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to customers*

DNOs, Suppliers, Distributed Generation and
Other Interested Parties

Our Ref: RBA/DPC/SOC/
Direct Dial: 020 7901 7255

1 December 2005

Dear Colleague,

**Consultation on Electricity Distribution Use of System Charging Modification Proposals:
Central Networks and United Utilities – Reactive Power Charges**

Background

Electricity Distribution Network Operators (DNOs) have licence obligations¹ to have in place as of 1 April 2005 three charging statements: the statement of use of system charges, the statement of use of system (UoS) methodology and the connection charging methodology. The statement of UoS methodology outlines the method by which distribution UoS charges are calculated.

The DNOs have a requirement to keep the methodology under review and bring forward proposals to modify the methodology that they consider better facilitate achievement of the relevant objectives².

Before making modifications to their charging methodologies the DNO must give the Gas and Electricity Markets Authority (the 'Authority')³ a proposal to modify their methodology stating

¹ Standard Licence Conditions (SLC) 4-4B

² The relevant objectives for both the connection and use of system charging methodologies, as contained in paragraph 3 of SLC4B and SLC4 of the distribution licence respectively 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 Electricity Act 1989 and by this licence;
- (b) that compliance with the use of system charging methodology facilitates competition in 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 reasonably practicable, properly takes account of developments in the licensee's distribution business.

how the proposal better facilitates achievement of the relevant objectives. The licensee then makes the modification unless within 28 days the Authority either directs the licensee not to make the modification or notifies the licensee that it intends to consult and then within a further three months directs the licensee not to make the modification.

Proposals received from Central Networks (CN) on 7 November 2005, covering both their East and West areas, and United Utilities (UU) on 31 October 2005 set out to modify their UoS charging methodologies. Having carefully considered the issues raised by the proposals, the Authority has decided to consult on the proposed modifications, and wrote to both companies on 24 November informing them of this. In light of the fact that both proposals relate to the same subject (UoS charges for excess reactive power) it is intended to consult on both proposals within this consultation letter.

DNO Modification Proposals

Ofgem has received two modification proposals associated with charges for excess reactive power for customers with poor power factor connections. These are briefly described below but the detail can be found in the modification reports submitted by each DNO. The relevant reports are detailed on our website as attachments to this consultation document.

Power factor and reactive power can be described as follows:

- *Power factor is the ratio of (real) power actually being used in an electric circuit, expressed in kilowatts (kW), to the power that is apparently being drawn from the power source, expressed in kilovolt-amperes (kVA).*
- *Reactive power is measured in kilovolt-amperes reactive (kVAr) and can be derived as follows:*

$$\text{Reactive Power (kVAr)} = \sqrt{[(\text{apparent power (kVA)})^2 - (\text{real power (kW)})^2]}$$

CN Proposal

It should be noted that CN submitted one report to cover proposed changes to both their East and West areas and the report also contains other changes to meet an outstanding condition on their methodology and a further modification on excess capacity charges. This letter deals solely with the issue of excess reactive charges.

Charges affected - Currently CN do not charge users, whether demand or generation, excess reactive charges in either of their distribution areas. This proposal introduces new charges for only demand users where total kVArh exceeds 33% of total kWh in a particular period – an average power factor of 0.95.

Customers affected – charges will only be levied on demand customers where there is metering in place that can record reactive units.

³ Ofgem is the office of the Authority. The terms 'Ofgem' and the 'Authority' are used interchangeably in this letter.

Methodology - CN propose to derive the excess reactive charge by comparing the cost of a 500MW extension to their network at a power factor of 0.95 with the extension required to cater for a 500MW extension at the weighted average power factor of customers whose power factor is below 0.95 for each customer class. The power factors of customers in a particular class are derived from last year's recorded data. The charging model is then uplifted to cater for the increased capacity and this generates a higher cost per kW to extend the network due to the extra capacity required. To derive a kVArh charge, the total cost (derived from the increment in total costs coming out of the pricing model due to the higher yardsticks) is divided by the forecast volume of kVArhs for the coming year.

This means that if the customer is metered as taking a volume of reactive units on average within the time period, e.g. one month, in excess of 33% of the number of real units (kWh) taken then the user will be charged on the number in excess of this level.

Relevant objectives - CN consider the proposal better facilitates the relevant objectives on the basis that it is more cost reflective.

UU Proposal

Charges affected - UU currently charge large users, both demand and generation, for excess reactive power but propose to amend the methodology used to derive these charges. In particular they propose to charge excess reactive charges for users whose power factor is lower than 0.95, rather than the current level of 0.9, to be consistent with the assumed power factor in their Distribution Reinforcement Model (DRM).

Customers affected - UU intend only to charge customers who have reactive metering fitted at their site – this is likely to apply to relatively few non-half hourly (NHH) customers and will predominantly affect half hourly (HH) customers. These charges will apply to both demand and generation users.

Methodology - The revised method assumes that a higher investment cost would be required for the same MW increment to the network at a power factor lower than 0.95. The effect is that the yardstick price per kW would increase as the power factor of the customer class decreases. The proposal assumes a linear approximation for the increasing yardstick to the reducing power factor using a simple ratio. Coupled with the incremental change in reactive units for a change in power factor, an incremental cost per kVArh can be calculated for each power factor band.

Although the method used by UU is able to calculate reactive charges for a discrete band of power factor, they intend to apply a single charge across all power factors which are on average worse than 0.95 in a monthly period. UU use a weighted average of customer class profiles to determine the level of the single charge from the banded power factor charges.

Relevant objectives - UU note that the basis for the current method is unclear and therefore a review was appropriate. UU considers that the proposal better facilitates the relevant objectives on the basis that it is more cost reflective.

Discussion

As noted in previous Ofgem documents on the structure of electricity distribution charges, poor power factors may lead to increased costs on the distribution network. It is important that these costs are reflected through to customers where practicable to encourage economic development

of the network. The DNOs generally charge large customers (normally half hourly metered customers) on the basis of kVA (through an Agreed Supply Capacity or Demand Capacity).

A number of DNOs already charge in addition to the capacity charge (kVA) a stand alone excess reactive power charge (p/kVAh). The table in **Annex 1** shows at a high level the different approaches taken by the DNOs prior to these modifications.

Views sought

- Are the proposed modifications to the charging methodologies for excess reactive charges more cost reflective considering also that the approaches being proposed are different?
- As noted in Annex 1, there are different approaches taken by the DNOs to reactive charging – are these justified?
- Both of the proposals appear to establish what the incremental cost of extending the network at peak may be at different power factors. It is not clear how these costs also relate to the existing capacity charge (kVA) which all the DNOs levy in some form or another on larger users (normally HH metered). Does the capacity charge already reflect an element of these additional costs?
- Poor power factor may increase costs on the network at times other than peak, which may lead to increased network losses. The methods proposed by the DNOs indicate that these charges do not reflect the cost of the network losses for instance - should they?
- CN propose that reactive charges should only apply to their demand customers while UU already charge distributed generation for excess reactive power charges and do not intend to change this approach except to change the method of calculation. Is there justification for levying (or not levying) excess reactive charges on distributed generation?
- Do the proposed modifications better achieve the relevant objectives?

Responses to this consultation letter

Views are invited on all the issues raised on both these charging modification proposals from interested parties, including DNOs, suppliers, distributed generators, customers and their representatives. Views are also sought on whether the individual proposals better facilitate achievement of the relevant objectives as explained earlier in this letter.

Views are invited by **Monday 16 January 2006**. Where possible responses should be sent electronically to:

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Distribution Policy
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It should be noted that the process associated with modifications to the charging methodologies is detailed within the distribution licence, SLC 4 and 4B. As the Authority's decision is time bound please ensure that your comments are received by the date indicated so that they can be fully considered – it may not be possible to consider responses that are received after this date.

All responses will be held electronically by Ofgem. They will normally be published on the Ofgem website unless they are clearly marked confidential. Consultees should put confidential material in appendices to their responses where possible. Ofgem prefers to receive responses electronically so that they can easily be placed on the website.

Copies of this document are available on the Ofgem website under Electricity Distribution Charges (Modifications) area of work.

Please contact Mark Cox on 0207 901 7458 or Colette Schrier on 0207 901 7239 if you have any queries in relation to the issues raised in this letter.

Yours sincerely,



Martin Crouch
Director, Distribution

Annex 1: DNO excess reactive charges – 2005-06

DNO	Threshold* (kVArh in excess of % of monthly kWh)	LV NHH MD (Profiles 5-8) network p/kVArh	LV HH network p/kVArh	HV HH network p/kVArh
CE NEDL	No charges			
CE YEDL	No charges			
CN E	No charges			
CN W	No charges			
EDF EPN	Band 33% & 90%	No charge	0.627	0.329
	In excess of 90%		0.735	0.385
EDF LPN	Band 33% & 90%	No charge	0.487	0.262
	In excess of 90%		0.571	0.307
EDF SPN	Band 33% & 90%	No charge	0.457	0.256
	In excess of 90%		0.535	0.300
SP D	33%	No charge	0.27	0.16
SP M	33%	0.29 (NHH MD HV)	0.29	0.19
SSE SHEPD	No charges			
SSE SEPD	No charges			
UU	50%	0.56	0.56	0.36
WPD S Wales	50%	No charge	0.3	0.17
WPD S West	50%	No charge	0.3	0.15

* The percentage threshold can be approximated to average power factor with 33% approximately equivalent to 0.95, 50% equivalent to 0.89, and 90% equivalent to 0.74.

Annex 2: Glossary

DNO	Electricity Distribution Network Operator
DRM	Distribution Reinforcement Model
LV	Low voltage as defined in the Distribution Code (less than 1000V)
HV	High Voltage as defined in the Distribution Code (greater than 1000V)
HH	Half Hourly metered customers
kVA	Kilovolt Amperes
kVArh	Kilovolt Amperes Reactive hour
kWh	Kilo Watt hour
MD	Customer with maximum demand (MD) metering
NHH	Non Half Hourly metered customers
UoS	Use of System