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Central Networks East

USE OF SYSTEM CHARGING METHODOLOGY

This statement is effective from 1st ~~7th~~ April 201~~08~~

This statement has been approved by the Gas and Electricity Markets Authority (GEMA)

East plc

Central Networks

Registered in England and Wales No. 2366923

Registered office: Westwood Way Westwood Business Park

Coventry CV4 8LG

Contents

General Introduction

This statement

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

~~**PART A** 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 XX).~~

PART ~~A~~B 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. Central Networks is the electricity distribution business covering central England. Central Networks holds two Distribution Licences covering the East and the West of the region. This statement is produced by Central Networks East plc the licensed electricity distribution business serving customers across an area totalling 16,000 km² from the north of Chesterfield in Derbyshire to south of Milton Keynes in Buckinghamshire, and from Tamworth in the west to the Lincolnshire coast in the east. ~~Our service area is shown on the map in Appendix B.~~ Our Distribution Licence is issued under the Utilities Act (2000). In this statement Central Networks East plc is referred to as 'Central Networks', 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 Central Networks' electricity Distribution System. The methodology applies to charges that become effective on or after 1st April 2010~~06~~.

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3. Central Networks is obliged, under ~~Licence Condition 4, paragraph 1(a), of~~ 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.

~~3. We are also obliged to review our Use of System Charging Methodology annually in accordance with Licence Condition 4, paragraph 2(a) and in order to comply with paragraph 2(b) make such modifications to the Use of System Charging Methodology that better achieve the Relevant Objectives.~~

~~4. "…the Relevant Objectives are:~~

~~a) that compliance with the Use of System Charging Methodology facilitates the discharge by the licensee of the obligations imposed on it under the Act and by this Licence;~~

~~b) that compliance with the Use of System Charging Methodology facilitates competition in the generation and supply of electricity, and does not restrict, distort, or prevent competition in the transmission or distribution of electricity;~~

~~c) that compliance with the Use of System Charging Methodology results in charges which reflect, as far as is reasonably practicable (taking account of implementation costs), the costs incurred by the licensee in its distribution business; and~~

~~d) that, so far as is consistent with sub-paragraphs a), b) and c), the Use of System Charging Methodology, as far as is reasonably practicable, properly takes account of developments in the licensee's distribution business."~~

~~5.~~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.

~~6.~~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. ~~Alternatively a hard copy can be supplied with subsequent copies at a charge of £5.00 by following up the contact details in paragraph 16.~~

~~5.~~

Price Control

~~7.~~6. Central Networks 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

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Central Networks 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 Central Networks sets its Use of System Charges to recover its allowed revenue.

Connection and Use of System Boundary

~~8.~~ Central Networks 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. ~~Alternatively a hard copy can be supplied with subsequent copies at a charge of £5.00 by following the contact details in paragraph 16.~~

7.

The Contractual Framework

~~9.~~8. Persons entitled to use Central Networks' electricity Distribution System are those who are authorised by Licence or by exemption under the Act to ~~supply or generate~~supply, generate or distribute electricity ("Users"). ~~.~~ In order to protect all users of the system, Central Networks 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, ~~or~~ Licensed Generators or Licensed Distributors only.

~~10.~~9. Central Networks will levy Use of System Charges for utilisation of its network for the supply of electricity to and~~or~~ 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.

~~11.~~ 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). ~~enter into~~

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~~an agreement with Central Networks setting out the obligations of both parties. The party seeking use of the system will be required to:~~

- ~~pay all charges due in respect of use of the system as described in the Use of System Charging Statement and its accompanying schedules;~~
- ~~be a party (where the Exit Points are registered in SVA) to the Master Registration Agreement (MRA) for the provision of Metering Point Administration Services within Central Networks' authorised area;~~
- ~~enter into the National Grid Company's (NGC) Connection and Use of System Code and any necessary Bilateral Agreement, governing connections to and use of NGC's transmission system, unless Central Networks is informed by NGC that this is not required in any particular case;~~
- ~~be a party to the Balancing and Settlements Code; and~~
- ~~comply with the provisions of the Distribution Code (a copy of which is available online at www.dcode.org.uk). Alternatively if you do not have access to the internet please contact us following the details in paragraph 16.~~

10.

~~12. If the applicant and Central Networks fail to agree contractual terms, or any variation of contractual terms proposed by Central Networks, either party may request settlement by Ofgem (contact details in paragraph 16).~~

~~13. While the terms and conditions in the agreements will be consistent with those in this statement and the Use of System Charging Statement, the agreement will take precedence. Where a User, having entered an agreement for use of Central Networks' electricity Distribution System, ceases to be eligible to apply for use of the system for whatever reason, then the entitlement to use of the system will cease forthwith, but the operator will continue to be liable under the agreement unless and until the agreement is terminated. In order to avoid any liability in this regard, a User wishing to terminate their agreement or wishing to notify a change should give Central Networks no less than 28 days notice. Central Networks will normally respond within 28 days of a notification of change.~~

~~14.~~11. Terms and conditions for connection of premises or other electrical systems to Central Networks' 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. ~~Alternatively a hard copy can be supplied with subsequent copies at a charge of £5.00 by following the contact details in paragraph 16.~~ Persons seeking Use of System with respect to a new supply must apply for

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connection in accordance with the terms and conditions described in that statement.

~~15.~~12. Where a person requires a connection to Central Networks' 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 Central Networks, as an electricity distributor), in respect of the distribution of electricity to owners or occupiers of premises.

Contact Details

~~16.~~13. This statement has been prepared in order to discharge Central Networks' 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.

Central Networks	Ofgem
Herald Way	9 Millbank
Pegasus Business Park	London
Castle Donington	SW1P 3GE
DE74 2TU	
Tel: 01332 393765	Tel: 0207 7901 7000
www.central-networks.co.uk	www.ofgem.gov.uk

Principles

~~17.~~14. The following paragraphs relate to the transport of electricity on Central Networks' system by Users to or from Exit Points on the system.

~~18.~~15. Where a supply of electricity is provided over electric lines or electrical plant comprising a part of Central Networks' 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'.

~~19.~~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.

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~~20.~~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 Central Networks 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 Central Networks of providing certain services and performing functions for Users, on terms which Central Networks 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. Central Networks 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'.

~~21.~~18. C~~All e~~harges 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.

~~22.~~19. Charges to Users for the use of the system for demand are evaluated as if from Central Networks' 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.

~~23.~~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[1];

- 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.

- ~~transactional charges for certain services provided by Central Networks on an individual basis to Users. Details are given in our 'Use of System Charging Statement' in Schedules 1 to 5 inclusive.~~

~~24. The fixed charge referred to above may include:~~

- ~~amounts to reflect the cost of the service cable to the premises and its termination, a contribution to the cost of the local network except as recovered within the connection charge, and all other administrative costs associated with the provision of a Use of System service;~~

- ~~amounts to reflect the costs of provision of non-half hourly (NHH) metering (where appropriate); and~~

- ~~amounts to recover certain costs associated with the provision of Metering Point Administration Services under the MRA.~~

21. Charges for meter provision~~ing services~~ 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.

~~25. Alternatively a hard copy can be supplied with subsequent copies at a charge of £5.00 by following up the contact details in paragraph 16.~~

~~26.~~ The meter operator must ensure that the data provided by the metering meets Central Networks' requirements for Use of System billing purposes. ~~Whether Central Networks is appointed to carry out this task, or the User appoints another meter operator or installs their own energy metering,~~ Central Networks reserves the right to install separate Use of System metering equipment. If Central

[1] 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.

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Networks exercises this right, no additional charge will be made for this equipment.

~~27.~~22. ~~Normally, charges for Use of System will be payable in accordance with the billing period and payment terms agreed with the party using the system. Central Networks reserves the right to require appropriate security in respect of the charges estimated to arise, depending on the circumstances of the supply and on the basis of the agreed payment terms. Interest charges are applicable to late payments. Invoices for residential and most business supplies will generally be calculated according to the Supercustomer Methodology for Use of System Billing, a description of which is given in our 'Use of System Charging Statement'. For Exit Points with half-hourly (HH) metering, site specific invoices will be rendered. These will list the supplies to which the invoice refers, the information about the supply on which the charge has been calculated, and the amount due for each supply identified on the invoice.~~

~~28.~~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.

~~29.~~ Where the supply is to be provided over Central Networks' 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.

24.

25. In setting charges there is the need to adjust prices so that allowed revenue is correctly recovered. The following summarises our seven step approach for 2010/11 tariff setting:

(1) Calculate total allowed revenue pot from price control formula

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(2) Calculate the EHV DG element of the pot from price control formula

(3) Use the revenue given by (2) to scale EHV DG charges

(4) Subtract the revenue given by (2) from the total allowed revenue pot

(5) Calculate the EHV 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".

~~30. Where Central Networks, after evaluation of the characteristics of the requested use of the system, accepts that none of the categories of charges in the schedules of its 'Use of System Charging Statement' is appropriate or where supplies are to be provided at a voltage not listed, Central Networks will offer special arrangements. Such charges will be calculated according to the same principles and methodologies as laid out in this Statement. In most cases, Central Networks will make its offer of terms within 28 days of receiving the application, following receipt of the full and final information necessary for the preparation of the terms.~~

~~31. Charges for demand include an allowance for NGC Exit Charges. Charges for export do not include NGC exit charges.~~

~~32. Charges for demand include an allowance for Business Rates. Charges for export do not include Business Rates.~~

~~33.~~26. Central Networks 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.

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PART A

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

27. 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 at [XXXX], and is subject to governance arrangements set out in [XXXX].

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PART B

Use of System Charging Methodology – EHV~~Regulated~~ Demand Charges *Not* Covered by the CDCM

~~Tariffs~~

Overview

28. Please refer to paragraph 26 in connection with Central Networks' review of its methodology for EHV charges.

29. Central Networks 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 ~~newly developed~~ Microsoft Excel spreadsheet designed to lay out as clearly as possible the various inputs, workings and outputs.

~~34.~~30. The pricing model produces charges for all network levels, but only those for EHV demand are used. See paragraph 27 in respect of HV and LV charges.

~~35.~~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

~~36.~~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)

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~~37.~~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[2]. Any future changes to the tariff structures will constitute a methodology change.

Allowed Revenue (Demand)

~~38.~~ Distribution allowed revenue is the maximum allowed in a particular regulatory year (April – March). ~~The price control formula which governs allowed revenue is large and complex, but in essence this follows the 'RPI minus X' form designed to give real reductions in charges over time. A number of key inputs drive allowed income:~~

- ~~Growth in units distributed~~
- ~~Growth in customer numbers~~
- ~~Changes in network losses~~
- ~~Network performance~~
- ~~Inflation and 'X'~~

~~Forecasts~~

~~39.~~34. Central Networks 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

~~40.~~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.

[2] ~~Full lists of tariffs and associated details are given in our 'Use of System Charging Statement'~~

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Setting Capacity Charges

~~41.~~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.

~~42.~~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 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 2.2~~65~~).

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Setting Unit Charges

~~43.~~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

~~44.~~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):

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- 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

~~45.~~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.

~~46.~~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.

~~47.~~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 'The Treatment of NGC Exit Charges').

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.

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The Treatment of NGC Exit Charges

~~48.~~43. NGC exit charges are a pass-through cost which is additional to the allowed revenue calculated by the price control formula.

~~49.~~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.

~~50.~~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.

~~51.~~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

~~52.~~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

Unusual EHV Demand Connections

~~EHV Tariffs~~

48. For the majority of EHV demand connections a standard EHV tariff is used. This tariff ~~has the same structure to the HV and LV half-hourly tariffs, consist~~s~~ing~~ of fixed charges, unit charges, capacity charges, ~~and~~ excess capacity charges and excess reactive power charges.

~~53. The EHV tariff is set using the same methodology as the HV and LV half-hourly tariffs.~~

~~54.~~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

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reason such connections have historically been subject to charges based wholly on capacity, and without unit charges.

~~55.~~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.

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

~~Use of System Charging Methodology – Generation Tariffs~~

Overview

51. Please refer to paragraph 28 in connection with Central Networks' review of its methodology for EHV charges.

~~56.~~52. Central Networks ~~will~~ 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[3], or if there are material changes to their use of the system – for example increased capacity.

~~57.~~53. The charges are designed to recover the costs of the connection that have been met by Central Networks, 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 ~~U~~use of system charges ~~for larger generators~~ are based on the export capacity (chargeable capacity) used, measured in kVA, as reflected in the connection agreement.

~~58. For small LV connected generators, which do not have metering capable of collecting HH export data, it is not practical to charge in this way, and an equivalent unit charge is used. Unit charges are based on the LV generator capacity charge, and are calculated using average load factors.~~

55. Charges for EHV connected generation are~~will be~~ site specific. These charges ~~will~~ provide focussed cost reflective economic signals to generators that will encourage efficient connection to the network. The charges are ~~will be~~ set to recover ~~the three elements[4] of allowed~~ revenue relevant to each particular EHV connected generator with reference to the actual capacity and cost of each connection.~~,~~

~~59. and may be adjusted to match actual income to allowed revenue.~~

~~60. Charges for HV and LV connected generation will be generic (i.e. the same charges will apply to all generation connected at each particular voltage).~~

[3] In a very few cases large generators paid site specific charges for export prior to April 2005

~~[4] Refer to paragraphs 65 to 70 for details of these three elements~~

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61. The starting point for setting HV and LV charges is the allowed revenue forecast for generators. Our Generator UoS charges are set to recover the total anticipated allowed revenue associated with generation.

62. Initial charges for HV and LV connected generation, which apply from 1st April 2005, are based purely on forecast information about the likely export connection capacity and reinforcement costs of generator connections. Subsequent charges are based on a weighted mix of the initial forecast and actual connection capacity and reinforcement costs. The move from reliance on forecasts to actual costs is made in a planned progressive manner, over the period to 31st March 2010[5]. This transition is designed to allow time for significant amounts of actual cost information to become available, and to prevent undue volatility in prices.

Classes of Generator Connection

63. Generator connections will be split into the following main classes for charging purposes:

- EHV connected (HH metered) – Site Specific
- HV connected (HH metered)
- LV connected (HH Metered)
- LV connected (NHH Metered) excluding SSEG[6]
- LV connected (NHH Metered) SSEG

Allowed Revenue

64. The following reflects our current understanding of the DR4 price control proposals. Any differences between these and the final price control may prompt the need for a methodology change.

65. The allowed revenue relating to generators consists of three main elements; pass-through, operation and maintenance, and the generation incentive.

66. Pass-through costs are 80% of the costs of connecting Distributed Generation (DG), excluding costs met by the generators directly through connection charges. Operation and maintenance costs are deemed to be £1 per kW of installed generation capacity per year. The DG incentive is £1.50 per kW of installed generation capacity per year.

67. At the end of the price control period (March 2010) the total return from our generator UoS charges will be subject

[5] Refer to paragraph 78 for details of this transition

[6] Small Scale Embedded generation (SSEG) is defined in the Energy Networks Association's Engineering recommendation G83/1 as a source of electrical energy rated up to and including 16 Ampere per phase, single or multiphase, 230/400 Volts ac

to 'cap and collar' limits. These limits are designed to ensure our total return from generator connections during the period of the price control is consistent with assumptions made by Ofgem when setting the control.

68. Special arrangements apply to connection charges for 'high cost connections' – where connection costs exceed £200 per kW[7].

69. Our generator UoS charges are set to recover the anticipated total allowed revenue associated with generation, initial estimates of allowed revenue are based on forecasts of the level of the three elements of allowed income.

Network Rebates

70. Generators with LV export connections are eligible for the same compensation for network unavailability under the guaranteed standards[8] as LV demand customers.

71. Users responsible for the output of Generators with HV or 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 Central Networks' policy to recommend firm[9] connections for HV and EHV generators.

72. 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 of 0.2p per kWh.

73. 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.

74. 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.

Forecasts

75. The initial forecast is based on Central Networks' submissions for the price control review – covering the

[7] These arrangements are detailed in our 'Connection Charging Methodology' (paragraphs 2.24 and 2.25)
[8] The Electricity (Standards of Performance) Regulations 2005
[9] For the purpose of determining what constitutes a firm connection the requirements of Engineering Recommendation P2/5 will apply, but the exclusion of single connections will not apply to generators

~~period April 2005 to March 2010 – updated for changes known at the time of initial tariff setting (e.g. new or cancelled connection enquiries).~~

~~76. We collect information on actual capacity and Direct Costs associated with Relevant DG as defined in the Regulatory Instructions and Guidance. The actual data used in setting charges is the cumulative actual data from 1 April 2005 to the relevant date.~~

~~77. The transition between forecast and actual data as the basis of charges will be based on the sum of the five-year forecast, and the cumulative actual data, weighted in the following way:~~

	~~2005/6~~	~~2006/7~~	~~2007/8~~	~~2008/9~~	~~2009/10~~
~~Forecast~~	~~1~~	~~0.75~~	~~0.5~~	~~0.25~~	~~0~~
~~Actual~~	~~0~~	~~0.25~~	~~0.5~~	~~0.75~~	~~1~~

Calculation of generation ~~f EHV C~~charges ~~(Site Specific Charges)~~

~~78.~~56. For EHV connected generators site specific charges are calculated from two~~he three~~ elements ~~of allowed revenue~~:

- Pass-through costs (site specific)
- Other standard costs
- ~~Incentive~~
- ~~O&M~~

~~79.~~57. The pass-through element is calculated from the shared reinforcement costs associated with the particular connection. The ~~allowed~~ pass-through percentage of these costs (80%) is annuitised over 15 years (or the expected life of the connection where this is less than 15 years) at the current regulatory cost of capital. This calculation gives an annual amount to be charged.

~~80.~~58. The other standard costs element is ~~incentive element is~~ calculated from the capacity of the generator expressed in kW, ~~,~~ multiplied by the sum of the distributed generation incentive and the distributed generation O&M allowance set out in our price control ~~the incentive rate of~~ (both expressed in £/kW/year) ~~£1.50/kW/year~~, to give an annual amount to be charged.

~~81. The O&M element is calculated from the capacity of the generator expressed in kW, multiplied by the O&M rate of £1.00/kW/year to give an annual amount to be charged.~~

~~82.~~59. The two~~hree~~ amounts above are ~~then~~ summed to give the total annual amount to be charged. This total is then divided by the product of the generator export capacity (in

kVA), the number of days in the year (365/366), and 100, to give an equivalent daily charge in pence per kVA per day.

EHV charges are ~~will be~~ adjusted annually in line with changes in RPI. This ~~will~~ maintains the real value of the returns on investment that underpin the pricing methodology. All EHV charges are ~~will be~~ adjusted at the same time, and charges relating to connections completed less than six months ahead of an annual adjustment will be excluded from that adjustment.

60.

~~83. EHV charges will also be adjusted (if required) to balance overall levels of allowed and actual revenue for DG. If such adjustments are required they will apply pro rata across all charges, including LV and HV DG tariffs.~~

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Calculation of HV and LV Charges (Generic Charges)

Model Inputs

84. A spreadsheet model is used to set the charges For HV and LV connected generators. The model uses a mix of forecast and actual data to generate charges. The model requires the following Inputs:

- Assumed cost of capital 6.9%
- Pass through percentage 80%
- Assumed inflation 2.5%
- Incentive rate £1.50 per kW per year
- O&M rate £1.00 per kW per year
- Export load factor (NHH) 30%
- Export load factor (SSEG) 15%

For each class of connection:

- Forecast of installed and chargeable generation capacity
- Forecast of reinforcement costs
- Weighting of forecast and actual data for each year[10]
- Actual data equivalent to the forecast data above as this becomes available

Assumptions

85. For pricing purposes it is assumed that generators connecting to the system will continue to use it for fifteen years in a way that is consistent with the capacity originally required[11].

86. It is assumed that, in addition to any adjustments to charges occasioned by changes to the input data, charges will be adjusted annually in line with changes in RPI. This will maintain the real value of the returns on investment that underpin the pricing methodology.

87. Where, for a particular class of generation, both the forecast and actual costs are nil, then the charge is nil (i.e. no operation and maintenance or incentive is charged for, and no adjustments are made to match actual and allowed revenue).

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[10] See paragraph 78

[11] Actual 'tie-in' periods for capacity will generally be three years

Model Outputs

88. The model outputs are a series of charges for the various classes of DG connections. These will be expressed in either pence per kVA per day or pence per kWh as follows:

HV pence per kVA per day
LV HH pence per kVA per day
LV NHH pence per kWh
LV SSEG pence per kWh

89. Having established base prices as described above these are adjusted to ensure recovery of allowed revenue. This involves proportionate adjustment to match the total forecast income that the charges will yield, and the forecast allowed revenue for the corresponding year, taking account of any adjustments for under or over recovery in previous years.

90. In addition to the stability created by the gradual transition from forecast to actual data as the basis for charges, in the first five years of these charges (up to March 2010) special measures will be taken to ensure stability of prices. Under these measures the time over which any price increase will be introduced depends on the size of the prospective step change that would be required to correct the prices in a single increase. Except in cases where prices are nil, price increases will be spread over a maximum number of years as follows:

Prospective Step Change	**Introduction Period**[12]
Up to 15%	Immediate
16% to 30%	2 years
31% to 45%	3 years
More than 45%	4 years

91. Percentage based constraint of increases is inappropriate where prices are nil. In these cases any initial increase will be capped at an amount equivalent to 15% of the relevant charge for HV connected generation[13].

[12] Introduction period will be limited to remaining years to March 2010. Where there is insufficient time remaining, the increase will be spread over the available years

[13] HV charges have a positive value from 1 April 2005, and therefore form an appropriate reference value for setting caps for other charges which start at nil. Based on our indicative HV generator export charge for 2005 (1.02p per kVA per day), the limit on increases in other charges which start from nil will be around 0.15p

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~~**Example Model Calculations**~~

~~92. For the case of a worked example here we are only examining HV distributed generation and, for illustrative purposes only, the following fictional HV cumulative forecast has been assumed for the year in question:~~

~~Connection Voltage~~	~~Forecast Installed Capacity (MW)~~	~~Forecast Export Capacity (MW)~~	~~Forecast Shared Costs~~
~~HV~~	~~200~~	~~200~~	~~£8,000,000~~

~~93. The actual data to date is as follows:~~

~~Connection Voltage~~	~~Actual Installed Capacity (MW)~~	~~Actual Export Capacity (MW)~~	~~Actual Shared Costs~~
~~HV~~	~~150~~	~~150~~	~~£10,000,000~~

~~94. For the example model we have assumed a 50:50 weighting of forecast and actual data (the actual weightings depend on the year as detailed above). In the example above the average cost per MW is higher than that forecasted. By combining the actual data and the forecast data the model will achieve the most stable prices:~~

~~Connectio~~	~~Assumed~~	~~Assumed~~	~~Assumed~~	~~Costs per~~

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n Voltage	Installed Capacity (MW)	Export Capacity (MW)	Shared Costs	MW of Export Capacity
HV	175	175	£9,000,000	£51,429

95. The cost is then annuitised and is expressed in £ per kW per year. The actual annuity factor will be based on the cost of capital allowed in the price control, but for ease in this example we have assumed an annuity factor of 10% – giving an annuitised cost of £5.14/kW per annum. We are able to pass-through 80% of this amount[14], so the annuitised annual pass-through cost is £4.11 per kW per annum. In addition to the pass-through, the incentive rate of £1.50 per kW and the ongoing operation and maintenance allowance is £1 per kW, so the total is £6.61 per kW per year.

96. The modelled annual charge is then converted to an equivalent charge in pence per kVA of chargeable capacity per day[15] (this is derived by: 100x(6.61/365)). In this example the charge would be 1.81p per kVA per day[16].

97. For NHH generators, we calculate an equivalent unit rate using an assumed load factor for LV export connections. If it is assumed for illustrative purposes that the model described above has produced the charge of 1.0p per kVA per day for LV NHH connections, then the equivalent unit rate is derived by dividing this by the number of hours export per day (30% load factor x 24 hours in this example), to give an equivalent unit charge of 0.14p per kWh exported.

98. Charges will also be adjusted (if required) to balance overall levels of allowed and actual revenue for DG. If such adjustments are required they will apply pro-rata across all DG charges, including EHV charges.

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[14] In this example the generator contribution to shared connection costs is assumed to be zero

[15] Where the installed generator capacity is different from the chargeable capacity (because of on-site demand for example)the charges will be adjusted by the ratio of installed capacity to chargeable capacity in order to collect the appropriate revenue

[16] In this example the power factor is assumed to be unity

~~99. **Finally checks are made to determine whether the special stability measures described in paragraph 92 apply and, if so, price increases are reduced as appropriate.**~~

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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 Central Networks' policy to recommend firm[9] 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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[9] 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

~~## Where our Use of System Charges are Published~~

~~100.~~ Central Networks' 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. ~~Alternatively a complementary hard copy can be supplied with subsequent copies at a charge of £5.00 by following the contact details in paragraph 16.~~

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Appendix A - GlossaryA

~~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 Distribution Licence (EDL)	The Electricity Distribution Licence granted to Central Networks 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 Objectives	As defined in paragraph 3 of condition 4 of the EDL and repeated in the general introduction to

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	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 FactorsB

~~Central Networks' Methodology for Line Loss Factors~~

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

[LLF methodology to be re-drafted to comply with new BSC requirements]

~~Central Networks publishes two different types of line loss factors (LLFs) for each of its licensed areas. Firstly, site-specific LLFs which apply to individual sites with demand (or export) that is very large or unusual in nature, and generally connected at extra high voltage (EHV). Secondly, 'voltage general' LLFs which apply to all other sites connected at a particular voltage level.~~

~~The LLFs that apply to a particular site can be determined by reference to the site's Supply Number, which is printed on supplier bills. The last three digits on the top line of this number are the LLFID that is used in settlements to allocate losses. Suppliers or end users can check the LLFs that apply to any site by accessing the ELEXON web site and looking up the LLFs listed against that LLFID. However these are given in a half-hourly format and are intended for loading into computer systems, rather than for easy understanding. Alternatively (and much more easily) our statements of charges provide summary details of our voltage general LLFs, and details of our site-specific LLFs are given in the charging information sheets that we send to the relevant end users and their suppliers.~~

~~Site-specific LLFs are calculated using the so-called 'substitution method', which has its roots in pre-privatisation industry standards. The basis of this method is detailed load flow modelling of the relevant parts of the network to which the particular end user is connected. The models contain technical details of the particular network such as length and type of line / cable, transformer impedance, load information, etc. The model is run twice – once without the relevant end user's demand / export included, and a second time with this included – and the total losses are calculated in each case. The difference between the two totals of losses is deemed to be due to the presence of the particular demand / generation in question, and is ascribed to its LLFs. Further information and an illustrative example of the substitution method are given in the example shown at the end of this section.~~

~~It is not possible to calculate voltage general LLFs in the same way as site-specific LLFs, as they represent average~~

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losses for a particular voltage level across the entire network, rather than for any one network node. Total network losses can be modelled, but the necessary assumptions and simplifications are rather sweeping, and the results are insufficiently accurate to form the basis of LLFs. Therefore, our voltage general LLFs are based on long-run averages of network losses (i.e. what flows into the network less what flows out, less those losses attributable to site-specific LLFs). In determining the level of losses we take account of information about the degree of correction taking place in balancing and settlement, as well as known factors that will influence the levels of losses going forward (such as the correction of energisation statuses, etc.). The main pieces of settlement information that we look at are the Annual Demand Ratios (ADRs). ADRs are essentially rolling annual measurements of the total amount of correction taking place within a GSP group. Our aim in setting LLFs is to achieve ADRs that are as close to unity as possible. That is, that the inputs to the network are in balance with the sum of outputs and losses, without the need for significant correction. Our voltage general LLFs therefore implicitly include all categories of losses - both 'technical' and 'non-technical' (theft, etc.).

In addition to addressing the ADRs, we aim to adjust the LLFs in a way that minimises average amounts of correction in each individual time slot. The time slots used in both our licence areas have been aligned and are as follows:

LLF Time Slots (Clock Time)
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

The use of time slots, rather than half-hourly varying values of LLF, facilitates publication and assimilation of the information. The LLF files that we submit for use in settlement are however generally half-hourly in nature, and it would be possible – at least in principle – to have different LLFs for each half-hour. We do not believe that there is a case for this at present however.

Example of the calculation of a site specific line loss factor

Consider a load of 10MW, 0.95 power factor for connection to the Central Networks high voltage system. A network connection is designed using suitable circuitry for the connection, i.e. line, cable, transformer and busbar components, and then added to the existing computer based

~~network model. The model is completed by the addition of the required load.~~

~~Line loss factors (LLF) are calculated for each LLF period. The method used for each LLF period is as follows.~~

1. ~~Adjust system load to required percentage of peak load.~~
2. ~~Adjust required new load value if necessary.~~
3. ~~Compute system losses prior to introduction of the new load.~~
4. ~~Compute system losses after introduction of the new load.~~
5. ~~Determine additional losses in Central Networks assets caused by introduction of new load.~~
6. ~~Divide the additional losses by the value of the load to give the losses as a proportion of the new load~~
7. ~~Convert this to a LLF by adding 1.~~

~~The table below gives results of a typical study on real network~~

- ~~for each of four LLF periods (defined in the first column),~~
- ~~for system load given as a percentage of peak load (second column), and~~
- ~~for expected values of the new load at those times (third column).~~

~~Time Slots~~	~~System load (% of max.)~~	~~Value of new load (MW)~~	~~Losses before new load (MW)~~	~~Losses after new load (MW)~~	~~Losses due to new load (MW)~~	~~Losses as proportion of new load~~	~~LLFs~~
~~Night 00:30 – 07:30~~	~~30%~~	~~7~~	~~9.289~~	~~9.118~~	~~-0.171~~	~~-0.024~~	~~0.976~~
~~Monday – Friday 16:00 – 19:00 November to February~~	~~100%~~	~~10~~	~~26.944~~	~~27.288~~	~~0.344~~	~~0.034~~	~~1.034~~
~~Monday – Friday 07:30 – 16:00 & 19:00 – 20:00 November to February~~	~~95%~~	~~10~~	~~24.171~~	~~24.461~~	~~0.290~~	~~0.029~~	~~1.029~~
~~All other times~~	~~80%~~	~~10~~	~~17.426~~	~~17.571~~	~~0.145~~	~~0.015~~	~~1.015~~

~~In this example in the night time slot the new load helps soak up the output of existing local embedded generation – which would otherwise feed back up the network – and therefore reduces overall losses at night. In the other three time slots the load increases overall losses. These effects on losses are reflected in LLFs that are less than unity at night, and greater than unity in the other three time slots.~~

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

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~~Appendix C~~

~~Map of Service Area~~

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