

# Central Networks

A company of *e-on*

## **Central Networks West - Proposals Concerning Use of System Charging Methodology**

November 2005



## **INTRODUCTION**

This submission is made in respect of Central Networks West. A separate but similar submission is also being made in respect of Central Networks East.

This submission consists of two sections:

**Section one** addresses the condition placed on the Authority's approval of Central Networks West's Use of System Charging Methodology, namely:

"Development and implementation of a new charging model by 1 April 2006"<sup>1</sup>.

**Section two** proposes two modifications to the methodology which we believe better achieve the relevant objectives set out in our licence.

We are submitting these two sections within a single document because each has a significant impact on the other. It is our aim (subject to approval) to implement the proposals detailed in both sections together with effect from 1 April 2006.

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<sup>1</sup> Condition detailed in letter from Martin Crouch (Ofgem), dated 16 December 2004, and confirmed in letter from Martin Crouch dated 22 March 2005

## **SECTION ONE**

We have developed a new charging model based on long run marginal costs. It is our intention to implement the new model, in conjunction with the proposals detailed in section two, to produce the prices that will come into effect from 1 April 2006. This timetable would require us to make an indicative announcement in late December 2005. Ideally we would like to have the Authority's approval of these proposals prior to this date, but recognise that we might have to make the indicative prices conditional upon such approval.

The remainder of this section is arranged in the following way:

- 1.1 Detailed description of our proposals;
- 1.2 Explanation of how the proposals cover off the condition;
- 1.3 Consultations carried out;
- 1.4 Illustrative charges;
- 1.5 Proposed wording of Methodology Statement; and
- 1.6 Our future plans.

### **1.1 Detailed description of the proposals**

We propose to move away from the 'regulatory reflective' approach described in our current methodology, and introduce a new model reflecting long run marginal costs. In practice this will mean removing the link between the tariff basket weightings contained in the price control formula and our unit rates, which was criticised in the Authority's approval decision notice, and moving to a model that calculates typical long run marginal costs and allocates these between the different classes of customer.

We have developed a new pricing model based on the long run marginal costs of the network and the operating costs identified from our Regulatory Reporting Pack. The model adopts principles similar to those used in the ESI's original 500MW model, in that it aims to calculate the marginal costs associated with providing for an additional increment of demand. Implementation of the model is via a Microsoft

Excel spreadsheet newly developed from an original prototype built by EATL for East Midlands Electricity and other DNOs. The spreadsheet is designed to lay out as clearly as possible the various inputs, workings and outputs, but is necessarily large and complex - running to some eleven worksheets in total, and linking to nineteen GIS traces (captured as spreadsheets) and numerous other worksheets. The model borrows heavily from the topography and demographics of representative parts of our existing network, but is not a literal representation of this network. Rather it represents the way in which we would provide network to meet the requirements of typical demands and topography if we were to do this today using our latest equipment and network design standards.

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', representing the relative amounts of cost attributable to each customer group, which can be used in combination with standing charge and availability charge calculations to create tariffs that will recover specified revenues given forecasts of volumes, customer numbers and capacity.

The model has been improved over the original in a number of ways - principally by its clearer and more straightforward presentation, the adoption of a more rigorous and detailed approach to asset maintenance, repair and restoration costs (sourced from the Regulatory Reporting Pack), and the combination of both existing network topography and demographics with our latest equipment and network design standards.

In developing and implementing our new model the following issues needed to be addressed:

- simplifying and rationalising the tariffs that we publish so as to clarify charges;

- reflecting cost drivers by attributing proportionately more network cost to capacity charges, rather than unit charges, in our half-hourly tariffs;
- modelling the network based on an assumed minimum power factor.

We believe that by addressing these issues in the new model we are providing greater cost reflectivity, as required in the condition, and paving the way for development of the longer-term methodology.

We are simplifying and rationalising the tariffs so as to clarify charges in the following ways:

- removing residual and inappropriate references to metering in tariffs (e.g 'card meter' versions of tariffs);
- removing references to 'commercial' and 'industrial' end users;
- rationalising unmetered supply tariffs

Our aim is to achieve a set of tariffs that are more aligned with those of other DNOs, that are clear and cost reflective and as such will facilitate competition in the supply of electricity, and furthermore that will enable us to make a cleaner transition to the longer term framework in due course.

We have reviewed the allocation of costs to the various tariff elements for larger customers and overall this has resulted in greater emphasis on capacity charges, rather than unit charges, in our half-hourly tariffs. This is achieved by including a greater proportion of the costs for the 'upper network' in capacity charges, which will represent approximately 65% of recovery through half-hourly tariffs in future. We believe this better reflects the importance of capacity as a cost driver for this category of customer.

In respect of reactive power our new model makes the simple assumption that demand customers' power factors will not be worse than 0.95 lagging (the minimum power factor required in our connection agreements with large customers).

### **1.2 Explanation of how the proposals cover off the condition**

The Authority's condition requires Central Networks West to develop and implement a new charging model by 1 April 2006.

Our proposals address the condition by replacing the 'regulatory reflective' methodology with a cost reflective methodology based on long run marginal costs, and implementing this (if approved) by 1 April 2006.

Adoption of the new model removes the link between tariff basket weightings in the price control and unit rates that was at the heart of the regulatory reflective model (and central to the Authority's concerns about it), and replaces this with a cost reflective methodology broadly comparable to those currently approved by the Authority for use by a number of other DNOs.

In addition to covering off the condition we believe the changes also better meet relevant licence objectives, principally by increasing cost-reflectivity and facilitating competition.

The proposals have been developed in ways which are designed to pave the way for transition to the longer term arrangements. All the proposals were flagged to electricity suppliers and Ofgem in June 2005 (see below), and subsequently presented to and discussed with the ISG and Ofgem.

### **1.3 Consultations carried out**

In June 2005 we wrote to all suppliers with an update on the work we were doing to develop our use of system methodology, and an invitation to comment. The text of the letter was as follows:

*Dear Supplier*

*I am writing to you to tell you about work that we are currently doing to develop our use of system methodology, and to invite your comments.*

*This letter does not constitute formal notice of changes to the methodology or charges. Any change to the methodology would be subject to approval by the Authority, and any subsequent change to the charges would be subject to the usual three months formal notice to suppliers. We do not currently anticipate changing our charges before April 2006, though we reserve the right to do this at any time with the appropriate notice.*

*You may be aware that approval of the use of system methodologies for both Central Networks East and West are subject to conditions that we are required to address by April 2006. In response to these conditions we are currently developing a new pricing model for our demand tariffs based on forward looking long run marginal costs. This model will use information about the network and other costs to arrive at yardstick prices. We are aiming to complete this model and to propose amendments to our methodology by the end of September 2005.*

*It is anticipated that the new methodology will form the basis of charging until the longer term framework, currently under development by the ISG and recently the subject of consultation by Ofgem, is implemented.*

*In addition to addressing Ofgem's specific conditions, we are considering further improving the methodology for demand tariffs in a number of other ways:*

- By reducing the number of tariffs that we publish so as to simplify and clarify charges. We are currently looking at a number of possible ways to do this; including standardising the 'economy 7' night time slot within and across the two licensed areas, removing residual and inappropriate references to metering in tariffs, removing references to 'commercial' and 'industrial' end users, removing some preserved and little used tariffs, rationalising*

*charges for unmetered supplies, etc. Our aim will be to achieve a minimal set of tariffs that will enable us to make a cleaner transition to the longer term framework in due course;*

- By placing greater emphasis on capacity charges, rather than unit charges, in our half-hourly tariffs;*
- By introducing (reintroducing in the case of CN East) differential charges for excess demand for our half-hourly tariffs, based on a cost reflective methodology for establishing the differentials;*
- By introducing special charges for demand at average power factors below an acceptable limit, possibly by way of kVArh charges where kVArh exceeds a set proportion of kWh in a particular charging period.*

*We do not currently anticipate making any changes to our methodology for generation export tariffs.*

*I hope that this letter provides a helpful insight into the work that we are currently undertaking. If you would like to make any comments it would be helpful to receive these by mid July. I would also be happy to discuss any comments with you on a one-to-one basis, please contact me if you would like to do this.*

*Yours sincerely*

*Andrew Neves  
Tariff and Income Manager*

*c.c. Mark Cox, Ofgem*

We did not receive any response to this letter, and this was taken as an indication that the proposals it outlined were broadly acceptable to suppliers. We also listened to what suppliers were saying in forums such as the Implementation Steering Group (ISG). Again these views did not appear to conflict with anything that we were proposing to do.

We have not carried out formal consultations on our final proposals.

#### **1.4 Illustrative charges**

The illustrative charges detailed in table 1 on the following page have been calculated in a way designed to allow fair comparison of the old and new methodologies.

The table compares Central Networks West's existing 2005/06 tariffs ("Old Price") to equivalent 2005/06 tariffs derived using the new pricing model ("New Price").

These are NOT indicative 2006/07 prices. Also, please note that standing charge and capacity charges are expressed in p/day and p/kVA/day in our charging statement, however for ease of understanding and comparison they have been expressed here as £/customer/yr and £/kVA/month respectively.

**Table 1: Illustrative charges**

<b>Name</b>	<b>Charge</b>	<b>Units</b>	<b>Old price</b>	<b>New price</b>
D-UR	Standing charge	£/cust/yr	£21.68	£21.54
	Unit charge	p/kWh	0.78	0.77
D-TR	Standing charge	£/cust/yr	£22.59	£25.55
	Unit charge - day	p/kWh	0.92	0.89
	Unit charge - night	p/kWh	0.12	0.16
ND-UR	Standing charge	£/cust/yr	£30.11	£72.01
	Unit charge	p/kWh	1.15	0.70
ND-TR	Standing charge	£/cust/yr	£30.15	£75.00
	Unit charge - day	p/kWh	1.21	0.79
	Unit charge - night	p/kWh	0.12	0.16
M- LV	Standing charge	£/cust/yr	£98.70	£531.96
	Unit charge - day	p/kWh	1.21	0.75
	Unit charge - night	p/kWh	0.12	0.16
M-HV	Standing charge	£/cust/yr	£1,089.05	£1,044.52
	Unit charge - day	p/kWh	0.54	0.45
	Unit charge - night	p/kWh	0.08	0.15
HH LV	Standing charge	£/cust/yr	£125.93	£606.69
	Availability charge <sup>2</sup>	£/kVA/m	£1.16	£1.26
	Excess capacity charge <sup>2</sup>	£/kVA/m	£1.16	£2.14
	Excess reactive power charge <sup>2</sup>	p/kVArh	N/A	0.37
	Unit charge - day	p/kWh	0.54	0.21
	Unit charge - night	p/kWh	0.13	0.09
HH HV	Standing charge	£/cust/yr	£1,156.61	£1,617.84
	Availability charge <sup>2</sup>	£/kVA/m	£1.00	£1.00
	Excess capacity charge <sup>2</sup>	£/kVA/m	£1.00	£1.70
	Excess reactive power charge <sup>2</sup>	p/kVArh	N/A	0.19
	Unit charge - day	p/kWh	0.16	0.15
	Unit charge - night	p/kWh	0.05	0.08
EHV 33	Standing charge	£/cust/yr	£1,156.61	£1,617.84
	Availability charge <sup>2</sup>	£/kVA/m	£0.81	£0.61
	Excess capacity charge <sup>2</sup>	£/kVA/m	£0.81	£1.04
	Excess reactive power charge <sup>2</sup>	p/kVArh	N/A	0.14
	Unit charge - day	p/kWh	0.06	0.11
	Unit charge - night	p/kWh	0.03	0.07

<sup>2</sup> These charges are subject to the approval of the modifications proposed in Section 2

It should be pointed out that the charges for half-hourly standard capacity ("Availability charge"), excess capacity and excess reactive power, contained in table 1, have been shown assuming the modifications proposed in section two of this submission are approved.

Should the modification concerning excess capacity not be approved, this will have an impact on both standard and excess availability charges as shown below:

	Modification accepted		Modification rejected	
	Availability £/kVA/m	Excess £/kVA/m	Availability £/kVA/m	Excess £/kVA/m
HH LV	£1.26	£2.14	£1.28	£1.28
HH HV	£1.00	£1.70	£1.02	£1.02
EHV 33	£0.61	£1.04	£0.62	£0.62

It can be seen that the effect of charging for excess capacity at the same rate as standard capacity is to cause all customers to pay a higher standard rate.

### **Main movements in prices:**

Small non-domestic standing charge (ND-UR) has increased from £30.11 to £72.01, with similar increases on the two rate tariff (ND-TR). This change is a result of the increased weighting applied to this customer group in the allocation of non-system costs, which reflect the increased cost that this type of customer would impose. We believe that the size of the change is a result of the original price not being properly cost reflective.

Alongside this increase in standing charge, the day unit rates for the small non-domestic tariffs have reduced significantly (from 1.15 p/kWh to 0.70 p/kWh for ND-UR). We believe that this is a result of inappropriate demand factor inputs to the old model. The new reduced unit rates reflect our latest view of demand factors for this customer group which we believe intuitively appear more cost reflective. Overall the cost to the small non-domestic group of customers as a whole is expected to reduce by 8%.

In the medium non-domestic LV tariff (M - LV) the standing charge has also increased, from £98.70 to £531.96, which reflects our latest view of the weighting to be applied to this customer group in the recovery of non-system costs. There have also been significant reductions in the day unit rates (from 1.21 p/kWh to 0.75 p/kWh for M -LV) similar in magnitude to those experienced by the small non-domestic tariffs. Again, we believe that this is a result of inappropriate demand factor inputs to the old model. The new reduced unit rates reflect our latest view of demand factors for this customer group which we again believe intuitively appear more cost reflective. Changes to the medium non-domestic HV tariff have been less significant and overall the cost to the medium non-domestic group of customers as a whole is expected to increase by 1%.

This pattern is repeated for the large non-domestic LV tariff (HH LV) for which there has been an increase in standing charge, from £125.93 to £606.69, (reflecting our latest view of the weighting to be applied to this customer group in the recovery of non-system costs). There has also been significant reductions in the day unit rates (from 0.54 p/kWh to 0.21 p/kWh for M-LV). However, in addition to the effect of updating the demand factors for this customer group, the day rates have also reduced because of the increase in the proportion of cost to be recovered through availability charges.

Availability charges for the standard EHV tariff (EHV 33) have actually reduced as a result of the implementation of the new methodology for availability charges and as a result the residual unit rates have increased. Overall, the cost to our standard EHV customers is expected to reduce by 2%.

### **Unmetered Supplies**

Not included in the above table of illustrative charges are our unmetered supply tariffs however we are also making changes to these tariffs as highlighted in the table 3 below:

**Table 3 : Unmetered Supply tariffs**

<b>Name</b>	<b>Charge</b>	<b>Units</b>	<b>Old price</b>	<b>New price</b>
HH UMS	Unit charge	p/kWh	0.09	1.33
	Availability charge	£/KW/m	£3.52	£0.00
UMS1-U	Unit charge	p/kWh	0.78	1.33
UMS2-U	Unit charge	p/kWh	1.41	1.33
UMS3-U	Unit charge	p/kWh	3.46	1.33
UMS1-A	Unit charge	p/kWh	0.62	1.33
UMS2-A	Unit charge	p/kWh	1.13	1.33
UMS3-A	Unit charge	p/kWh	2.76	1.33

We are implementing a uniform tariff for all unmetered supplies for the following reasons:

- The three tariffs, UMS1-U, UMS2-U, and UMS3-U are effectively versions of the UMS1-A, UMS2-A and UMS3-A tariffs but include a premium charge on the basis of the fact that their inventories are unapproved. We do not have a cost reflective methodology for calculating the premium element of this charge and we no longer believe one is appropriate since there is no evidence that these customers impose any additional costs on the network.
- The three tariffs, UMS1-A, UMS2-A and UMS3-A are non-half-hourly tariffs for whom consumption is based on assigned settlements profiles, which we believe may be unreliable for the purposes of calculating the demand factors that are necessary for the tariff model. We therefore believe that the price for all unmetered supplies should be based on the demand factors of the half-hourly group of unmetered supplies (HH UMS). This group represents the largest proportion of unmetered demand and is also the one on which we have the most reliable consumption data since it is based on actual measurements of light levels which influence the actual switching times of the various items making up the inventories.
- As well as basing the unmetered supply tariff on the half-hourly groups' demand factors, we are also removing the demand charge element of this tariff (currently £3.52 kW/m) since we believe that it does not offer any cost signal to the users, whose demand is based purely on other factors (time of year etc) and for

whom there can be no actual measurement of capacity in kVA terms due to their unmetered nature.

### **Effects on DUoS bills**

Table 2 shows the effects of the main illustrative prices on the annual bills of three different types of customer - the Central Networks average customer, a customer with a low load factor and a customer with a high load factor.

Overall the annual revenue recovery from the main customer groups has moved in the following ways:

- domestic will increase by 0.1%.
- small non-domestic will reduce by 8%
- medium non-domestic will increase by 1% and
- large non-domestic will increase by 2%.

**Table 2: Effect of illustrative charges on annual bills**

<b>Name</b>	<b>Load Factor</b>	<b>Annual Consumption Day/Total (kWh)</b>	<b>Annual Consumption Night (kWh)</b>	<b>Capacity (kVA)</b>	<b>Old Model Annual Bill (£)</b>	<b>New Model Annual Bill (£)</b>
<b>D-UR</b>	Low	500			£26	£25
	CNW average	4,200			£54	£54
	High	7,500			£80	£79
<b>D-TR</b>	Low	1,500	1,400		£38	£41
	CNW average	3,700	3,500		£61	£64
	High	7,500	7,100		£100	£104
<b>ND-UR</b>	Low	5,000			£88	£107
	CNW average	13,200			£182	£164
	High	20,000			£260	£212
<b>ND-TR</b>	Low	7,000	4,200		£120	£137
	CNW average	14,400	8,700		£215	£203
	High	21,000	12,700		£299	£261
<b>M-LV</b>	Low	67,000	15,000		£927	£1,058
	CNW average	92,000	21,000		£1,237	£1,255
	High	166,000	38,000		£2,153	£1,836
<b>M-HV</b>	Low	100,000	23,000		£1,647	£1,530
	CNW average	135,000	31,000		£1,843	£1,699
	High	250,000	57,000		£2,485	£2,256
<b>HH LV</b>	Low	150,000	49,000	140	£2,952	£3,124
	CNW average	259,000	85,000	140	£3,587	£3,387
	High	500,000	164,000	140	£4,991	£3,967
<b>HH HV</b>	Low	1,000,000	346,000	800	£12,566	£13,188
	CNW average	2,000,000	692,000	800	£14,339	£14,949
	High	5,000,000	1,730,000	800	£19,658	£20,232
<b>EHV 33</b>	Low	5,000,000	1,900,000	4800	£51,178	£44,131
	CNW average	13,500,000	5,130,000	4800	£57,226	£55,876
	High	30,000,000	11,400,000	4800	£68,968	£78,675

## **1.5 Proposed wording of methodology statement**

### **Use of System Charging Methodology – Regulated Demand Tariffs**

**Pages ten to fourteen of the Methodology Statement currently containing paragraphs thirty four to fifty six will be replaced with the following paragraphs.**

#### **Overview**

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.

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 and capacity.

#### **Classes of Demand Connection**

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)

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>3</sup> Any future changes to the tariff structures will constitute a methodology change.

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

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**

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**

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',

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<sup>3</sup> Full lists of tariffs and associated details are given in our 'Use of System Charging Statement'

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, capacity, etc.

### **Setting Capacity charges**

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.

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.

***[Paragraphs relating to excess capacity charges, detailed in section two, will be inserted here if appropriate]***

### **Setting Unit Charges**

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.

***[Paragraphs relating to excess reactive power charges, detailed in section two, will be inserted here if appropriate]***

## **Setting Standing Charges**

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.

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.

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.

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

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

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.

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.

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**

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

### **EHV Tariffs**

For the majority of EHV demand connections standard EHV tariffs are used (a 33kV tariff and a 132kV tariff). These tariffs have the same structure to the HV and LV half-hourly tariffs, consisting of fixed charges, unit charges, capacity charges, excess capacity charges and excess reactive power charges. **[Note: excess reactive power charges are subject to approval of the modification proposed in section two]**. The EHV tariffs are set using the same methodology as the HV and LV half-hourly tariffs.

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

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.

### **1.6 Our future plans**

We plan to use the proposed methodology (if approved) to set the indicative charges for 2006/7, which will be announced in late December 2005.

In respect of longer term arrangements we are actively collaborating with other DNOs through the Energy Networks Association (ENA). This DNO group is looking at possible 'quick wins' in some of the areas identified in the paper presented to the recent ISG meeting by npower. The group has also met on a number of occasions to discuss the longer term arrangements and to develop requirements specifications for elements of work which we aim to commission jointly. We believe that working in this way will give us the best chance of developing consistent and acceptable methodologies for the longer term. It is also likely that some economies can be achieved by working together.

Although our strong preference is for a cooperative solution for the longer term arrangements, and despite the very promising start made by the DNO group, we do still have some concerns that the different starting points and aspirations of the DNOs might make the desired outcome impossible to achieve as a fully united group. For this reason, at this stage, we do not rule out the option of developing our longer term methodology as part of a smaller sub-group of DNOs, or even on our own.



## **SECTION TWO**

We have developed new cost reflective methodologies for setting excess capacity charges and excess reactive power charges. It is our intention to implement the new methodologies in conjunction with the new model described in section one, and to use them to produce the prices that will come into effect from 1 April 2006. This timetable would require us to make an indicative announcement in late December 2005. Ideally we would like to have the Authority's approval of these proposals prior to this date, but recognise that we might have to make the indicative prices conditional upon such approval.

The remainder of this section is arranged in the following way:

- 2.1 Detailed description of our proposals;
- 2.2 Explanation of how the proposals better meet licence objectives;
- 2.3 Consultations carried out;
- 2.4 Illustrative charges;
- 2.5 Proposed wording of Methodology Statement;
- 2.6 Our future plans.

### **2.1 Detailed description of the proposals**

We propose to modify our methodology in relation to dealing with breaches of agreed capacity, and to introduce new charges in relation to excess reactive power.

#### **Modification 1: Excess capacity charges**

In relation to dealing with breaches of agreed capacity Central Networks West currently charges for excess demand in the month in which it occurs at the normal rate for authorised capacity. For the year 2005/06 we had proposed to change the rate for excess capacity to three times the normal rate of capacity, which was something that had worked exceptionally well in reducing overall excess, and therefore costs, on the network for Central Networks East. When considering our proposed methodology statement early in 2005 the Authority was concerned that setting the excess demand charge at three times the

rate for authorised capacity was not cost reflective. Central Networks accepted that the three times multiplier had been chosen for its incentive effect and proportionality, rather than by any demonstrably cost reflective methodology, but maintained that excess demand was a driver of excess costs. At the time it was agreed that excess capacity should be charged for at the same rate as normal capacity, and this arrangement was subsequently approved by the Authority.

The proposed new methodology is based on the premise that the whole network must provide capacity, over and above that needed to meet authorised demand, to cater for the fact that authorised capacity levels will be exceeded by a proportion of customers spread randomly over the network.

In developing this proposal it has been suggested that there is no justification for charging excess demand at premium rates as compared with authorised demand, because the cost of capacity is the same in each case. It could even be argued that, as networks generally have some spare capacity there is no extra cost whatsoever, and that there should therefore be no charge for excess demand. In response to these arguments we would point out the following as justification for premium charging:

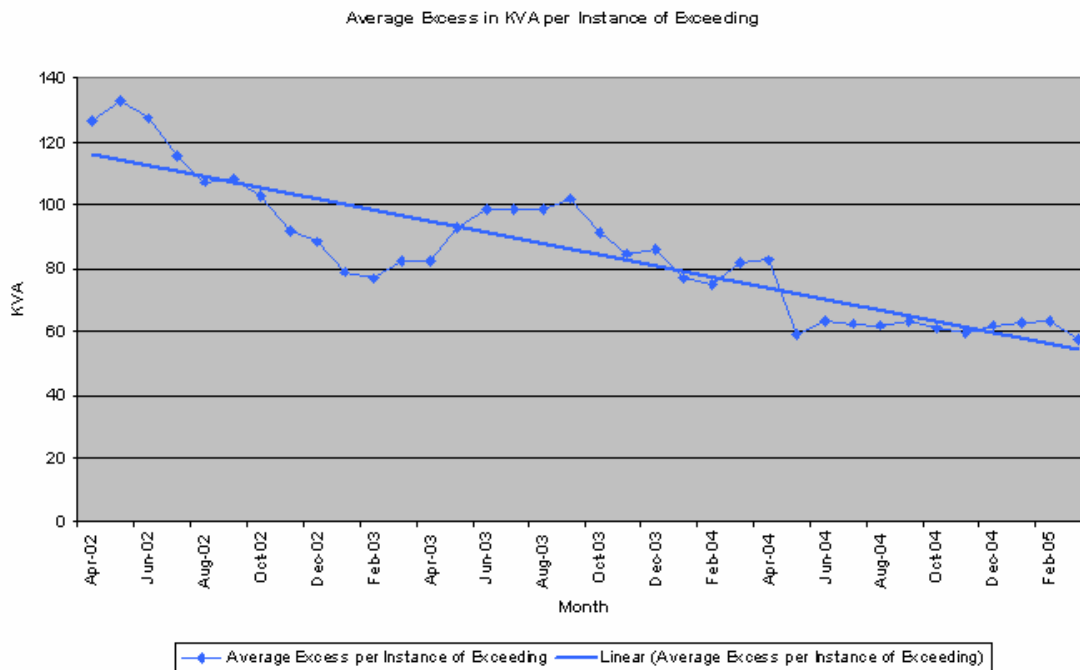
- When designing networks in a world where customers are prone to excess demand, more capacity must be provided than would be the case in a (hypothetical) world where customers did not exceed their authorised capacity;
- Network design standards have been developed over the years in a world where excess demand is known to occur randomly across networks, and therefore these standards implicitly embody allowances for this;
- Authorised capacity is the key piece of information when requests for connection are considered, and forms the basis for the apportionment of shared reinforcement costs to the customer. It is important that customers have an incentive to apply for the capacity they actually need;

- In contrast to authorised capacity, any excess demand will not have been subject to apportionment of additional shared costs to the customer and, in the absence of excess capacity charges, these costs would simply (and unfairly) be spread over all customers;
- The possibility of excess demand is not factored into our new model's calculation of the normal availability charges, and if it were to be included this would increase the total costs to be allocated to all customers;
- Network costs driven by excess demand should be focused on those that create excess demand;
- There is strong evidence that properly applied excess demand charges influence customer behaviour in a positive way and therefore facilitate the more efficient development of the network in the longer term.

Our proposed methodology takes account of information on authorised capacity, levels of excess demand and factors reflecting demand diversity effects. These are then used to calculate the average levels of excess capacity that the network must accommodate. The cost of this capacity is then shared amongst those giving rise to the need for the capacity (i.e. customers that exceed authorised demand levels). This cost is expressed as a multiplier to be applied to the normal capacity charge rates to arrive at the excess demand charge rates (expressed in pence per kVA per day). An initial indicative multiple of 1.7 has been calculated for Central Networks West.

Central Networks are proactive in helping customers manage their capacity requirements, and our aim is that all large customers should have the right authorised capacity. Evidence from Central Networks East strongly suggests that the proposed approach will provide a successful incentive for customers to manage their demand and will reduce overall levels of excess demand (see graph below). In light of this we would expect the multiplier to reduce over time. However, the arithmetic makes it possible that the multiplier may become excessively large in the 'end game', as customers respond to the cost messages and fewer actually exceed their authorised capacity. To avoid this it may be

appropriate to introduce a 'cap' and 'collar' arrangement for the multiplier, and we would suggest a cap of 3, and a collar of 1. There are arguments for and against a cap and collar, but we consider these to be a pragmatic solution to an unlikely but possible future problem. We do not insist on this as an essential part of the proposed methodology however, and are happy to be guided by the Authority on this matter.



The graph above tracks the average level of excess demand over the period during which Central Networks East operated 'in month' excess capacity charges with a multiplier of 3. Prior to this we had for many years operated the more traditional '12 month rolling capacity increase' approach to excess demand. During the three years for which the new policy operated average levels of excess demand halved.

**Modification 2: Excess reactive power charges**

In relation to reactive power our new model begins with an assumption that demand customers' power factors will not be worse than 0.95 lagging (the minimum power factor required in our connection agreements with large customers). In recognition of the additional costs prompted by customers with poor power factors the model also calculates excess reactive power charges for large customers with

demand at average power factors below the level assumed in our pricing model. This is in line with Ofgem's view<sup>4</sup>, that:

*"It is important that DNOs' charging arrangements reflect the costs that low power factors impose on the networks. Competition in supply would then mean that it would be in suppliers' interest to give the appropriate signals to their customers. Ofgem would therefore expect DNOs to include charges for low power factors for large customers as part of a revised charging methodology....."*

We propose to introduce charges for excess reactive power, where total kVAh exceeds 33% of total kWh in a particular charging period (this boundary being equivalent to the minimum average power factor of 0.95). The charges will be 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. The pricing model uses this information to re-calculate the yardsticks for the half-hourly tariffs at each voltage level. The resulting yardstick increments are then converted into equivalent prices in pence per kVAh that will recover the incremental cost, given forecast levels of reactive power.

We believe that reactive power charges will form an important cost reflective element of the longer term charging arrangements, and that introduction of these charges as part of the new model paves the way for transition to the longer term arrangements.

## **2.2 Explanation of how the proposals better meet licence objectives**

### **Modification 1: Excess capacity charges**

We believe that the proposal better meets licence objectives by providing cost reflective charges for excess capacity that have been demonstrated to modify customers' behaviour in a way that will reduce long run network costs.

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<sup>4</sup> Quote taken from Ofgem's Structure of Charges Initial Conclusions Document

By contrast, our current method of charging for excess capacity (at the same rate as normal authorised capacity) effectively allocates part of the additional cost caused by customers that exceed, to all large customers. This provides little incentive for customers to control their demand, and unfairly penalises those customers that do control their demand.

### **Modification 2: Excess reactive power charges**

We believe that the proposal better meets licence objectives by providing cost reflective charges for excess reactive power which complement the assumptions made in our new pricing model, and that are expected to modify customers' behaviour in a way that will reduce long run network costs.

### **2.3 Consultations carried out**

In June 2005 we wrote to all suppliers with an update on the work we were doing to develop our use of system methodology, and an invitation to comment. The text of the letter appears in section one (consultations carried out).

We did not receive any response to this letter, and this was taken as an indication that the proposals it outlined were broadly acceptable to suppliers. We also listened to what suppliers were saying in forums such as the Implementation Steering Group (ISG). Again these views did not appear to conflict with anything that we were proposing to do and, in particular, the views submitted by npower in their recent paper and discussed at the ISG were consistent with our proposed method of charging for excess capacity.

We have not carried out formal consultations on our final proposals.

## **2.4 Illustrative charges**

### **Modification 1: Excess capacity charges**

The illustrative availability and excess capacity charges for large non-domestic (half-hourly) customers detailed in the table below have been calculated in a way designed to allow fair comparison of the old and new methodologies. The table illustrates the effects of the proposed multiplier on the excess capacity charges.

The table compares Central Networks West's existing 2005/06 availability charges and excess capacity charges ("Old Price") to equivalent 2005/06 tariffs derived using the new pricing model described in section one and the methodology for excess demand described above ("New Price"), the assumption being that both sections one and two are approved by the Authority.

These are NOT indicative 2006/07 prices. Also, please note that capacity charges are expressed p/kVA/day in our charging statement, however for ease of understanding and comparison they have been expressed here as £/kVA/month.

<b>Name</b>	<b>Charge</b>	<b>Units</b>	<b>Old price</b>	<b>New price</b>
LND LV	Availability charge	£/kVA/m	£1.16	£1.26
	Excess capacity charge	£/kVA/m	£1.16	£2.14
LND HV	Availability charge	£/kVA/m	£1.00	£1.00
	Excess capacity charge	£/kVA/m	£1.00	£1.70
LND EHV	Availability charge	£/kVA/m	£0.81	£0.61
	Excess capacity charge	£/kVA/m	£0.81	£1.04

It should be noted that the level of the excess demand charges has implications for the level of the 'normal' availability charges. In effect the normal availability charges need to be higher if the excess demand multiplier is one. If the model described in section one was approved by the Authority and implemented, but the methodology described in section two above was not, then the prices shown in the table below would apply.

<b>Name</b>	<b>Charge</b>	<b>Units</b>	<b>Old price</b>	<b>New price</b>
LND LV	Availability charge	£/kVA/m	£1.16	£1.28
	Excess capacity charge	£/kVA/m	£1.16	£1.28
LND HV	Availability charge	£/kVA/m	£1.00	£1.02
	Excess capacity charge	£/kVA/m	£1.00	£1.02
LND EHV	Availability charge	£/kVA/m	£0.81	£0.62
	Excess capacity charge	£/kVA/m	£0.81	£0.62

### **Modification 2: Excess reactive power charges**

The illustrative excess reactive power charges for large non-domestic (half-hourly) customers detailed in the table below have been calculated in the way described in section 2.5 below using latest available data. These are NOT indicative 2006/07 prices.

<b>Name</b>	<b>Charge</b>	<b>Units</b>	<b>Old Price</b>	<b>New Price</b>
HH LV	Excess reactive power charge	p/kVArh	N/A	0.37
HH HV	Excess reactive power charge	p/kVArh	N/A	0.19
EHV 33	Excess reactive power charge	p/kVArh	N/A	0.14

## **2.5 Proposed wording of methodology statement**

### **Modification 1: Excess capacity charges**

***[To be included between paragraphs where indicated in the proposed wording set out in section one.]***

In addition to the standard capacity charges that apply to use of the network within the authorised supply capacities of particular connections, demand in excess of this is subject to excess capacity charges in the month in which excess demand occurs<sup>5</sup>. The excess demand charges are set at a multiple of the normal capacity charge rate for the relevant tariffs.

The multiplier is determined by reference to a methodology based on the premise that the whole network must provide capacity, over and above that needed to meet authorised demand, to cater for the

<sup>5</sup> See 'Use of System Charging Statement' for full details of the application of these charges

possibility that authorised capacity levels will be exceeded by a proportion of customers spread randomly over the network.

Historical information on authorised capacity, levels of excess demand and factors reflecting demand diversity effects are then used to calculate the average levels of excess capacity that the network must accommodate. The cost of this additional capacity is then shared amongst those giving rise to the need for the capacity (i.e. customers that exceed authorised demand levels). This cost is expressed as a multiplier to be applied to the normal capacity charge rates to arrive at the excess demand charge rates (expressed in pence per kVA per day).

[Optional paragraph depending on Authority's views] Evidence from Central Networks East suggests that this approach to excess demand charges will be successful in reducing overall levels of excess demand, and we would therefore expect the multiplier to reduce over time. However, in order to avoid the possibility that the multiplier may become disproportionately large in the 'end game', as customers respond to the cost messages and fewer actually exceed their authorised capacity, the value of the multiplier is subject to a 'cap' of three, and 'collar' of one.

The methodology is set out in more detail below:

- The average percentage excess demand of all half-hourly metered connections is calculated;
- This percentage is then applied to the total authorised supply capacity, to give a notional additional capacity of a network designed to accommodate average levels of excess demand;
- This total additional capacity is reduced by the application of a diversity factor of 0.33, reflecting the effects of demand diversity;
- This reduced total is then divided by the total excess demand, to give the excess demand multiplier;

- [Optional paragraph depending on Authority's views] To avoid the possibility of an inappropriately large or small multiplier resulting from this calculation, the multiplier is subject to a 'cap' of three and 'collar' of one;
- The multiplier is then applied to the normal capacity charge rates for each tariff, to give the relevant charges for excess demand (expressed in pence per kVA per day).

### **Modification 2: Excess reactive power charges**

***[To be included between paragraphs where indicated in the proposed wording set out in section one.]***

#### **Setting excess reactive power charges**

Excess reactive power charges apply to demand where total kVA<sub>r</sub>h 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, and noting the increments in the relevant yardsticks for the half-hourly tariff at each voltage level. The resulting yardstick increments are converted into equivalent prices in pence per kVA<sub>r</sub>h that will recover the incremental cost, 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.
- The excess reactive power charge is then calculated by dividing the resultant increase in required cost recovery from the half-hourly customers by the forecast volume of KVARh that is causing that increase, expressed in p/KVARh.

## **2.6 Our future plans**

We plan to use the proposed methodology (if approved) to set the indicative charges for 2006/7, which will be announced in late December 2005.

As indicated in section one, we are actively collaborating with other DNOs through the Energy Networks Association (ENA) to develop proposals for the longer term arrangements. We are aware that some other DNOs see advantages in using a methodology along the lines described above as part of the longer term arrangements, and we will be promoting this approach to the other DNOs.