

**Statement of Use of System Charging  
Methodology for Western Power Distribution  
(West Midlands) plc**

**April 2010**

Western Power Distribution (West Midlands) plc

Registered No: 3600574

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## **General Introduction**

### **This statement**

Following this section 'General Introduction' and the following section 'Principles', this statement is split into in two major parts:

**PART A** refers to charges for HV and LV connected users that are covered by the new Common Distribution Charging Methodology (CDCM)

**PART B** refers to charges for EHV connected users that are *not* covered by the Common Distribution Charging Methodology (CDCM). The methodology for setting these charges is essentially that used prior to 1 April 2010 (see paragraph 29).

### **Who we are**

1. Western Power Distribution is the electricity distribution business covering the midlands, the south west and south Wales. Western Power Distribution holds four Distribution Licences. This statement is produced by Western Power Distribution (West Midlands) plc the licensed electricity distribution business serving the west part of the West Midlands Conurbation, the majority of the counties of Gloucestershire, Worcestershire, Herefordshire and Shropshire, the west part of Staffordshire including the Stoke conurbation and small parts of Oxfordshire (Banbury), Warwickshire (Stratford) and Cheshire (Congleton). Our Distribution Licence is issued under the Utilities Act (2000). In this statement Western Power Distribution (West Midlands) plc is referred to as 'Western Power Distribution', although certain of the responsibilities may be undertaken by associated companies or agents.

### **Licence Obligations**

2. This statement describes the Use of System Charging Methodology under which authorised persons will be charged for use of Western Power Distribution's' electricity Distribution System. The methodology applies to charges that become effective on or after 1<sup>st</sup> April 2010.
3. Western Power Distribution is obliged, under its Electricity Distribution Licence, to prepare a statement approved by the

Authority setting out the methodology upon which charges will be made for the provision of Use of System.

4. Words and expressions used in this statement have (unless specifically defined herein) the definitions given to them in the Act or the Licence and shall be construed accordingly. A glossary appears as Appendix A.
5. This statement has been approved by the Gas and Electricity Markets Authority. Copies of this statement can be obtained free of charge via our website, [www.central-networks.co.uk](http://www.central-networks.co.uk).

#### **Price Control**

6. Western Power Distribution is a licensed distribution business and is regulated by the Gas and Electricity Markets Authority through the Office of Gas and Electricity Markets (Ofgem). The regulation is applied via the Distribution Licence and the price control mechanism. The price control period is five years and Ofgem prescribe the amount of revenue that Western Power Distribution is allowed to recover from its customer base annually and over the price control period. Use of System charges may vary from time to time, with appropriate notice, as Western Power Distribution sets its Use of System Charges to recover its allowed revenue.

#### **Connection and Use of System Boundary**

7. Western Power Distribution splits the recovery of costs between connection to the Distribution System and on-going Use of System Charges for utilisation of the network. The boundary point at which this split occurs is common for both demand and generation customers. This statement details the charging methodology that is applied for the calculation of Use of System Charges. In addition our 'Use of System Charging Statement' details the Use of System Charges that are applied, whilst the 'Connection Charging Methodology' details the methodology used to calculate connection charges. The latter statement also contains indicative charges and examples to aid understanding of connection charges. Copies of these statements can be obtained free of charge via our website, [www.central-networks.co.uk](http://www.central-networks.co.uk).

#### **The Contractual Framework**

8. Persons entitled to use Western Power Distribution's electricity Distribution System are those who are authorised by Licence or by exemption under the Act to supply, generate or distribute electricity ("Users"). In order to protect all users of the system, Western Power Distribution will require evidence of authorisation before agreeing terms for use of the system. NOTE: In the rest of this commentary, requirements applying to Users should be taken to mean Licensed Suppliers, Licensed Generators or Licensed Distributors only.
  
9. Western Power Distribution will levy Use of System Charges for utilisation of its network for the supply of electricity to and the export of electricity from Exit Points. Use of System Charges will be payable by the User who registers the Metering Point. For Exit Points registered in Supplier Volume Allocation (SVA) this will be the Party registering the Supply Number (MPAN). For Central Volume Allocation (CVA) it will be the party registering the Metering Point.
  
10. Persons seeking to use the system will be required, prior to using the system, to become a party to the Distribution Connection and Use of System Agreement (DCUSA).
  
11. Terms and conditions for connection of premises or other electrical systems to Western Power Distribution's electricity Distribution System are contained in our 'Connection Charging Methodology'. A copy of this statement can be obtained free of charge via our website, [www.central-networks.co.uk](http://www.central-networks.co.uk). Persons seeking Use of System with respect to a new supply must apply for connection in accordance with the terms and conditions described in that statement.
  
12. Where a person requires a connection to Western Power Distribution's electricity Distribution System pursuant to the Act, the provisions of this statement are without prejudice to the provisions of sections 16 to 23 of the Act (those sections which deal with the rights, powers and duties of Western Power Distribution, as an electricity distributor), in

respect of the distribution of electricity to owners or occupiers of premises.

### **Contact Details**

13. This statement has been prepared in order to discharge Western Power Distribution's' obligation under Condition 4 of the Licence. If you have any questions about this statement please contact us at the address shown below. Also given below are contact details for the Office of Gas and Electricity Markets should prospective users wish to enquire separately on matters relating to this statement.

Western Power Distribution      Ofgem

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DE74 2TU  
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[www.central-networks.co.uk](http://www.central-networks.co.uk)      [www.ofgem.gov.uk](http://www.ofgem.gov.uk)

### **Principles**

14. The following paragraphs relate to the transport of electricity on Western Power Distribution's' system by Users to or from Exit Points on the system.

15. Where a supply of electricity is provided over electric lines or electrical plant comprising a part of Western Power Distribution's' electricity Distribution System, a charge for use of the system will be levied on the User. The relevant charges are described in our 'Use of System Charging Statement'.

16. The charges for each category of supply depend upon the criteria that determine eligibility for that category, including the voltage of connection to the system, the characteristics of the load or generation, and installation of the appropriate Use of System metering.

17. The charges for use of the system reflect:

- the costs of providing, operating and maintaining the electricity Distribution System to the standards prescribed by the Act, other than those costs which are recovered through charges paid to Western Power Distribution in respect of connection to the system, such that electricity can be transported efficiently through the system to or from Exit Points; and
- the costs to Western Power Distribution of providing certain services and performing functions for Users, on terms which Western Power Distribution is under a duty to offer under its Electricity Distribution Licence, in order to support the operations of a fully competitive supply market in its authorised area. Western Power Distribution may charge for these services through Use of System Charges or through transaction charges. The cost for provision of these services is detailed in our 'Use of System Charging Statement'.

18. Charges for use of the system include a reasonable return on the relevant assets, and the revenues arising from the charges are subject to regulation in accordance with the terms of the Licence.

19. Charges to Users for the use of the system for demand are evaluated as if from Western Power Distribution's' Grid Supply Points to reflect the need to provide adequate capacity at all voltage levels to protect the security of the system and the trading of energy at Grid Supply Points. However, the resulting charges are then applied to the electricity as measured at the Exit Points.

20. The charges for demand and generation use of the system may include some or all of the following elements:

- fixed charges to cover the costs which do not vary with the extent to which the supply is taken up. This consists of a daily rate per site;
- charges for kVA to cover system import or export capacity at each voltage level attributed to the connection. Capacity will normally be agreed with the end customer and its measurement will be determined in the most appropriate way with regard to the data available from the meter and processing facilities. Where users exceed the agreed capacity an excess charge may apply.
- charges for kWh unit delivered to or exported from the Exit Point, designed to reflect utilisation of the system at all relevant voltage levels. Units for metered supplies are based on actual meter readings or profiled consumption based on actual meter readings and/or estimated annual consumptions. Units for unmetered supplies are based on the certified estimated annual consumption of an inventory of unmetered equipment provided by the end user<sup>1</sup>;
- charges for excess kVArh reactive power delivered to or exported from the Exit Point, designed to reflect utilisation of the system at all relevant voltage levels.

21. Charges for meter provision are separate from use of system. Full details of our metering charges are available in a separate statement, 'Statement of Charges for Metering and Data Services'. This can be obtained free of charge from our web-site, [www.central-networks.co.uk](http://www.central-networks.co.uk).

22. The meter operator must ensure that the data provided by the metering meets Western Power Distribution's requirements for Use of System billing purposes. Western Power Distribution reserves the right to install separate Use of System metering

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<sup>1</sup>Inventories are generally kept up to date, but where end users fail to do this in a proper manner Central Networks reserves the right to adjust estimated annual consumption values.

equipment. If Western Power Distribution exercises this right, no additional charge will be made for this equipment.

23. The User must demonstrate that at all times the quantity of electricity being traded at the Grid Supply Point equals the metered quantity measured at the Exit Point adjusted for the amount of electrical losses appropriate to the voltage at which the supply is delivered/from which the export is accepted and to the nature of the supply, as shown in the schedule of loss adjustment factors in our 'Use of System Charging Statement'. Site specific loss adjustment factors for EHV connections are available on request. Relevant metering information or being a party to the Balancing and Settlement Code will be considered to be adequate demonstration. Users should refer to the loss adjustment factors to calculate the amount of electricity that they must trade. The same loss adjustment factors are reflected automatically in the BSC settlement system.

24. Where the supply is to be provided over Western Power Distribution's electricity Distribution System on either an intermittent or continuing basis to any premises with own generation, charges for use of the system for demand will be levied with respect to the system capacity provided to meet the maximum power required as requested by the party seeking use of the system and the extent to which that supply is taken up.

25. In setting charges there is a need to adjust prices so that allowed revenue is correctly recovered. The following summarises our seven step approach:

1. Calculate total allowed revenue pot from price control formula
2. Calculate the EHV DG charges in accordance with the methodology statement
3. Calculate the total revenue expected to be received from EHV DG charges
4. Subtract the revenue given by (3) from the total allowed revenue pot
5. Calculate the EHV demand charges (and HV/LV charges which aren't used later), using the current (DRM) DUoS model, including scaling to match the allowed revenue calculated in (4)

6. Subtract the total revenue recovered from applying the EHV charges calculated in (5) from the revenue in (4).
7. Use the sum of the numbers from (2) and (6) to populate the table of target revenue in the CDCM, under "revenues recovered outside this model".

26.

Eastern Power Distribution is reviewing its methodology for EHV charges as part of Ofgem's ongoing structure of charges review. The basis of our charges for HV and LV connected users was aligned with the Common Distribution Charging methodology (CDCM) with effect from 1 April 2010. The basis of charges for EHV demand and generation is essentially unchanged, but is likely to change substantially with effect from 1 April 2011, when the EHV Distribution Charging Methodology (EDCM) is expected to be implemented. In addition to this, and as a consequence of the removal of the blanket exemption from export DUoS charges of distributed generation connected before 1 April 2005 as part of Ofgem's DPCR5 final proposals, we are working with the other distributors to develop appropriate charging arrangements for this group of generators. As yet we have no details, but our expectation is that charges will apply to this group of generators in the future.

## **PART A**

### **Use of System Charging Methodology - HV and LV Charges Covered by the Common Distribution Charging Methodology (CDCM)**

26. Charges for HV and LV connected demand, generation and embedded networks are set in accordance with the new common distribution charging methodology. This methodology can be found in the DCUSA schedule designated to contain the CDCM, and is subject to governance arrangements set out in the DCUSA.

27. PART B

## **Use of System Charging Methodology - EHV Demand Charges Not Covered by the CDCM**

### **Overview**

28. Please refer to paragraph 26 in connection with Western Power Distribution's' review of its methodology for EHV charges.
29. Western Power Distribution uses a pricing model based on the long run marginal costs of the network and the operating costs identified from our Regulatory Reporting Packs. The model adopts principles similar to those used in the ESI's original 500MW model, in that it aims to calculate the marginal costs at each voltage level associated with providing for an additional increment of demand. Implementation of the model is via a Microsoft Excel spreadsheet designed to lay out as clearly as possible the various inputs, workings and outputs.
30. The pricing model produces charges for all network levels, but only those for EHV demand are used. See paragraph 26 in respect of HV and LV charges.
31. The basic principle of the model is to share the asset costs of the network between customers by reference to their contribution to the demand that necessitates the assets. The outputs from the model are tariff 'yardsticks', expressed in pence per kWh, which can be used in combination with standing charge and availability charge calculations and scaled to create tariffs that will recover specified allowed revenues given forecasts of volumes, customer numbers, capacity, etc.

### **Classes of Demand Connection**

32. Demand connections are split into the following main classes for charging purposes:
- EHV connected (HH metered)
  - HV connected (HH metered)
  - HV connected (NHH metered)
  - LV connected (HH Metered)
  - LV connected (NHH Metered)
33. These main classes are then variously sub-divided into domestic, small non-domestic, medium non-domestic and large non-domestic connections, and further sub divided according to tariff type (for example standard domestic, E7, and

evening and weekend) as appropriate<sup>2</sup>. Any future changes to the tariff structures will constitute a methodology change.

### **Allowed Revenue (Demand)**

34. Distribution allowed revenue is the maximum allowed in a particular regulatory year (April - March). Western Power Distribution forecasts allowed revenue by forecasting the various drivers in the price control formula. We also forecast the unit volumes, demands and customer numbers associated with each individual tariff. These forecasts then allow us to set tariffs in a way which matches actual income to allowed revenue as closely as possible.

### **Setting Charges**

35. The basic principle of the tariff setting model is to share the asset costs of the network between customers by reference to their contribution to the demand that necessitates the assets, and using this to create 'network yardsticks'. These are then combined with elements of non-system costs (see 'Non-system costs') to create 'tariff yardsticks', expressed in pence per kWh, which can be used in combination with standing charge and availability charge calculations and scaled to create tariffs that will recover specified revenues given forecasts of volumes, customer numbers and capacity.

### **Setting Capacity Charges**

36. Our kVA capacity charges are derived by taking the yardstick cost per kW per year for each voltage level, calculated from the tariff setting model, and then assigning this cost to the various customer groups by reference to their use of those particular voltage levels. The charges also incorporate apportioned elements of exit charges (see 'treatment of NGC exit charges') and are converted to equivalent kVA values. This reflects the way in which connection capacity is granted, and provides some incentive for the minimisation of reactive power flows.

37. Following connection there is generally an initial tie-in period of three years in respect of authorised supply capacity. After this connected parties can request a reduction in authorised supply capacity without charge. Connected parties can request increased capacity at any time, and such increases may be subject to additional connection charges. Where connection is made to an embedded distribution network operated by another licensed

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<sup>2</sup> Full lists of tariffs and associated details are given in our 'Use of System Charging Statement'

distribution system operator, demand at the boundary may grow over an extended period of time. In these circumstances the capacity used for DUoS charging purposes will be allowed to grow over time, in line with demand, up to the limit represented by the authorised supply capacity. For the avoidance of doubt, these arrangements do not affect the entitlement of operators of embedded licensed distribution networks to use the authorised supply capacity in accordance with the relevant connection terms. Arrangements for periodic review of the authorised supply capacity are detailed in the Connection Charging Methodology (paragraph 2.26).

### **Setting Unit Charges**

38. The unit charges are set by subtracting the costs attributed to capacity charge from the previously calculated tariff 'yardsticks' to provide a residual unit charge expressed in pence per kWh for each customer group.

### **Setting Excess Reactive Power Charges**

39. Excess reactive power charges apply to half-hourly demand where total kVArh exceeds 33% of total kWh in a particular charging period (this boundary being equivalent to the average power factor of 0.95 assumed in the pricing model). The charges are derived by 'flexing' the pricing model between power factors of 0.95 and a value equivalent to the weighted average power factor for the sub set of customers who's power factor is worse than 0.95 and those assumed to be 0.95. This has the effect of increasing the size of the model network used to set prices and thus the cost of that network. This increased cost causes an increase in the relevant yardsticks for the half-hourly tariff at each voltage level. Our methodology uses the yardstick increment that would not be recovered by a consumer's standard capacity charge (since it could be argued that a consumer may already be paying for a proportion of the increased capacity costs through the standard kVA capacity charge) and converts this into equivalent prices in pence per kVArh, given forecast levels of reactive power.

The methodology is set out in more detail below:

For each voltage level (LV, HV and EHV):

- The average power factor of those customers with power factors less than 0.95 is calculated.
- This is then combined with the assumed power factors (0.95) of those customers who do not use excess reactive power to produce a weighted average power

factor for the voltage specific class of customers as a whole.

- This new weighted average power factor is then fed into the charging model which calculates the increased network costs that this extra capacity requires.
- These increased network costs translate into increased yardsticks that are applicable to customer's with poor power factors.
- The standard capacity charge will recover an element of the increased yardstick costs.
- The unit charge will not capture any of the increased yardstick costs.
- The element of the increased yardstick costs which are not recovered through standard capacity charges or unit charges will be recovered by excess reactive power charges.
- The excess reactive power charge is calculated by dividing the element of the additional yardstick costs from the half-hourly customers that is not recovered from the standard capacity charge or unit charge by the forecast volume of kVArh that is causing that increase, expressed in p/kVArh.

### **Setting Standing Charges**

40. Non-system costs, the costs which inform the bulk of our standing charges, include items such as customer service, billing, administration, business rates and other overheads. The apportioned element of non-system costs to be recovered via standing charges (see 'Non-system costs') are allocated to customer groups on the basis of customer weighting factors.
41. In effect, the customer weighting factors attempt to express how much over a standard domestic consumer it costs for each other type of consumer to be connected to and receive the standard services of our network. The factors are multiplied by actual customer numbers and the resultant weighted customer numbers are used to allocate the overheads amongst the tariff groups on a per customer basis.
42. Final standing charges are then set by adding to this calculated value the required allocation of NGC exit charges attributable to each customer group (see paragraphs 41-45).

## **Non-system costs**

Non-system costs are recovered on a weighted basis between standing charges and unit charges (weighted approximately 80:20, reflecting our view that, although these costs will vary to a small degree with the volume of units distributed, they are predominantly fixed). The amount to be recovered through unit charges is divided by the total forecast volume of units to produce the required amount, expressed in pence per unit, to be added to each of the network yardsticks calculated earlier.

## **The Treatment of NGC Exit Charges**

43. NGC exit charges are a pass-through cost which is additional to the allowed revenue calculated by the price control formula.
44. We are charged by NGC on the basis of the particular 'plug' assets at the various grid supply points (GSPs) that our network is connected to. As these GSP assets are designed to meet peak demand, the total exit charge costs for all GSPs are allocated between tariff groups on the basis of estimates of each group's contribution to our system peak at GSP level.
45. The estimated contributions to system peak are calculated from the annual consumption, the units/kW and the peak capacity coincidence factors for each demand tariff group. The proportion of the peak that each particular tariff group contributes determines the cost apportioned to that group. Contributions to peak demand are calculated whenever charges are changed.
46. The resultant costs per tariff group are then spread amongst demand consumers either on the basis of kVA capacity (where this is known), or consumer numbers (acting in place of kVA).

## **Setting Final Tariffs**

47. Following production of the model's outputs, checks are made to ensure that the resulting charges are appropriate and fit for purpose. In particular the following issues are addressed:
  - The need to express charges in the right format (e.g. pence per MPAN per day, pence per kVA per day, etc.) and to the number of decimal places appropriate for publication and billing;

The need for the total revenue expected to be generated by the final tariffs to match allowed revenue (see paragraph 25)

### **Unusual EHV Demand Connections**

48. For the majority of EHV demand connections a standard EHV tariff is used. This tariff consists of fixed charges, unit charges, capacity charges, excess capacity charges and excess reactive power charges.
49. Exceptions to this are particularly unusual EHV connections such as those for railway traction and standby import facilities associated with very large generators. The normal form of EHV tariff may be inappropriate for these types of connection because their extremely low load factors make unit charges ineffective in recovering costs. For this reason such connections are subject to charges based wholly on capacity, and without unit charges.
50. These charges are calculated using the same model as the normal EHV charges, but all costs are allocated to the capacity charge. We reserve the right to charge for other EHV connections with similarly low load factors in the same way.

## **Use of System Charging Methodology - EHV Generation Charges Not Covered by the CDCM**

### **Overview**

51. Please refer to paragraph 26 in connection with Western Power Distribution's review of its methodology for EHV charges.
52. Western Power Distribution makes charges for Use of System (UoS) relating to EHV generators connecting after the 31st March 2005. For the avoidance of doubt, no charges will be made in relation to generators already connected at this date unless charges were in existence prior to April 2005, or if there are material changes to their use of the system - for example increased capacity. However, as a consequence of the removal of the blanket exemption from export DUoS charges of distributed generation connected before 1 April 2005 as part of Ofgem's DPCR5 final proposals, we are working with the other distributors to develop appropriate charging arrangements for this group of generators. As yet we have no details, but our expectation is that charges will apply to this group of generators in the future.
53. The charges are designed to recover the costs of the connection that have been met by Western Power Distribution, together with the costs of repair and maintenance. The charges do not recover the cost of eventual replacement of life expired assets however, and any such replacement will be the subject of connection charges.
54. Generation use of system charges are based on the export capacity (chargeable capacity) used, measured in kVA, as reflected in the connection agreement.
55. Charges for EHV connected generation are site specific. These charges provide focussed cost reflective economic signals to generators that will encourage efficient connection to the network. The charges are set to recover revenue relevant to each particular EHV connected generator with reference to the actual capacity and cost of each connection.

### **Calculation of generation charges**

56. For all EHV generators connected under the 'shallowish' connection charging arrangements, which came into effect on

1 April 2005, site specific charges are calculated from two elements:

- Pass-through costs (site specific)
- Other standard costs

57. The pass-through costs element is calculated from the shared reinforcement costs associated with the particular connection. In each case the equivalent costs in 2010/11 prices is calculated to give a common basis for calculating the pass-through. The pass-through percentage of these equivalent costs (80%) is annuitised over 15 years (or the expected life of the connection where this is less than 15 years) at the allowed pre-tax cost of capital (R) set out in our price control. The resultant annual figure is then uplifted by the price index adjuster for DG (PIAG) set out in our price control. These calculations give the annual amount to be charged in the relevant year in relation to pass-through costs.

58. The other standard costs element is calculated from the capacity of the generator expressed in MW, multiplied by the sum of "the incentive rate for the DG incentive scheme" (GIR) and the "allowed operational and maintenance rate" (GOR) set out in our price control (both uplifted by the price index adjuster for DG (PIAG) set out in our price control and expressed in £/MW/year). These calculations give the annual amount to be charged in the relevant year in relation to other standard costs.

59. The pass through costs and other standard costs above are summed to give the total annual amount to be charged. This total is then multiplied by 100 to convert to pence, and then divided by the product of the generator export capacity (in kVA) and the number of days in the year (365/366), to give an equivalent daily charge rate in pence per kVA per day.

60. All EHV generator charges are recalculated annually in line with the above procedure.

### **Example Generation Charge Calculation**

#### Details of DG

Generator capacity	10MW
Export capacity	5MW
Shared reinforcement costs	£200000 (2010/11 prices)

#### Price control parameters

R	5.6%	
Fifteen-year annuity factor at 5.6%		0.10029
GIR	£1000/MW	
GOR	£1000/MW	
PIAG for 2010/11	1	

Pass through cost element

$$200000 * 0.8 * 0.10029 * 1 = \text{£}16046$$

Other standard costs element

$$10 * (1000 * 1 + 1000 * 1) = \text{£}20000$$

Total costs

$$16046 + 20000 = \text{£}36046$$

Daily charge per kVA

$$36046 * 100 / (5000 * 365) = \mathbf{1.975p/kVA/day}$$

**Network rebates**

61. Users responsible for the output of Generators with EHV export connections energised after the 31st March 2005 may be eligible for rebates of use of system charges in respect of network unavailability. The rebate will depend on the 'firmness' of the connection. It is Western Power Distribution's policy to recommend firm<sup>3</sup> connections for HV and EHV generators.
62. If a 'firm' connection was unavailable for a period, the rebate would be based on the capacity of the connection and the period of unavailability of that connection, and would be paid at the rate set out in the licence.
63. In the case of non-firm connections the arrangements for rebates will be agreed prior to connection and will depend on the baseline availability expected for the particular connection.
64. In all cases the total of rebates given in respect of a particular connection will be limited to the amount paid in export use of system charges for that connection during the year.

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<sup>3</sup> For the purpose of determining what constitutes a firm connection the requirements of Engineering Recommendation P2/6 will apply, but the exclusion of single connections will not apply to generators

## **Where Our Use of System Charges are Published**

65. Western Power Distribution's' Use of System tariffs are published in our Use of System Charging Statement. Copies of this statement can be obtained free of charge via our website, [www.central-networks.co.uk](http://www.central-networks.co.uk).

## Appendix A - Glossary

ASC (Authorised Supply Capacity)	Means the agreed maximum capacity measured in kilo volt-amperes the connectee may take from the Distribution System through their point of connection.
Act	The Electricity Act 1989 as amended by the Utilities Act 2000.
Annuity Factor	A factor to represent the lifetime costs of capital expenditure.
Balancing and Settlement Code	The Balancing and Settlement Code dated 14 August 2000, including all Party Service Lines and BSC Procedures (as therein defined) made under it, as at the Go-live Date.
Connection Charging Methodology	The principles on which and the methods by which, for the purposes of achieving the objectives referred to in paragraph 3 of standard condition 4B (Connection Charging Methodology Statement), connection charges are determined.
CUSC	Means the Connection and Use of System Code governing connection to and use of NGC's transmission system.
CVA	Central Volume Allocation.
De-energisation	Means the movement of any switch, the removal of any fuse, or the taking of any other step to deliberately prevent the flow of electricity from the Distribution System to the connection.
Disconnection	Our action intended to permanently break the connection between the Distribution System and the connectee's equipment, possibly including the removal of our equipment from the connectee's premises.
Disconnection Notice	A notice sent by a Supplier to us requesting the permanent disconnection of the connection to a premise.
Distribution Code	The Distribution Code of the Distributors of England and Wales; the document produced by each Distributor in accordance with Condition 9 of its Licence and approved by Ofgem to define the technical aspects and planning criteria of the working relationship between the Distributor and all those connected to its Distribution System.
Distribution Licence	Refers to the Electricity Distribution Licence.
Distribution Reinforcement Model (DRM) (500kW Model)	A model representing a theoretical 500MW extension to the Distribution System.
Distribution System	The whole of our interconnected distribution equipment, including such items as; cables, overhead lines and substations, which we operate in accordance with our Licence.
Distributed Generator	A generator with a direct connection to a Distributors' Distribution System, rather than NGC's transmission system.
Electricity	The Electricity Distribution Licence granted to

Distribution Licence (EDL)	Western Power Distribution pursuant to section 6(1) (c) of the Act.
Exit Point	A point of connection at which a supply of electricity may flow between the Distribution System and the Customer's Installation or User's Installation or the Distribution System of another person.
Export Capacity	Means the export of a supply of electricity into the Distribution System through the point of connection and is measured in kilo volt-amperes.
Extra High Voltage or EHV	A voltage level at or higher than 22kV.
Gas and Electricity Markets Authority (GEMA) (the Authority)	As established by the Utilities Act.
Grid Supply Points (GSPs)	The points on our system where supply is taken from NGC. Usually at a 400/132kV, a 275/132kV or a 400/275/66kV substation.
High Voltage or HV	Means a voltage between 1000 volts and 22,000 volts. In the case of our Distribution System, this means 6,600 volts or 11000 volts plus or minus 6% measured between any two phase conductors.
Licence	Refers to the Electricity Distribution Licence unless otherwise stated.
Low Voltage or LV	230 volts plus 10% or minus 6% measured between the neutral conductor and any phase conductor, or 400 volts plus 10% or minus 6% measured between any two phase conductors.
Master Registration Agreement (MRA)	Means the agreement of that name dated 1 June 1998, as at the Go-live Date.
Metering Point	The point, determined according to the principles and guidance given at Schedule 9 of the Master Registration Agreement, at which a supply to (export) or from (import) a Distribution System:  (a) is or is intended to be measured; or  (b) where metering equipment has been removed, was or was intended to be measured; or  (c) in the case of an Unmetered Supply under the Unmetered Supplies Procedure, is deemed to be measured, where in each case such measurement is for the purposes of ascertaining the supplier's settlement liabilities under either the Settlement Agreement or the Balancing and Settlement Code.
Ofgem	Ofgem is the Office of Gas and Electricity Markets, regulating gas and electricity industries in Great Britain. Ofgem operate under the governance of the Gas and Electricity Markets Authority (sometimes referred to as the Authority or GEMA) which sets all major decisions and policy priorities.
Relevant	As defined in paragraph 3 of condition 4 of the

Objectives	EDL and repeated in the general introduction to this statement.
Supply Number (also known as MPAN)	A unique identification number allocated to a connection of the Distribution System which allows for the accurate trading of energy by suppliers and the accurate billing of Use of System Charges.
SVA	Supplier Volume Allocation.
Use of System	Use of the Distribution System by Users
Use of System Charges	Charges made or levied, or to be made or levied, by the licensee for the provision of services as part of the distribution business to any person, as more fully described in standard condition 4 (Use of System Charging Methodology) and 4A (Charges for Use of System), but does not include connection charges.
Use of System Charging Methodology	The principles on which and the methods by which, for the purposes of achieving the objectives referred to in paragraph 3 of standard condition 4 (Use of System Charging Methodology), Use of System Charges are determined.
Users	Persons entitled to apply for Use of System.

## Appendix B – Methodology for Line Loss Factors

THE FOLLOWING SECTION IS NOT SUBJECT TO APPROVAL BY THE AUTHORITY. IT IS INCLUDED HERE FOR CONVENIENCE ONLY, AND IS NOT PART OF THE APPROVED METHODOLOGY STATEMENT.

THE METHODOLOGY HAS BEEN APPROVED IN ACCORDANCE WITH BSCP 128

### Western Power Distribution Methodology for Calculating Line Loss Factors (LLFs)

Last revised: 29<sup>th</sup> December 2009

#### Introduction

1. Western Power Distribution has one generic LLFC Group for customers connected at Low Voltage (LV), one for those connected at High Voltage (HV), and one for Extra High Voltage (EHV) (Principle 7). EHV is as defined in the Special Conditions of a distribution licence granted pursuant to section 6(1)(c) of the Electricity Act 1989 (Principle 1).
2. The generic EHV LLFC Group will be used where there is insufficient data to calculate a site specific LLF, for example where a site has connected during the year and there is not yet a full year of data with which to carry out any calculations. In these cases generic LLFs will stand for the complete year. Otherwise all EHV sites have site-specific LLFs. Customers connected at HV or LV can have site specific LLFs where the customer has requested these and Western Power Distribution is in agreement (Principle 1).
3. All of our LLFs are calculated to 3 decimal places (Principle 2). All site specific LLFs account for technical losses only (Principle 3). All generic LLFs take account of all losses (technical and non technical) (Principle 4).
4. Generic LLFs for Import and Export at the same site where the voltage level is the same have the same values (Principle 6).
5. Western Power Distribution uses the following time slots for all LLFs (Principle 8):

<b>LLF Time Slots (Clock Time)</b>	
Night	00:30 – 07:30
Monday – Friday	16:00 – 19:00 November to February
Monday-Friday	07:30-16:00 & 19:00-20:00 November to February
All other times	

6. No retrospective changes are made to approved site specific or generic LLFs other than to correct material manifest errors (Principle 15). Changes shall

only be made to approved site specific LLFs mid year if there has been a material change affecting the site and the revised LLFs have been approved by the BSC Panel. Annual updates have an Effective From Date of 1 April. Where default LLFs have been applied due to an audit failure, these may be updated to the approved LLFs on a prospective basis as determined by the BSC Panel from time to time (Principle 16).

7. Our generic LLFs are re-calculated every 2 years (Principle 12). Our site-specific LLFs are recalculated when there has been a relevant change to the site or network, and at least every 5 years (Principle 13).
8. The demand and generation data for both generic LLFs and site specific LLFs undergo internal control processes prior to being used in any calculations. Particular attention is paid to clock change days to ensure the data has been converted from GMT to BST correctly, data is present for all sites expected, leap years have been taken into account, and any known historic market wide issues noted in the BSC Auditor's latest report have been taken into account if agreed to be appropriate by the panel (Principle 11).
9. Prior to submission the newly calculated LLFs are compared against the previous years' submission to ensure none have changed significantly. Acceptable changes are within +/- 20% for SVA and +100% / -50% for CVA. Where there has been a significant change the reasons for the change are documented in section 9d of the CSAD (Principle 11).

#### Generic LLFs

10. No changes are made to the approved generic LLFCs mid year. Annual updates have an Effective From Date of 1 April. Where default LLFs have been applied due to an audit failure, these may be updated to the approved LLFs on a prospective basis as determined by the BSC Panel from time to time (Principle 14).
11. In calculating our generic LLFs we use settlement data from settlement run R2 or greater and from a complete 12-month period. The 12-month period to be used shall be determined by the BSC Panel or its delegated authority (Principle 9). Adjustments to LLFs, to take into account historic market wide issues noted in the BSC Auditor's latest Report, can only be made if agreed to be appropriate by the Panel (Principle 10).
12. The generic LLF Groups are calculated by taking the GSP half-hourly meter data (obtained via the IO29 which is the 'net' GSP group take accounting for interconnectors and CVA registered generation), adding on the half-hourly meter data from embedded generators including associated losses, and subtracting site specific meter data including associated losses (Principle 5). Associated losses are those that were registered in settlements for the specified

period. This leaves the total at GSP level attributable to sites which are subject to generic LLFs (the ‘Residual’).

13. We initially calculate our generic LLFs to account for technical losses in accordance with the results of network studies that have been carried out on our East and West networks. In order to take account of non-technical losses, these initial LLFs are then scaled, to ensure that when applied to the actual meter data the total matches the ‘Residual’ calculated above (Principle 4). Our aim is to get the overall error to GSP to less than 0.1% (Principle 11).
14. The Generic LLFs are presented as follows – note this table is for illustrative purposes only:

<b>LLF Time Slots (Clock Time)</b>	<b>LV</b>	<b>HV</b>	<b>EHV</b>
Night 00:30 – 07:30	1.061	1.031	1.015
Monday – Friday 16:00 – 19:00 November to February	1.089	1.045	1.022
Monday-Friday 07:30-16:00 & 19:00- 20:00 November to February	1.073	1.037	1.018
All other times	1.065	1.033	1.016

#### Site-Specific LLFs

15. The calculation of the technical losses associated with each site-specific customer is done using our most up-to-date network models populated with the load data for winter peak demands. The technical losses are modelled first without the customer load as measured at the metering point. All assets beyond the metering point are excluded from the calculation. The customer load is then added back into the model at the metering point, using their average load for each of the four time slots over the twelve month period. The difference in the two sets of network losses are assigned to that specific customer. This absolute amount of losses is then converted into losses as a proportion of the new load, and then a line loss factor, for each of the four time slots.
16. Where we do not have a full year of settlements data for a particular EHV customer in time for the annual re-submission of LLFs we will use the generic EHV LLFs. Once the customer has a full year of settlements data we will calculate site-specific LLFs and submit them with the next annual re-submission. Generic LLFs will not be substituted for calculated LLFs mid-year (Principle 16). Where we have some meter data but it is insufficient to carry out the losses calculation the LLFs will be set to unity as a default.
17. Western Power Distribution may choose to outsource the power flow analysis involved in calculating the losses in MW associated with the new load by providing a copy of the network model and the customers’ load data to a

specialist consultant, but converting these MW losses into LLFs will be done in-house.

Example of site-specific losses calculation:

<b>Time Slots</b>	<b>System load (MW)</b>	<b>New load (MW)</b>	<b>Losses before new load (MW)</b>	<b>Losses after new load (MW)</b>	<b>Losses due to new load (MW)</b>	<b>Losses as proportion of new load</b>	<b>LLFs</b>
Night 00:30 - 07:30	1724	7	9.289	9.118	-0.171	-0.024	0.976
Monday - Friday 16:00 - 19:00 November to February	3260	10	26.944	27.288	0.344	0.034	1.034
Monday-Friday 07:30-16:00 & 19:00-20:00 November to February	3058	10	24.171	24.461	0.290	0.029	1.029
All other times	2976	10	17.426	17.571	0.145	0.015	1.015

----- **END OF UNAPPROVED SECTION** -----  
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