

**WESTERN POWER DISTRIBUTION (SOUTH WEST) PLC
WESTERN POWER DISTRIBUTION (SOUTH WALES) PLC**

Modification Proposal

Amendment Proposal: WPD/WALES/WEST/UOS006

Title: Modification Request on changes to the Use of System Charging Methodology to incorporate HV and LV connected Embedded Generation and consequential changes to the form of the Use of System Charging Statement

Date of Issue: 23/04/2008

FOR APPROVAL BY THE AUTHORITY

This Modification Proposal sets out Western Power Distribution (South West) plc and Western Power Distribution (South Wales) plc (“WPD”) proposals to amend WPD’s Use of System Charging Methodologies and consequential changes to the form of the Use of System Charging Statements.

Issue Record

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Western Power Distribution (South Wales) plc
Registered in Wales No. 2366985
Registered Office: Avonbank, Feeder Road,
Bristol BS2 0TB

Western Power Distribution (South West) plc
Registered in England and Wales No. 2366894
Registered Office: Avonbank, Feeder Road,
Bristol BS2 0TB

Western Power Distribution

Modification Request for changes to the Use Of System Methodology to incorporate changes to Embedded Generators charging principles and consequential changes to the form of the Use of System Charging Statement

April 2008

1. Introduction

- 1.1 As of 1 April 2005, DNO's 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.
- 1.2 WPD are obliged, under SLC4(2) of their distribution licence, to keep their use of system charging methodologies under review and make modifications as necessary for the purpose of better achieving the relevant licence objectives. The purpose of this document is to propose changes to WPD's use of system charging methodologies, which will better reflect the costs associated with HV and LV embedded generators.
- 1.3 If the authority does not veto this proposal then it will be introduced by 30th December 2008 for application at the 1st April 2009 tariff round.

2. Charging Arrangements

Existing arrangements

- 2.1 Our licence contains a mechanism to incentivise WPD to connect distributed generators to its electrical network. The mechanism allows WPD to recover a percentage of the reinforcement costs associated with connection of generation, a value per kW of generation connected and the operation and maintenance on the sole use and reinforcement assets either from the individual generator or the population of generators. This approach involves the creation of a generation regulatory asset base and the development of a distributed generation (DG) allowed revenue income stream. It is only

applicable in the cases where distributed generation has connected post April 1st 2005.

- 2.2 No charges are made in relation to generators connected prior to 1st April 2005. If a generator connected prior to April 1st 2005 makes a significant alteration to their export requirement (due to, for example, increased export capacity) only the incremental increase in export capacity will be charged generator use of system.
- 2.3 For Generation connected at either EHV, or at the lower voltage busbar at an EHV substation, charges are calculated in accordance with the LRIC method detailed in our current charging methodology statement. We believe that this continues to provide cost reflective charges (both positive and negative) and does not need amendment at this time.
- 2.4 Charges for microgeneration (less than 16 amps per phase), generally connected at domestic/small commercial premises, are currently set to zero. There continues to be a very low level of connection of these types of generation and hence neither costs nor benefits have been identified. In addition, most types of microgeneration (photovoltaic, micro wind) are unlikely to have reliable outputs at times of system peak. This means that they are unlikely to have any impact on local network capacity needs and only a small impact on higher voltage networks once significant quantities exist. This appears to be a number of years away at present and so we will be keeping these charges set to zero and will review the situation periodically.
- 2.5 Currently embedded generation charges at the HV and LV voltage levels are determined from cost yardsticks which have characteristics derived from demand data. These were originally set using cost estimate data used for assessing the last price control settlement which looked at the expected cost of connecting the generation expected at that time. This simple approach was used due to the very low number of connections and hence very limited data on actual costs.

3. Reasons for Review

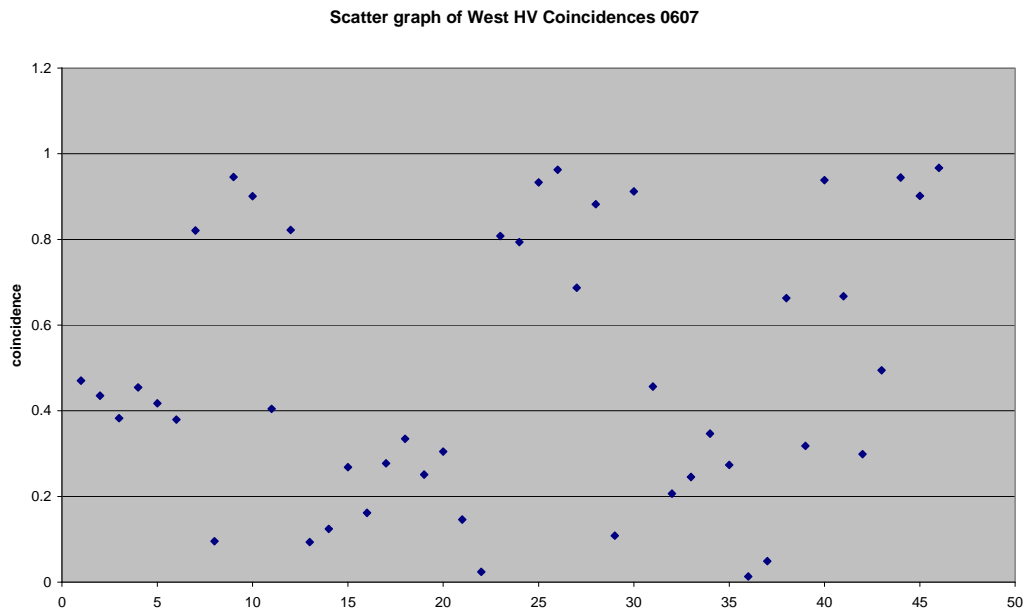
- 3.1 Concerns have been raised over whether the current simple approach to HV/LV generator charges is cost reflective and whether there are benefits that this generation provides to the network that are not being reflected in the tariffs offered.

4. Proposed Method for HV and LV connected generation

Data available

- 4.1 Embedded generation output in the South West was 440GWh in 2006/07 and the corresponding figure for South Wales was 318GWh.

- 4.2 For the HHM market, samples of the mpan's which build to the totals in 4.1 above, have been analysed and from half hourly data the coincidence of output with system maximum demand (calculated as export at time of system peak demand / peak export from site) and the units/kW of export have been determined.
- 4.3 The scatter graph below shows the range of coincidences which have been calculated for HV connected sites in the South West. In total 46 mpan's are represented on the graph.



- 4.4 As can be seen from the plotted points in the scatter graph, there appear to be two main clusters of points – those in the range of coincidences less than 0.5 and those with a coincidence of above 0.8. In broad terms the lower range of coincidences are characterised by generators which have lower load factors such as wind farms and waste treatment centres. The higher range of coincidences tend to be landfill sites and sites which are producing electricity as a by product of their own industrial process (e.g. CHP).

5. Principles for calculating HV/LV Generator UoS Charges

Non Half Hourly Metered HV and LV Connections

- 5.1 WPD proposes that charges for profile 5 to 8 sites will be treated in the same way as all other non half hourly metered sites. In common with the profile 1 to 4 sites there is currently little or no evidence of any additional costs or benefits associated with these connections so they will neither be charged nor receive a benefit. The position for these sites will be kept under review as the number of connections increases and further change proposals brought forward if necessary.

Half Hourly Metered HV and LV Connections

- 5.2 At present generation is widely dispersed across the network and it is rare that multiple generators are located on the same piece of HV or LV network. This means that whilst the output from the generator is likely to be absorbed by the locally connected load, sufficient local network needs to be established to supply the local load at times when the generator is not producing output.
- 5.3 It is more likely that the combined effect of multiple generators at the lower voltage levels will have an impact at times of system peak at higher voltage levels and hence it is appropriate to provide some credit to these generators. Consequently it is proposed that HV connected generators receive a benefit for savings at the EHV level and LV connected generators receive a benefit for savings at both the EHV and HV levels.
- 5.4 WPD proposes to take the calculated coincidences at HV and LV as appropriate for both licensed areas and multiply by -1 to reflect the benefit that these generators give to upstream networks. The assumption made is that any generation is dispersed in such a way across the network that no additional reinforcement costs are incurred by WPD as a result of the generator connecting to the system. If this situation changes due to a significant increase in generator connections then this method will need further revision. The generation can then act so as to back off demand in the immediate locality and will also be of benefit to the higher voltage levels of the distribution system in that reinforcement will be delayed. The cost yardstick will be negative being made up of a small positive service connection cost, zero cost at the voltage of connection and a negative charge at the higher voltages and so a credit given to the generator.
- 5.5 The yardstick cost (p/kWh), in this case benefit, is derived and multiplying by the forecast export kWh an expected overall credit to export sites can be determined. It is proposed that the tariff structure remains as at present, i.e. a p/kVA/day. In order to derive this, the overall credit (in £s) is spread across the forecast total agreed export capacities.
- 5.6 A further consideration is the consistency with the LRIC charging approach at higher voltage levels. Under the P2/6 security standard, generation that is intermittent such as wind generation, is assumed to be of no benefit in the winter and as such is given no credit. In addition the benefits at lower voltage levels of lower load factor generation are difficult to identify; combining these two together produces a further requirement that for HV/LV generation tariffs only those sites with a load factor of greater than 60% will be deemed to be of benefit to the network and so will receive a yardstick credit. Those lower than 60% load factor will not receive a yardstick credit or a yardstick charge except for recovery of future service replacement.

6. Scaling to required revenue

6.1 Allowed revenue in total will be positive as there is no mechanism within the price control to allow for overall credits to export sites connecting post April 1st 2005. This does not match with the newly derived export yardsticks which will be negative in value. Scaling back to a positive allowed income will necessarily reduce the pricing signals from the pure yardstick but also would reflect a recovery of other costs not included in the DRM yardsticks.

6.2 Whilst there are a number of options which could be considered the two main ones are;

Option 1: Apply a £/kVA adder to the negative export charges in order to produce an overall charge that recovers the positive allowed income under the price control. This may result in some of the negative charges at HV and LV becoming positive. It will also have the effect of increasing charges to generators that do not benefit the network above those that currently apply to all generators. The derivation of the allowed income would be as used for the site specific LRIC priced customers; allowed income would be incentivised connected capacity multiplied by the incentive rate (£2.50 per kW indexed up to allow for inflation).

Option 2: Do not scale the negative charges, leaving them as pure yardstick costs so maintaining a strong pricing signal. This would result in less revenue being collected than allowed and the build up of a correction factor in the generation part of the price control. Whilst in percentage terms this would be a large correction factor, given the low level of generation connections since April 2005 the quantum of revenue involved is small. Clearly such an approach would need regulatory acceptance that this revenue could be collected from the demand customer base until an enduring price control change could be implemented as part of the next price control review. This approach would not result in recovery of costs that do not form part of the yardstick created. These costs are overheads which can only be arbitrarily attributed to voltage levels in tariff formulation.

The main advantage of Option 1 is that WPD would still collect allowed revenue as intended at the time of DPR4. The main disadvantage with Option 1 is that to balance the benefit attributed to high load factor generators, the charges for low load factor generators increase. Option 2 provides a stronger cost signal to generators and does not transfer the recovery of benefit to high load factor generators onto low load factor generators, but the charges do not include any recovery of distribution overheads not included in the yardstick costs.

6.3 In both cases these charges will apply to export sites only i.e. the principal reason for the connection is to export output onto the distribution network.

6.4 In both cases WPD will remove the rule that prices cannot vary by more than 10% year on year for both HV and LV generation.

7. **Proposed method**

- 7.1 Yardsticks have been constructed which are based on a sample of existing generators with a load factor in excess of 60% - these are mainly landfill sites. For generators with load factors below 60%, a yardstick consisting of only service connection costs is used.
- 7.2 This produces coincidences of 0.87 for South Wales at HV and 0.92 for South West at HV. For LV the sample used is based on South West data as there have been no half hourly metered LV connected sites in S Wales since March 2005 and this gives a coincidence of 0.76. For the purpose of these tariffs; the negative of these figures is used at voltage levels higher than that at which the connection takes place.
- 7.3 At the voltage level of connection no cost beyond that which forms part of the connection charge is assumed to be incurred by WPD and neither is any network benefit of the generator envisaged, hence the £/kW is assumed to be zero.
- 7.4 The yardstick charges are scaled to allowed income by a £/kVA adder (Option 1 above).
- 7.5 These charges are only applicable for post April 2005 connections or augmentations.
- 7.6 The charges including a system benefit apply to generators which can demonstrate that the load factor either is or will be at 60% or above. Initially eligible generators will be landfill sites and those operating as a by-product of an industrial process. Generators with a load factor of less than 60% will be charged prices that do not include a system benefit. Generators falling into this category will be windfarms and waste treatment works. WPD will consider any evidence that would support the allocation of a generator to an alternative tariff.
- 7.7 All assumptions will be under review as more data becomes available.

8. Impact on Prices

8.1 South Wales area

	Low voltage connection		High voltage connection	
	< 60% Load Factor	> 60% Load Factor	< 60% Load Factor	>60% Load Factor
Existing charge (p/kVA/day)	1.98	1.98	2.46	2.46
Unscaled yardstick charge (p/kVA/day)	0.15	-17.62	0.04	-5.34
Scaled proposed charge (p/kVA/day)	5.85	-11.91	5.75	0.37

8.2 South West area

	Low voltage connection		High voltage connection	
	< 60% Load Factor	> 60% Load Factor	< 60% Load Factor	>60% Load Factor
Existing charge (p/kVA/day)	1.86	1.86	1.65	1.65
Unscaled yardstick charge (p/kVA/day)	0.31	-16.75	0.02	-6.80
Scaled proposed charge (p/kVA/day)	4.43	-12.63	4.14	-2.68

9. Proposals versus licence obligations

9.1 The revised proposals provide greater cost reflectivity than the existing charges as they reflect the benefit that high load factor generators provide in deferring deeper system reinforcement.

10. Changes of form to the Use of System Charging Statement

- 10.1 The Use of System charging statements for WPD (South West) and WPD (South Wales) will be modified to include the revised prices and the method of allocation of generators to the appropriate charge category.

11. Implementation

- 11.1 If the authority does not veto this proposal then it will be introduced on 30th December 2008 with the new prices implemented, allowing for 90 days notice, on 1st April 2009.