Mathematical & Computer Modelling

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Rachel Fletcher
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Your Ref: 2/10

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Dear Rachel,

Consultation on WPD's modification proposal 016

Please find attached some feedback on WPD's proposal and on the OFGEM summary and issues. I would be glad to explain or amplify the matters should it be considered helpful.

Yours sincerely,

Robin Hodgkins

Sent by email 3/2/10, via Nicholas Rubin

M&CM Response to Consultation on WPD's modification proposal 016

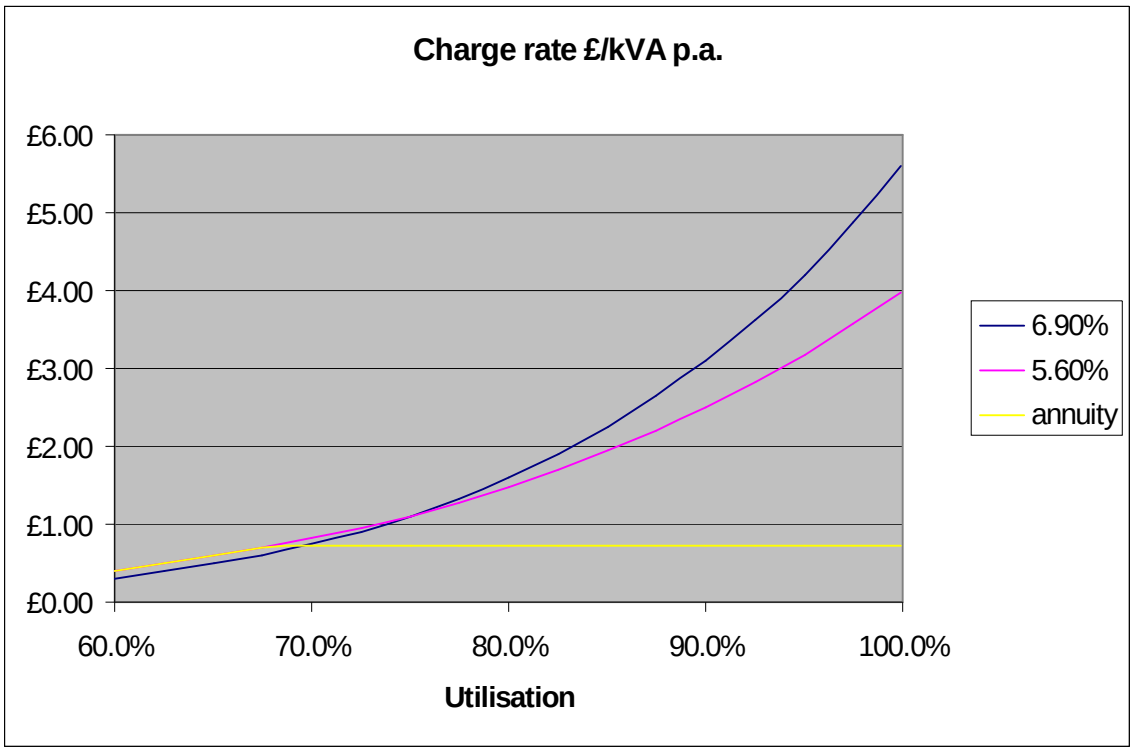
1. Transparency

A key requirement of UoS charges is transparency. Whilst the methodology is reasonably documented the network and demand data is not readily available. The original intention was that users could not only follow the derivation of their own charges but also understand how charges at different locations were likely to change in the future. Some other DNOs do publish as part of their LTDS both EHV network data and demand forecasts. For example the absence of data on the actual customer demands and generation means that is not possible to derive the charge per kVA from the total charge in order to examine issues of discrimination, nor is it possible in the absence of growth forecasts to determine whether reinforcement is actually likely to be required.

2. Cost of capital

It is appropriate that the revised cost of capital should be used in setting charges as there would appear to be no basis for the continuing use of 6.9% p.a. The effect of using a lower rate of 5.6% is to reduce the charge rate at high utilisation but to increase the charge rate at lower utilisations. The chart on p7 of the consultation document appears to be incorrect. The following derivation and chart illustrate both these features:

Growth rate.	1.00% p.a.								
Asset cost	£1,000,000								
Capacity	100 MVA								
Increment	0.1 MVA								
Life of asset	40 Years								
Cost of Capital			6.90%			5.60%			
Capital annuity factor			7.414%			6.314%			
R&M%			1.00%			1.00%			
Total annuity			8.414%			7.314%			
					£/kVA p.a.			£/kVA p.a.	
Utilisation	years	inc years	PV0	PV1	6.90%	PV0	PV1	5.60%	annuity
99.9%	0.10	0.00	£993,347	£1,000,000	£5.60	£994,563	£1,000,000	£3.98	£0.73
97.5%	2.53	2.43	£844,568	£850,365	£4.88	£871,140	£876,020	£3.57	£0.73
95.0%	5.13	5.02	£710,172	£715,175	£4.21	£756,171	£760,518	£3.18	£0.73
92.5%	7.80	7.69	£594,409	£598,710	£3.62	£653,902	£657,763	£2.82	£0.73
90.0%	10.54	10.43	£495,096	£498,778	£3.10	£563,217	£566,635	£2.50	£0.73
87.5%	13.35	13.24	£410,258	£413,396	£2.64	£483,073	£486,088	£2.21	£0.73
85.0%	16.25	16.13	£338,110	£340,773	£2.24	£412,493	£415,144	£1.94	£0.73
82.5%	19.24	19.12	£277,045	£279,293	£1.89	£350,568	£352,890	£1.70	£0.73
80.0%	22.31	22.19	£225,622	£227,510	£1.59	£296,452	£298,477	£1.48	£0.73
77.5%	25.49	25.36	£182,550	£184,127	£1.33	£249,359	£251,117	£1.29	£0.73
75.0%	28.77	28.63	£146,677	£147,987	£1.10	£208,560	£210,080	£1.11	£0.73
72.5%	32.16	32.02	£116,983	£118,064	£0.91	£173,383	£174,690	£0.96	£0.73
70.0%	35.67	35.52	£92,563	£93,449	£0.75	£143,208	£144,326	£0.82	£0.73
67.5%	39.30	39.16	£72,619	£73,340	£0.61	£117,465	£118,416	£0.70	£0.70
65.0%	43.08	42.92	£56,453	£57,035	£0.49	£95,631	£96,435	£0.59	£0.59
62.5%	47.00	46.84	£43,455	£43,921	£0.39	£77,230	£77,906	£0.49	£0.49
60.0%	51.08	50.92	£33,094	£33,463	£0.31	£61,828	£62,392	£0.41	£0.41



Here the lower curve shows the minimum of the charge rate for an annuity over 40 years based on a cost of capital of 5.6% and the WPD LRIC charge rate based on 5.6%. The cross over between the two rates for the different costs of capital occurs at a utilisation of just below 70%.

3. Split of allowed revenue between EHV and HV/LV

It is important that there is a common agreed method to determine this split. To some extend it is inevitably arbitrary and to use the CDCM method would seem to be acceptable.

4. Capping of charges for highly used assets

As set out by WPD, this proposal is discriminatory. It uses the total charge rather than the charge per MVA or per MW as the governing criteria. Thus a large customer (in this case Sully) would receive a very substantial rebate, but a number of smaller customers with the same total generation would not receive a rebate. This would appear to fall foul of the conditions against discrimination and distortion of competition. It could be regarded as buying off large customers which might be able to afford to appeal to the Competition Commission.

It is therefore necessary to examine why this problem of excessive charges appears and why it may be appropriate to do something about it.

The excessive charge rates at high utilisation result from the WPD LRIC methodology which applies a fixed growth rate of 1% p.a. to limit the even more excessive charge rates which would be set by the Bath LRIC methodology at lower growth rates. As such the

charge rates are arbitrary. The charge rates are relatively even more excessive at lower utilisations. However, it is in general appropriate for a methodology to give a charge rate higher than the rate of annuity at high utilisations. So what are the reasons for seeking a cap:

a) The methodology applies the high charge rate even when the actual and forecast rate of growth is zero. As such it would apply the same high charge year after year without any reinforcement taking place. If on the other hand growth is occurring necessitating expensive reinforcements in the near future, then there would appear to be no reason to apply a cap (rather than recognising that the methodology sets charges too high for all customers).

b) Realistically where a single large generator or several smaller generators would cause near maximum utilisation at times of minimum demand, then it is unlikely that reinforcement would be required. Rather, a generation management scheme would be introduced to negate the need for reinforcement. It is this cost which is the real incremental cost, not the cost of an engineering reinforcement for which no plan exists. The NPV approach to LRIC is aimed at determining a charge rate in situations of 'Capital Indivisibility', where strictly speaking the incremental cost is zero until the capacity is exhausted at which point the incremental cost suddenly becomes enormous. However, where a genuine incremental cost can be determined, as is set by a demand or generation management scheme, then there is no need to adopt an NPV method and indeed to base the charges on a fictitious reinforcement would contravene the licence conditions[1].

c) Even if the assumption of a growth rate of 1% p.a. is assumed to be a valid approach, the 1% should not apply to the EHV customers which have agreed capacities. Therefore for an asset where the EHV customer or customers account for a large portion of the utilisation of an asset, the LRIC charges need to be reduced by an appropriate proportion. One way of implementing this would be as follows:

Let the annuity factor be a p.a., the asset cost be £A, and the capacity at which reinforcement would be required be C kVA. Then the annuitised charge rate would be:

$a\,A/C$ £/kVA p.a.

Denote the LRIC charge rate by:

$k\,A/C$ £/kVA p.a.

Set the capped charge rate for EHV customers as:

$$(a\ EHVpower + k\ nonEHVpower)\ (A/C)/totalPower$$

where *EHVpower* is the power (generation at minimum demand, or demand at maximum demand) arising from the EHV customers[2]. It could be argued that the first term is a replacement charge and should therefore be omitted, or at least set to a replacement rate

[1] '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.'

[2] Given the incremental nature of the calculations, the values of the power used may preferably be determined from the incremental values.

of 2.5% p.a., assuming all assets are replaced over 40 years. This formula would apply to all EHV customers and be non-discriminatory.

5. Treatment of pre-2005 distributed generation

The WPD proposal to allow the connection agreements to run their course seems to be simple and appropriate. The suggestion by OFGEM to renegotiate the connection agreements could prove extremely burdensome and could simply result in customers who would find it advantageous accepting revised agreements and customers fearing unfavourable outcomes refusing new terms.

There seems to be some confusion over whether replacement costs should be included. OFGEM's footnote 20 implies that replacement costs have already been included in the original connection charge. On the next page OFGEM then argue that payment of DUoS charges could be appropriate because their asset life has expired. Sticking consistently to the connection agreement would seem to resolve this issue.

However, I understand that the general rule adopted by OFGEM is that replacement charges should not be part of reinforcement charges but would be included in the scaling. If this rule is followed then as discussed in the previous section, the proposed cap should not include the annuitised term as this is a replacement cost. On the other hand if replacement is to be included, then even when there is a generation/demand management scheme, then the replacement costs need to be added. It would seem sensible to stick to the consistent application of the rule that replacement charges are either covered within the connection agreement or, where deep connection charges were not levied, that replacement charges are included in the scaling. This has implications for scaling.

6. Scaling

For a demand dominated network, it is possible to argue that scaling should not apply to generators as most of the costs are paid for by the demand customers, although locally some assets are likely to still be generation dominated. However, it is difficult to maintain this argument as a larger proportion of the networks become generation dominated. Maybe as an incentive to generation for the term of DPCR5 the scaling could be set to zero. However, this would seem to be unsatisfactory for the longer term. An alternative could be to levy a transportation charge on the supplier per unit power distributed. It would then be up to the supplier to settle how this was apportioned between the demand customer and the generator.