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20 September 2007

Dear John

Electricity Distribution Network Planning – Engineering Recommendation P2/6

Electricity networks are, and will continue to be a critical part of our energy infrastructure, and we have a responsibility to ensure that they are developed consistently and in a manner that meets the future demands of society and customers. Central Networks therefore welcomes this timely opportunity to discuss the requirements of network planning standards.

We have already been developing our own views of customer supply security at a strategic level, both in the near term, and importantly the anticipated expectations of customers in 2020 and indeed beyond. Our review inevitably considered the substantially different characteristics presently embodied in the two CN networks and sought to identify a set of design principles that start to direct consistent incremental network development. The differences between the two networks led us to ask a number of questions around the requirements of P2/6, the definition of compliance and its alignment with the IIS.

Before answering the questions raised in your letter, we would like to replay some issues that emerged during the DR4 process. Questions were raised by Ofgem's consultants about the very definition of compliance. The debate was firstly around the point at which a network is expected to exceed its design capacity – by how much, and for how many hours each year? There is little guidance and therefore consistency of approach, which leaves an open

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question on the flexibility of interpretation that we believe should be considered in advance of the DR5 submissions.

The second concern raised was around the number of networks that were moving outside their design capacity. In Central Networks West this was quite properly being reduced significantly by the actions planned for the DR4 period, such that the 'closing balance' was substantially lower than the number at the start of the period. This was actually due in part to the constraint on the load related capital allowance within DPCR3. The consultants were of the opinion that the plans incorporated a material change in the implied network risk, and the associated expenditure should not rightfully form part of the Base Case allowance. Central Networks believed it was acting entirely correctly in planning its network security to meet the, then P2/5 requirements, and that as an important component of the distributors licence requirements, this should form a part of the Base Case. The approach also needs to be clarified before the planning process for DR5 commences.

We are also concerned that the UK could have been enjoying security levels that are beyond P2/6 requirements, and these may be eroded due to asset replacement activity within the National Grid network, as outlined in the KEMA report. Central Networks has been advised of a particular plan for a GSP, where the intention is to replace existing transformer plant with a smaller number of larger units. The resultant configuration is entirely compliant, but naturally leaves Central Networks' customers with a greater interruption risk. Should this action be part of a wider initiative, the perceived acceptability of current P2/6 standards may actually have been enhanced by latent additional facilities. Removal of these could introduce an unwelcome deterioration in service standards, as well as potentially impact the DNO's future IIS penalties.

Our overall belief is that the process of network development should be directed towards a long term vision aligned with the expectations of present and future customers. P2/n in our view remains the most effective way of consistently ensuring economic and efficient planning through a robust framework of principles. A more relaxed arrangement with additional reliance on output measures could have the benefits of flexibility, but may not provide for longer term network development and will lead to significant inconsistencies in the future capabilities of this critical primary infrastructure.

Furthermore, there must be alignment with the price control framework, which effectively establishes customer charges and has historically been consistent with these standards.

Turning to the specific issues introduced by the open letter:-

1 Issues to be addressed in the short term

1.1 Is there adequate clarity in the licence drafting?

Central Networks certainly believes that there should be greater clarity and understanding of the role of P2/6, and the extent to which it directs system development. The removal of P2/6 would undoubtedly affect the efficacy of the future infrastructure planning process, and it cannot therefore simply be replaced by output measures.

As already outlined in the introduction to this response, we support the development of greater definitional clarity potentially provided by the suggested option iii - retention of P2/6 and changes to wording.

1.2 Definitions of group demand and transfer capacity

a) There do appear to be a number of possible interpretations of the definition of 'group demand' even amongst staff within individual network companies. The definitions adopted can directly influence security considerations such as the P2/6 group classification, and we therefore believe it would be helpful to clarify the approach.

b) With regard to transfer capacity, DNOs provide an annual statement as part of the Week 24 submissions. However, the availability of this capacity is not defined, and the network may well be constrained when required due to the DNO's own planned or unplanned network activity. This depletion would result in an increased risk of outage for DNO customers, and an associated regulatory penalty impact. It may therefore be possible to identify constrained and unconstrained transfer capacity, and also define DNO network availability in (n-1) conditions.

1.3 Critical loading conditions

There is now real evidence in Central Networks that summer load conditions can provide the binding constraints for some urban networks, where demands are now highest at the time when ambient temperature dependent thermal ratings are lowest. Of particular importance is the inability to universally rely upon summer outage windows for maintenance. As suggested, it is the critical network constraint that is important, rather than Average Cold Spell condition.

1.4 Coordination of substation designs at GSPs

Coordination is certainly important across the DNO / Grid interface to ensure that networks are developed with regard to the lowest societal cost.

1.5 Early experience of ER P2/6 on the treatment of distributed generation

It is not felt that the penetration of distributed generation has reached the critical mass required to provide security support for distribution networks. We certainly consider the availability of distributed generation as part of the capacity planning process. However there do not yet appear to be opportunities to establish the technical and commercial interfaces required to incorporate the security contribution of distributed generation. Generators will inevitably follow their principal commercial drivers in determining the economics of their operation, rather than those of the network operator. Clearly there will be a need for network companies to require generators to operate if they were to play a part in meeting the distributor's security obligations.

2 Issues to consider for longer term.

2.1 How might the standard be updated to accommodate developments such as active networks, demand side management and virtual power plants?

Central Networks is participating in UK working groups involved in the development of distributed generation and active networks. In addition we do have some real experience with the development of active networks, with the introduction of a distributed generation scheme that links dynamic conductor ratings with the control of generation output. There have not yet been any

opportunities to deploy demand side management, though the potential for this technique is the subject of a current research project.

Our current belief is that P2/6 should continue to provide the network security framework; whereas 'active network management', 'demand side management' and 'virtual power plants' have the potential to introduce valuable demand reductions that could supplant or defer network reinforcement, provided the supplier and customer interface is agreed.

2.2 Would there be significant value in re-examining the reliability calculations which underpin ER P2/6?

In principle there is a case for re-assessment of the underpinning calculations of P2/6 as current customer values of lost load may not be the same as those incorporated in the original studies. Furthermore, the networks installed today must meet the needs of future customers, and therefore this factor should be incorporated in the development of the future security standards.

2.3 Should the standard be updated to take account of longer construction outages as well as maintenance outages, and the additional risk to consumers that these outages may present?

There is support for the development of clearer guidance on security requirements during construction outages which may affect many thousands of customers for a protracted period. This guidance could take the form of a risk assessment, and allow the construction of temporary or permanent assets that reduce the scale of a potential outage. The framework must be directly associated with the IIS and GOS liability and exclusion arrangements to ensure that networks are developed economically, rather than inappropriately just to mitigate short term financial risk.

2.4 Is there scope to remove the requirement of the design standard for smaller sizes of group demand (e.g. demand groups up to 60MW) and rely purely on output incentives (IIP) as the network design driver for these demand groups?

The principal role of P2/6 is to direct the development of the primary network infrastructure of the UK. The suggestion that network planning standards should be less onerous for Groups A to C appears illogical as the customer numbers attached to these groups is far from insignificant (60MW potentially equating to 60,000 domestic customers). IIS is certainly a strong driver of

network performance improvement within DNOs, but it alone does not tend to encourage the longer term development of inherent network security in all circumstances, and generally favours shorter term supply restoration activity. This planning standard must therefore continue to include the current categories, with the possible exception of Group A as this relates to supplies of less than 1MW, which are almost exclusively supported by the 11kV network, and therefore strongly influenced by IIS arrangements. However, from a pragmatic perspective, the removal of Group A has little real effect.

4.5 How should environmental and sustainability issues be considered in the design standard?

This is an interesting area for longer term development as there is a real interaction between network utilisation, distributed generation penetration, network resilience and network losses. The guiding principles should ultimately be directing the development of an electricity infrastructure that, to the best of our ability optimises these factors to meet anticipated future society requirements.

For now, networks should be designed to meet future security needs, with opportunities sought to reduce carbon footprint. However, the process of assessing the development of optimised networks should commence, such that ultimately the total lifetime 'carbon cost' of network options are fully considered along with the other drivers and overall financial cost. This potential optimisation is the subject of a current research project directed by Central Networks.

4.6 How should the standard be updated to take account of climate change, in particular higher summer loadings and reduced ratings of plant due to higher ambient temperatures?

In addition to the points raised in 1.3 above, there is an emerging need to take account of a range of climate change effects, and it is suggested that the current Meteorological Office project assessing these is used to help identify the potential issues, particularly relating to equipment and line ratings. This may then indicate the need for an industry led initiative to revisit the present network capacity guidance.

Finally, in addition to the points raised above, there are a number of key issues that require consideration as part of this exercise to guide the development of

distribution networks to meet future customer needs. It is important that these are either contained within a new drafting of P2/6, or separately, but fully documented as infrastructure design expectations, to ensure that the security requirements and investment impacts are properly recognised by all stakeholders, and consistently applied.

a.) P2/6 provides sound design guidance frequently on the assumption that adjacent plant is able to meet the demand of a failed item. Some types of incident, for example flooding, and possibly more extreme third party interference, are almost certain to affect all distribution plant at a location, and the potential for common mode failure therefore requires special recognition.

b.) In addition to the specific issues above, there are many situations where P2/6 security requirements are met, but a single incident has the potential to impact other critical plant. It is suggested that generic reference to this risk, and mitigation would also usefully be included in future network security specifications.

c.) The industry is presently discussing the security of electricity supplies serving sensitive urban demand, and the importance of 'high impact, low probability' events. It seems appropriate that some central business districts, and possibly other areas where the loss of electricity supplies could cause societal concern should be designed to an enhanced security standard.

d.) Similarly, industry consideration is also currently being given to the needs of priority users of electricity (Electricity Supply Emergency Code), and again it would be appropriate to capture any generic network security requirements.

e.) Offshore generation will provide a significant contribution to the UK's power requirements, and many of these are likely to be connected to distribution networks. There is a need to define and incorporate the security requirements of these connections.

The UK's electricity network has an excellent reputation for overall reliability, and whilst there are some differences in the way it has developed over many years across the regions, much of its inherent security is due to the deterministic nature of the network planning arrangement.

Society's expectations have changed significantly since the foundations of the current standards were laid, and the demands on networks are sure to increase, both technically and commercially. These changing requirements and risks must be properly factored into our longer term system planning. Also, many of our commercial customers have a particular interest in supply security, and they certainly value information and assurances on current and planned network security standards.

Future customers will benefit greatly from this timely review which should focus on both the immediate needs for improvements in clarity and definition and fundamentally direct the longer term development of this critical infrastructure.

Should you require any further information or discussion on this important subject, please do not hesitate to contact either myself, Andrzej Michalowski (andrzej.michalowski@central-networks.co.uk) or Eric Homer (eric.homer@central-networks.co.uk)

Yours sincerely

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