Structure of Distribution Charges Implementation Steering Group (ISG)
Capacity Charging Sub-Group

1. Background

It has been recognised through the ISG that DNOs apply differing methods for calculating and applying certain charge types in their Distribution Use of System charges (DUoS). The most material charge type is Capacity.
Further to this, the DNO community recognised that there would be benefit in working towards a common approach to capacity charging:
http://www.energynetworks.org/spring/regulation/pdfs/COGmicrosite/SOC_microsite/ISG_Papers/ENA%20COG%20sub-group%20response%20to%20%27Capacity%20Charging%27%20comments.pdf

This paper outlined agreement on a number of aspects of capacity charging, after comparing all the different approaches, but left four main areas to be agreed. These are:

1. What name to give to 'authorised capacity'?
2. For how long is authorised capacity fixed after connection?
3. How is demand to be calculated from the Half-Hourly (HH) data?
4. How should charges for demand in excess of authorised capacity be applied?

A group, reporting back into the ISG, has been organised to consider these issues. This document is to update on the progress of this sub-group.

Each of the above areas will be considered (to varying levels of detail).
We also assume that these are demand-only sites, recognising that having generation causes further complications that are currently being considered elsewhere. Further, it is recognised that the general Structure of Charges has the potential to radically alter structures, so the intention here to provide conformity to the current basic tariff structure.

2. What name to give to 'authorised capacity'?

As a reasonably uncontroversial issue this was considered quickly and the expression **maximum capacity** is the suggestion for common terminology. It is hoped this simple phrase conveys the appropriate impression of what the charge is for. A suffix of Import/Export may be employed when clarification is required.

3. For how long is 'authorised capacity' fixed after connection?

It was felt that that a signal recognising the importance of agreeing the correct level of capacity is important and, as such, a period of fixing the maximum capacity was necessary. A period of **3 years** after connection before a capacity reduction could be enacted seems a reasonable level. This may be a reduction in time in many instances.

When an existing customer requests additional capacity, if providing this incurs any costs then this would be treated in the same way as a new connection.

Regardless of the above, a minimum period of 1 year between changes in capacity levels is required to avoid customers changing capacity to fit their demand profile.

If a change of tenancy occurs within a fixed period, the new tenant would be able to re-negotiate capacity levels.

4. How is demand to be calculated from the Half-Hourly (HH) data?

It was assumed that maximum capacity would be stated in kVA and also that kVA would be the resultant of the Active (kW) and Reactive (kVAr) metered values.
It was agreed that, as in reality we are looking for an instantaneous value of when peak maximum capacity is reached, it would be more appropriate to calculate the kVA value for each HH separately, and then using the highest HH value. (This is as opposed to calculating an average monthly power factor and applying to the HH kW values).
So, what remains is how to handle the Reactive meter reading: what is the correct method of combined Reactive lag and Reactive lead.

The options appear to be as follows:

1. Lag only
2. Lead only
3. Maximum Lag and Lead
4. Net Lag and Lead
5. Sum Lag and Lead

These will now be considered in turn.

4.1. Lag only

Advantages

The majority of sites are likely to run at a lagging power factor and so for these sites it is the simplest method of giving the ‘right’ answer.

Disadvantages

Sites that do run at a leading power factor will not have this reflected in their kVA.

4.2. Lead Only

This does not seem appropriate as most sites run at a lagging power factor

4.3. Maximum Lag and Lead

Advantages

If you consider that we are attempting to approximate an instantaneous value, and given that a site can not instantaneously be lagging and leading, this would seem to give the best approximation of the correct ‘peak’ value.

Disadvantages

This is not a method currently employed so is likely to require the most systems (both DNO and Supplier) to be amended. HH metering does not give instantaneous values. Hence, it is possible that the kWh reading employed and the kVArh readings may not be on the same basis.

4.4. Net Lag and Lead

Advantages

If lag and lead in close proximity can be viewed as having contrary affects then this would appear to be appropriate.

Disadvantages

Netting off lead and lag values may be inappropriate since this could lead to an apparently perfect (unity) power factor where large amounts of lead were balanced by large amounts of lag in a particular half-hour.

4.5. Sum Lag and Lead

Advantages

Sites with large amounts of lag and lead would have this reflected in the kVA. Both the kWh and kVArh readings employed are on the same basis, i.e. the values are integrated over a full HH.

Disadvantages

If we are looking to reflect an instantaneous value, summing items that are not coincidental is questionable. There may be better places to reflect the impact of a ‘swinging power factor’. A site that does have amounts of both lag and lead will not necessarily have a greater current than a site with the only (the same level of) lag, and if costs are related to the current then may not be appropriate.

4.6. Summary

As can be seen from the above considerations none of the options are fully satisfactory. Also, for the majority of demand sites the different methods of calculation will give the same answer and even then the site will only be billed on the calculated figure if it exceeds the maximum capacity level. Out of the options above taking the maximum of the lag and lead, within each HH, may give the most accurate approximation of the peak. However, it is recognised that this possibly involves the most change. Given that the vast majority of customers,

running at a lagging power factor, will be unaffected by the method employed, it may be sensible to consider only Lag data.

5. How should charges for demand in excess of 'authorised capacity' be applied?

Maximum capacity is initially set as a contractual figure arising from the connection agreement between the DNO and End-User. Particularly from a Network Planning perspective, it is not beneficial for a customer to exceed this initial figure without first agreeing an increased maximum capacity figure with the DNO. The below assumes that if the end-user uses more the contracted figure, it is fair that this should be paid for.

There appear to be 3 main options to applying excess capacity:

1. Charging for excess capacity only within the month it is exceeded
2. Charging at this higher level for a defined period of time (12 months)
3. Replacing the maximum capacity with the new higher level

These will now be considered in turn.

5.1. Charging for excess capacity only within the month it is exceeded

Advantages

This would relatively simple to apply, understand and validate. Also, the effect of exceeded capacity on the customer's electricity bill would be concentrated emphasising any message intended, although this depends upon the level at which the excess is charged.

Disadvantages

It may be that if a customer only needs extra capacity occasionally, he may think it preferable to pay for this extra capacity in this fashion than to consult the DNO (with the potential for connection/reinforcement costs). This could lead to safety and network planning issues. This will, of course, depend on what level the excess capacity is charged at. Previous attempts to charge excess capacity at a higher level have been viewed as not cost-reflective by Ofgem.

5.2. Charging at this higher level for a defined period of time (12 months)

Advantages

A strong message is applied for exceeding 'authorised capacity' levels. This is probably the most established method and so may mean the least change.

Disadvantages

For a customer who has a singular 'blip' this may seem unduly harsh, with nothing a customer can do to rectify the situation for a year. This method of

calculation is often impossible for Suppliers to replicate, as it requires 12 months of data which a supplier is unlikely to have in the majority of cases. This gives issues for suppliers in ensuring the costs it incurs are correct and also in ensuring the correct value is passed through to end-users.

5.3. Replacing the maximum capacity with the new higher level

Advantages

This should encourage end-users to actively manage their maximum capacity levels. This is also relatively simple to apply.

Disadvantages

This could be seen to imply that end-users have ‘agreed’ to a new maximum capacity level by default through their usage, and so have also secured the right to it. If customers do not actively manage their capacity this could be an extreme penalty in many circumstances. Also, a supplier will still have issues in validating levels are correct.

5.4. Summary

Charging at the higher level for 12 months has the advantage of being a well established practice. However, charging only ‘within month’ is simpler to apply and easier to pass through to end-users, and so may be the better option. It must be recognised that the strength of this option may well depend on the strength of the message it carries, and so the level of the excess capacity charge relative to the standard capacity charge.

6. Conclusion

Various options have been considered and some suggestions offered. With a number of the issues there remain a number of options, each with their own merits and demerits. We have not found a definitive ‘right’ answer. This is because a definitive ‘right’ answer probably does not exist. Given this, it is necessary to be pragmatic and agree to options to provide conformity.
It is recognised that the agreed solution may well involve system development and modifications to methodologies, which need to progressed in an efficient manner alongside other work that is progressing.