given load growth rate r can be determined from the equation:

$$C = D \times (1 + r)^n$$

where n is the number of years D takes to reach C .

i) Assuming a yearly load growth of r , a starting loading on the asset of D and an asset capacity of C , then the following investment time horizon until reinforcement is determined:

$$n = \frac{\log C - \log D}{\log(1 + r)} \text{ years}$$

ii) If future investment is the same as the current circuit, its present value, with a discount rate of d , after n will be:

$$PV = \frac{Asset}{(1 + d)^n} \quad \text{where } Asset \text{ is the MEA value of the asset}$$

iii) New reinforcement time horizon post injection of demand or generation

$$n_{new} = \frac{\log C - \log D}{\log(1 + r)} \text{ years}$$

iv) Present value with the earlier future reinforcement:

$$PV_{new} = \frac{Asset}{(1 + d)^{n_{new}}}$$

v) Difference in present value:

$$\Delta PV = PV_{new} - PV$$

vi) Charges are then annuitised:

$$\Delta U = \Delta PV * annuityfactor$$

Detailed Assumptions/Parameters

5.10 In order for the core equations above to be calculated, the LRIC method uses a number of inputs and assumptions;

1. The EHV network is as detailed in the Long Term Development Statement (published in accordance with Licence condition 25).
2. An assessment of the security factor applicable to each asset consistent with our security standard (P2/6). Assets to be used for this purpose are all WPD owned assets. At EHV connection sites, where the assets are for the sole use of the connected customer, an annuity of the MEA value of these connection assets is used. Some of these assets may have been part, or entirely paid for by customer contributions as part of their connection.

3. A modern equivalent asset (MEA) value for each element of the EHV network is used. By analysing historical costs, it has been identified that reinforcement of a transformer costs, in MEA terms, approximately half the cost of the original overloaded transformer. This factor takes into account that the model absorbs existing substation costs into the transformer value and hence the reinforcement has a lower marginal cost. The cost of reinforcing an overloaded 132kV circuit is approximately 1.5 times the MEA value of the overloaded circuit, at 33kV a factor of 2 is applied. The asset lives themselves are not constrained as this is a reinforcement model and not a replacement model and so the time to reinforcement can be greater than the probable asset lives.
4. The network configuration used is that which is expected to exist in the winter of the year for which charges are being set.
5. For the winter peak demands, the model uses the same demands as are used to assess reinforcement. These are detailed in our LTDS. Summer minimum demands are taken as being a percentage of winter peak demands. This percentage is derived for each GSP and applied to the demands supplied by that GSP. These are consistent with the annual data we provide NGT under the Grid Code.
6. The generation export used during the winter period is generally zero unless it is deemed to contribute to security under P2/6. The generation export used for the summer period is the maximum agreed export capacity. These are the same assumptions that are used for investment planning.
7. The underlying demand and generation growth forecast for the medium term (length of the price control period) is used. This consultation uses 1% per year for both demand and generation growth.

5.11 Security factors have been assessed for each asset by a team of distribution network experts using an N-1 security standard in line with P2/6. The whole network has been inspected and varying security factors have been assigned to each circuit/transformer. For example, a circuit being one of 3 feeding part of the network would have its rating divided by 1.5. Whilst these are correct for the system configuration, they do not take into account uneven load sharing due to differing impedances on parallel paths through the network. This is indicated where the model shows a currently overloaded asset despite there being no plans in our LTDS for its reinforcement. Where this occurs, the security factor is increased in the assets taking a greater share of the loading to better reflect operating conditions. This is achieved by raising the security factor.

5.12 For EHV site, the charge is made up of the sum of three components:

- The scaled £/kW and £/kVAr charges multiplied by the assessed demand at time of peak or for generation sites the agreed export capacity
- The annuitised cost of the MEA value of the on site sole use connection assets
- The allocation of network rates

5.13 A spreadsheet is available (see section 8) which allows the user to alter several key inputs such as growth assumptions or security factors and provides for the user to gain some understanding of the sensitivity of the prices generated to the inputs.

Lower voltage networks

5.14 Three studies at the lower voltage levels (HV) urban, mixed urban and rural, were carried out. Only the heavily loaded urban HV network gave locational prices representing more than a few percent of the required revenue. Hence, using an LRIC method at these voltage levels would result in most of the price being represented by the reconciliation to allowed revenue. As a result we have decided to continue to use the distribution reinforcement model (DRM) methodology at voltage levels below the lower voltage busbar at EHV to HV substations.

Revenue Reconciliation

5.15 Using a hybrid of LRIC and DRM adds to the issue of reconciliation to allowed revenue. Initially a split of allowed revenue needs to be made between the two models. Two approaches were considered:

- Split allowed revenue between the EHV network and lower voltage networks using a modern equivalent asset (MEA) valuation of each network
- Maintain the split of revenue between the two parts of the network in the same proportion as the existing methodology splits the revenue.

5.16 Examples of the impact of these two approaches are shown in section 7. Whilst the second approach may give greater consistency with historic charging, it would not be possible to update with the development of the network and hence the first method is preferred.

5.17 Two approaches were considered for reconciling the LRIC method to a required revenue. These were:

- Adjustment of the derived charges by a uniform £/kW adjustment or
- Adjustment by a uniform percentage

5.18 Where charges are low (either positive or negative) the effect of a uniform £/kW adjustment can be to change a positive charge into a negative charge and vice versa. i.e if the model over recovers required revenue, a connection with a small positive demand charge could after a negative £/kW adjustment end up

with a negative charge and be paid for greater use of the network. The same effect can happen with generation that would be paid, but after reconciliation to allowed revenue would have to pay.

5.19 Consequently, we believe that adjustment to required revenue by uniform percentage scaling maintains relativities and provides the most cost reflective and fairest method.

5.20 Hence, it is proposed that the following approach is used:

- Allowed revenue is split between the EHV network and lower voltage networks using a modern equivalent asset (MEA) valuation
- Asset quantities used for this evaluation to be those contained in our Regulatory Reporting Tables together with MEA asset values used for our long term investment planning
- At the EHV level reconciliation will be made by a uniform percentage scaling
- Averaged £/kVA from the EHV model at the 33/11kV level will be used to populate the top levels of the DRM
- Reconciliation of the DRM to required revenue will be achieved by uniform scaling, excluding the parts derived from the LRIC model

5.21 Both the LRIC and DRM parts of the model recover forecast network rates in proportion to the revenue recovered.

5.22 Currently NGC exit charges are allocated via yardsticks in the DRM. It is proposed that these are recovered via the revenue reconciliation process described above. Under the 'plugs' methodology, the value of NGC exit charges at a site varies depending on whether the exit point is sole use or shared. This is not a cost influenced by the behaviour of customers connected to our network and hence we believe that incorporating these costs within the revenue reconciliation is fair.

Tariff structures

5.23 The process described above is about recovering a cost reflective share of the required revenue. We do not propose changing tariff structures as part of this methodology change and hence it will not require any changes to billing systems or processes.

Changes to Methodology Statement

5.24 The above proposals require a considerable revision to our methodology statement. A draft revision reflecting the hybrid LRIC/DRM method is attached to this consultation.

Views Invited

5.25 Views are invited on any aspect of the proposed methodology and in particular on:

- 5.26 As highlighted in 5.10 some of the assets charged for under LRIC may have been part, or entirely paid for by customer contributions as part of the original connection. A potential solution to this would be to move the connection boundary at the next price review for EHV connections and introduce consequential final sums liabilities and capacity guarantees. One consequence of this would be to weaken the incentive for new generators to opt for a cheaper, but less secure, local connection design as they currently see a benefit in lower connection charges. In the interim, should some additional adjustment be made to prices for EHV connections and if so what form should this take?
- 5.27 The growth rates chosen for both demand and generation are based on projections but based upon historical growth rates. Are these sensible assumptions or should for example, the growth in generation be linked more directly to government targets for renewable energy?
- 5.28 Do you agree that the method of revenue reconciliation is reasonable and fair?
- 5.29 Do you agree with the proposed treatment of NGC exit charges?
- 5.30 Do you agree that the draft methodology statement adequately describes the proposed methodology and if not which aspects need further clarification?

6. Proposals versus licence obligations

Licence Obligations

- 6.1 As of 1 April 2005, DNOs methodologies must conform to the objectives set out in Standard Licence Conditions 4(3) and 4B(3). These state that methodologies should:
- facilitate the discharge of the DNO's obligations under the Act and its licence; and
 - facilitate competition in supply and generation, and not restrict competition in transmission or distribution; and
 - be cost reflective, as far as is practicable once implementation costs are taken into account and
 - take into account developments in the licensee's distribution business.
- 6.2 OFGEM in its Structure of Charges documents and in particular in the May 2005 Consultation paper has indicated the importance of deriving a charging model which delivers economic efficiency. Economic efficiency as defined by OFGEM means "that consideration should be given to ensuring lowest cost provision of the system which would include the requirement for the provision of efficient investment signals to customers such that future network needs are met efficiently."
- 6.3 The Ofgem May 2005 Structure of Charges paper also identified the following high level charging principles:
- Cost reflectivity;
 - Simplicity;
 - Transparency;
 - Predictability; and
 - Facilitation of competition.
- 6.3 The LRIC method allows locational prices to be determined taking into account both the extent that assets are used to supply a node on the network and also the spare capacity that exists in those assets. This compares with the existing DRM method that uses average £/kW per voltage level. Hence the LRIC method is more cost reflective than the DRM. The locational signals derived for the HV and LV networks were only a small percentage of the required revenue (see section 5) and hence we do not believe that application of the LRIC method at these voltages would be more cost reflective than the existing DRM method.
- 6.4 The LRIC method is simple in concept; however, the volume of data used gives the appearance of a complex method. As detailed in section 5, there is no intention to change tariff structures as part of the application of LRIC to

EHV networks and hence the application of Use of System charges will remain easy to understand and apply.

- 6.5 This consultation paper sets out the formulae and assumptions used and a spreadsheet version allowing the user to vary certain assumptions is available (see section 8). This is a greater level of transparency of EHV charges than has been available under the DRM approach. Our intention is to make available details of the model used each year.
- 6.6 LRIC prices will vary due to changes in user's demands on the network, the networks configuration and the projection of future load growth used. Our current knowledge of changes in demands on the EHV network and its configuration are published in our LTDS annually and hence give users the same level of information as is available to us in predicting future changes in prices. The method is sensitive to changes in the forecast growth in demand and generation and hence it is intended to use medium term load growth forecasts underlying the price control and only vary these during a price control where strong evidence of a significant variation emerges.
- 6.7 Given the method's improved cost reflectivity and transparency, we believe that it will better facilitate competition in the supply and generation of electricity and will not restrict competition in transmission or distribution. We also believe that the improved costs reflectivity at the EHV level will reduce perverse incentives to connect to the distribution or transmission network due to the use of averaged charges on the distribution network.

Views invited

- 6.8 Views are invited on any aspect of this section and in particular on:
- 6.9 Do you agree that the proposed LRIC methodology better meets the licence objectives at EHV than the DRM?

7. Impact of proposed arrangements on prices

- 7.1 The following tables show the results from the revised methodology, tables 1 to 4 show the figures for the South West and tables 5 to 8 for South Wales. Tables 1 and 5 compare the current price with the price under the revised methodology for published tariffs. As highlighted in section 3, some of the existing EHV connected customers have prices that do not match the output from the existing methodology. For completeness Tables 2 and 6 show the prices for EHV sites and includes the current methodology price without capping, the charges that result from the proposed methodology, and the actual current charge. Tables 3 and 7 show the impact of the two revenue reconciliation or scaling methods described in para 5.15 and the two LRIC reconciliation to required revenue methods described in para 5.17. The table also shows the indicative prices under the proposed methodology assuming a 2% underlying load growth input assumption.
- 7.2 Tables 4 and 8 show illustrative generator prices. It should be noted that whilst the method calculates, and the tables show, generator prices, all of the generators were connected under pre April 2005 terms and hence would not currently be charged use of system charges. The charges are shown to inform users of what the charges would be if charges were applicable. Clearly other prices would change slightly to take account of the impact of these charges not applying and still recovering the required revenue.

| Assumptions | |
|---------------------------------------|-------|
| Load growth | 1.00% |
| reinforcement factor - substations | 0.5 |
| reinforcement factor - 33kV circuits | 2.0 |
| reinforcement factor - other circuits | 1.5 |
| Rate of return | 6.90% |

South West Tables

| TABLE 1 | | 2006/07 | 2006/07 | |
|----------------|--------------------------------------|--------------|-------------------------|----------|
| Profile | Tariff | Actual Price | Indicative | % change |
| | | p/kWh | LRIC_DRM approach p/kWh | |
| profile 1 | domestic unrestricted | 1.92 | 1.93 | 0.3% |
| profile 2 | economy 7 | 2.23 | 2.23 | 0.0% |
| profile 2 | economy 7 | 0.43 | 0.49 | 13.1% |
| profile 3 | non domestic unrestricted | 1.55 | 1.54 | -0.8% |
| profile 4 | non domestic economy 7 | 2.14 | 2.10 | -1.7% |
| profile 4 | non domestic economy 7 | 0.41 | 0.43 | 5.9% |
| profile 5to8 | low voltage supplies with substation | 1.32 | 1.27 | -3.5% |
| profile 5to8 | low voltage supplies | 1.63 | 1.69 | 3.8% |
| HHM | High voltage supplies | 0.70 | 0.63 | -10.2% |
| HHM | low voltage supplies with substation | 1.06 | 1.01 | -4.3% |
| HHM | low voltage supplies | 1.31 | 1.34 | 1.7% |
| UMS | NHHM | 1.78 | 1.82 | 2.5% |
| UMS | HHM | 1.70 | 1.77 | 4.2% |

| TABLE 2 EHV Designated Sites | 2006/07 | 2006/07 | | 2006/07 | % difference |
|---------------------------------|--------------|-----------|----------|-----------|--------------|
| | Actual Price | LRIC_DRM | approach | | |
| Load Sites | £s | £s | % change | | |
| South West Large Customer 1 | 30,061 | 28,284 | -5.9% | 17,362 | 63% |
| South West Large Customer 2 | 42,704 | 31,812 | -25.5% | 24,665 | 29% |
| South West Large Customer 3 | 50,985 | 65,085 | 27.7% | 29,448 | 121% |
| South West Large Customer 4 | 180,702 | 158,381 | -12.4% | 104,368 | 52% |
| South West Large Customer 5 | 322,765 | 253,241 | -21.5% | 186,420 | 36% |
| South West Large Customer 6 | 37,064 | 80,762 | 117.9% | 21,407 | 277% |
| South West Large Customer 7 | 995,603 | 1,732,393 | 74.0% | 1,044,890 | 66% |
| South West Large Customer 8 | 201,057 | 343,104 | 70.7% | 274,800 | 25% |
| South West Large Customer 9 | 607,984 | 194,763 | -68.0% | 423,299 | -54% |
| South West Large Customer 10 | 51,210 | 238,393 | 365.5% | 6,532 | 3550% |
| South West Large Customer 11 | 76,263 | 26,261 | -65.6% | 64,553 | -59% |
| South West Large Customer 12 | 536,900 | 1,117,779 | 108.2% | 386,569 | 189% |

| TABLE 3 | | 2006/07 | 2006/07 | 2006/07 | 2006/07 |
|---|--------------------------------------|---|---|---|---|
| | | Indicative | Indicative | Indicative | Indicative |
| | | LRIC_DRM | LRIC_DRM | LRIC_DRM | LRIC_DRM |
| Comparison of Different Revenue Reconciliation Approaches | | Proposed Method: scaled to EHV asset allowed revenue split p/kWh | scaled to DRM determined EHV revenue allocation p/kWh | unused recovery - £/kVA approach p/kWh | proposed method with 2% growth p/kWh |
| profile 1 | domestic unrestricted | 1.93 | 1.89 | 1.93 | 1.93 |
| profile 2 | economy 7 | 2.23 | 2.20 | 2.23 | 2.23 |
| profile 2 | economy 7 | 0.49 | 0.44 | 0.49 | 0.49 |
| profile 3 | non domestic unrestricted | 1.54 | 1.52 | 1.54 | 1.54 |
| profile 4 | non domestic economy 7 | 2.10 | 2.09 | 2.11 | 2.11 |
| profile 4 | non domestic economy 7 | 0.43 | 0.42 | 0.43 | 0.43 |
| profile 5to8 | low voltage supplies with substation | 1.27 | 1.29 | 1.27 | 1.27 |
| profile 5to8 | low voltage supplies | 1.69 | 1.63 | 1.69 | 1.69 |
| HHM | High voltage supplies | 0.63 | 0.70 | 0.63 | 0.63 |
| HHM | low voltage supplies with substation | 1.01 | 1.02 | 1.01 | 1.01 |
| HHM | low voltage supplies | 1.34 | 1.29 | 1.34 | 1.34 |
| UMS | NHHM | 1.82 | 1.74 | 1.82 | 1.82 |
| UMS | HHM | 1.77 | 1.70 | 1.77 | 1.77 |
| | | £s | £s | £s | £s |
| South West Large Customer 1 | | 28,284 | 30,631 | 26,715 | 31,541 |
| South West Large Customer 2 | | 31,812 | 35,438 | 28,398 | 32,304 |
| South West Large Customer 3 | | 65,085 | 83,909 | 65,697 | 53,320 |
| South West Large Customer 4 | | 158,381 | 213,026 | 149,820 | 179,322 |
| South West Large Customer 5 | | 253,241 | 340,977 | 240,502 | 299,310 |
| South West Large Customer 6 | | 80,762 | 107,287 | 86,697 | 65,051 |
| South West Large Customer 7 | | 1,732,393 | 2,333,781 | 1,750,646 | 1,576,049 |
| South West Large Customer 8 | | 343,104 | 465,270 | 242,816 | 433,186 |
| South West Large Customer 9 | | 194,763 | 192,425 | 12,980 | 233,088 |
| South West Large Customer 10 | | 238,393 | 321,292 | 244,564 | 195,055 |
| South West Large Customer 11 | | 26,261 | 25,882 | 20,944 | 26,479 |
| South West Large Customer 12 | | 1,117,779 | 1,517,415 | 1,198,848 | 859,579 |
| Total EHV sites recovery | | 4,270,258 | 5,667,331 | 4,068,628 | 3,984,285 |

| TABLE 4 | | Illustrative Charge Only |
|---|--|---------------------------------|
| EHV Designated Sites | | 2006/07 (£s) |
| Generation Sites - for info only | | |
| South West Large Generator 1 | | 38,208 |
| South West Large Generator 2 | | -2,040 |
| South West Large Generator 3 | | 15,449 |
| South West Large Generator 4 | | 42,067 |
| South West Large Generator 5 | | 3,308 |
| South West Large Generator 6 | | -640 |
| South West Large Generator 7 | | 22,992 |
| South West Large Generator 8 | | 6,067 |
| South West Large Generator 9 | | 464 |
| South West Large Generator 10 | | 623,181 |
| South West Large Generator 11 | | 3,350 |
| South West Large Generator 12 | | 54,568 |
| South West Large Generator 13 | | -3,364 |
| South West Large Generator 14 | | -8,567 |
| South West Large Generator 15 | | -4,440 |
| South West Large Generator 16 | | 2,082 |
| South West Large Generator 17 | | 4,754 |
| South West Large Generator 18 | | 6,171 |

South Wales Tables

| Profile | Tariff | 2006/07 | | % change |
|--------------|---------------------------|-----------------------|---|----------|
| | | Actual Price p/kWh | Indicative LRIC_DRM approach p/kWh | |
| profile 1 | domestic unrestricted | 2.24 | 2.31 | 3.1% |
| profile 2 | economy 7 | 2.59 | 2.65 | 2.2% |
| profile 2 | economy 7 | 0.30 | 0.36 | 18.7% |
| profile 3 | non domestic unrestricted | 1.73 | 1.73 | 0.2% |
| profile 4 | non domestic economy 7 | 2.24 | 2.20 | -2.0% |
| profile 4 | non domestic economy 7 | 0.35 | 0.41 | 18.2% |
| profile 5to8 | low voltage supplies | 1.69 | 1.71 | 1.0% |
| HHM | High voltage supplies | 0.81 | 0.72 | -10.5% |
| | low voltage supplies | 1.43 | 1.49 | 4.2% |
| UMS | NHHM | 1.84 | 2.07 | 12.6% |
| | HHM | 1.86 | 1.96 | 5.6% |

| TABLE 6 EHV Designated Sites | 2006/07 | 2006/07 | % change | 2006/07 | % difference |
|---------------------------------|--------------|----------------------|----------|-----------------------------------|---------------------------|
| | Actual Price | LRIC_DRM approach | | Current method without capping | from LRIC_DRM approach |
| Load Sites | £s | £s | | | |
| South Wales Large Customer 1 | 73,522 | -26,443 | -136.0% | 86,000 | -131% |
| South Wales Large Customer 2 | 380,447 | 381,337 | 0.2% | 311,154 | 23% |
| South Wales Large Customer 3 | 219,548 | 37,253 | -83.0% | 98,495 | -62% |
| South Wales Large Customer 4 | 189,008 | 244,666 | 29.4% | 34,634 | 606% |
| South Wales Large Customer 5 | 152,665 | 389,584 | 155.2% | 288,221 | 35% |
| South Wales Large Customer 6 | 112,088 | 132,214 | 18.0% | 216,490 | -39% |
| South Wales Large Customer 7 | 186,190 | 18,699 | -90.0% | 152,435 | -88% |
| South Wales Large Customer 8 | 517,139 | 35,626 | -93.1% | 826,548 | -96% |
| South Wales Large Customer 9 | 39,497 | 31,165 | -21.1% | 37,640 | -17% |
| South Wales Large Customer 10 | 264,112 | 297,036 | 12.5% | 261,379 | 14% |
| South Wales Large Customer 11 | 1,090,401 | 448,543 | -58.9% | 714,727 | -37% |
| South Wales Large Customer 12 | 321,357 | 64,911 | -79.8% | 381,295 | -83% |
| South Wales Large Customer 13 | 445,592 | 279,155 | -37.4% | 560,593 | -50% |
| South Wales Large Customer 14 | 60,827 | 522,887 | 759.6% | 38,203 | 1269% |
| South Wales Large Customer 15 | 79,902 | 53,782 | -32.7% | 159,234 | -66% |
| South Wales Large Customer 16 | 58,028 | -108,493 | -287.0% | 63,974 | -270% |
| South Wales Large Customer 17 | 543,032 | 390,448 | -28.1% | 473,077 | -17% |
| South Wales Large Customer 18 | 199,673 | 47,366 | -76.3% | 301,558 | -84% |
| South Wales Large Customer 19 | 194,370 | 82,845 | -57.4% | 188,414 | -56% |
| South Wales Large Customer 20 | 127,119 | 57,314 | -54.9% | 145,261 | -61% |
| South Wales Large Customer 21 | 176,193 | 44,202 | -74.9% | 34,952 | 26% |
| South Wales Large Customer 22 | 83,549 | 86,381 | 3.4% | 28,281 | 205% |
| South Wales Large Customer 23 | 94,769 | 136,198 | 43.7% | 141,989 | -4% |
| South Wales Large Customer 24 | 836,033 | 391,130 | -53.2% | 597,147 | -35% |
| South Wales Large Customer 25 | 20,863 | 37,920 | 81.8% | 25,214 | 50% |
| South Wales Large Customer 26 | 138,379 | 11,611 | -91.6% | 29,350 | -60% |
| South Wales Large Customer 27 | 63,298 | 34,190 | -46.0% | 67,503 | -49% |
| South Wales Large Customer 28 | 82,474 | 274,564 | 232.9% | 79,035 | 247% |
| South Wales Large Customer 29 | 77,117 | 17,625 | -77.1% | 16,375 | 8% |

| TABLE 7 | | | | 2006/07 | 2006/07 | 2006/07 | 2006/07 |
|--|---------------------------|-------|--|--|---|--|--------------------------------------|
| | | | | Indicative | Indicative | Indicative | Indicative |
| | | | | LRIC_DRM | LRIC_DRM | LRIC_DRM | LRIC_DRM |
| Comparison of Different Revenue Reconciliation Approaches | | | | Proposed method: scaled to EHV asset allowed revenue split p/kWh | scaled to DRM determined EHV revenue allocation p/kWh | unused recovery - £/kVA approach p/kWh | proposed method with 2% growth p/kWh |
| profile 1 | domestic unrestricted | | | 2.31 | 2.27 | 2.31 | 2.30 |
| profile 2 | economy 7 | day | | 2.65 | 2.61 | 2.65 | 2.64 |
| profile 2 | economy 7 | night | | 0.36 | 0.33 | 0.36 | 0.36 |
| profile 3 | non domestic unrestricted | | | 1.73 | 1.72 | 1.74 | 1.72 |
| profile 4 | non domestic economy 7 | day | | 2.20 | 2.21 | 2.20 | 2.18 |
| profile 4 | non domestic economy 7 | night | | 0.41 | 0.38 | 0.41 | 0.41 |
| profile 5to8 | low voltage supplies | | | 1.71 | 1.71 | 1.71 | 1.71 |
| HHM | High voltage supplies | | | 0.72 | 0.78 | 0.73 | 0.72 |
| HHM | low voltage supplies | | | 1.49 | 1.46 | 1.49 | 1.48 |
| UMS | NHHM | | | 2.07 | 2.01 | 2.07 | 2.06 |
| UMS | HHM | | | 1.96 | 1.91 | 1.97 | 1.95 |
| | | | | £s | £s | £s | £s |
| South Wales Large Customer 1 | | | | -26,443 | -34,590 | -28,846 | -22,667 |
| South Wales Large Customer 2 | | | | 381,337 | 471,812 | 371,452 | 428,880 |
| South Wales Large Customer 3 | | | | 37,253 | 47,628 | -2,775 | 61,713 |
| South Wales Large Customer 4 | | | | 244,666 | 311,280 | 240,521 | 295,659 |
| South Wales Large Customer 5 | | | | 389,584 | 467,490 | 384,569 | 398,604 |
| South Wales Large Customer 6 | | | | 132,214 | 166,608 | 125,676 | 74,637 |
| South Wales Large Customer 7 | | | | 18,699 | 21,871 | 14,563 | -15,256 |
| South Wales Large Customer 8 | | | | 35,626 | 37,472 | 12,623 | 122,523 |
| South Wales Large Customer 9 | | | | 31,165 | 34,972 | 30,874 | 31,166 |
| South Wales Large Customer 10 | | | | 297,036 | 370,070 | 294,487 | 395,558 |
| South Wales Large Customer 11 | | | | 448,543 | 562,663 | 434,081 | 336,033 |
| South Wales Large Customer 12 | | | | 64,911 | 80,704 | 58,057 | 139,017 |
| South Wales Large Customer 13 | | | | 279,155 | 356,903 | 270,365 | 414,369 |
| South Wales Large Customer 14 | | | | 522,887 | 662,821 | 526,737 | 431,259 |
| South Wales Large Customer 15 | | | | 53,782 | 66,304 | 50,216 | 66,984 |
| South Wales Large Customer 16 | | | | -108,493 | -139,333 | -115,327 | -101,432 |
| South Wales Large Customer 17 | | | | 390,448 | 467,953 | 382,175 | 489,604 |
| South Wales Large Customer 18 | | | | 47,366 | 58,596 | 42,231 | 135,591 |
| South Wales Large Customer 19 | | | | 82,845 | 103,884 | 81,384 | 86,485 |
| South Wales Large Customer 20 | | | | 57,314 | 69,599 | 52,042 | 98,939 |
| South Wales Large Customer 21 | | | | 44,202 | 49,401 | 42,657 | 44,981 |
| South Wales Large Customer 22 | | | | 86,381 | 86,755 | 85,362 | 99,183 |
| South Wales Large Customer 23 | | | | 136,198 | 169,230 | 128,977 | 192,335 |
| South Wales Large Customer 24 | | | | 391,130 | 429,577 | 374,573 | 581,536 |
| South Wales Large Customer 25 | | | | 37,920 | 38,994 | 36,892 | 50,719 |
| South Wales Large Customer 26 | | | | 11,611 | 11,795 | 9,140 | 21,777 |
| South Wales Large Customer 27 | | | | 34,190 | 43,699 | 33,601 | 44,056 |
| South Wales Large Customer 28 | | | | 274,564 | 348,676 | 275,065 | 297,894 |
| South Wales Large Customer 29 | | | | 17,625 | 20,078 | 12,986 | 77,696 |
| Total EHV sites recovery | | | | 4,413,715 | 5,382,913 | 4,224,360 | 5,277,843 |

| TABLE 8 | |
|---|---------------------------------|
| EHV Designated Sites | Illustrative Charge Only |
| Generation Sites - for info only | 2006/07 (£s) |
| South Wales Large Generator 1 | 4,020 |
| South Wales Large Generator 2 | 337,427 |
| South Wales Large Generator 3 | 9,961 |
| South Wales Large Generator 4 | 4,693 |
| South Wales Large Generator 5 | 4,258 |
| South Wales Large Generator 6 | 9,591 |
| South Wales Large Generator 7 | -370 |
| South Wales Large Generator 8 | -35 |
| South Wales Large Generator 9 | 27,699 |
| South Wales Large Generator 10 | 1,414,265 |
| South Wales Large Generator 11 | 6,857 |
| South Wales Large Generator 12 | 7,018 |

Views invited

- 7.3 As with all methodology changes, this change would result in price disturbance and consideration needs to be given to whether transition arrangements are appropriate. Do you believe that transition arrangements would be appropriate and if so in what form?
- 7.4 On a p/kWh basis, the charges calculated for most of the EHV customers are below those that would apply to an HV connected customer. In a few cases the p/kWh charge for an EHV site exceeds the HV p/kWh. Do users believe that this would be an acceptable situation? Or should, for example, a cap at the HV charge level be applied at the EHV level?

8. **Spreadsheet models allowing some sensitivities to be explored**

8.1 A spreadsheet model has been developed that allows some sensitivity analysis and further understanding of the model to be gained by users. Examples of the model are available showing the demand and generation cases for both South West and South Wales networks.

8.2 Specifically, it allows the user to vary

- the load growth assumptions
- the generation growth assumption
- the parameters of what future reinforcement costs will be
- split of revenue recovery between the LRIC and DRM parts of the model
- with some more detailed intervention an indication of the effect of specific assets being uprated or the security factor changing

8.3 We want to restrict the use of this model to understanding of the proposed methodology and not for other purposes, hence we will require users to sign the agreement shown in appendix 2 and return it to us prior to issuing the model on CD to the user. There will be no charge for the model.

8.4 Please send completed agreement to:

Nigel Lloyd
Income & Connection Manager
Western Power Distribution
Avonbank
Feeder Road
Bristol
BS2 0TB

9. Next steps

- 9.1 WPD welcomes responses and comments on any aspect of this consultation and in particular to the specific issues. Views are invited by 25th August 2006. Please send responses electronically to wpdpricing@westernpower.co.uk .
- 9.2 Once responses have been received WPD will consider what changes are required to our methodology before submitting a revised methodology statement to the Authority.
- 9.3 We will need to have the change to our methodology accepted by the Authority in the autumn to allow prices to be set by the end of December 2006.
- 9.4 Our objective is that the revised charging method becomes fully operational from the April 2007 tariff revision.