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13 August 2009

Dear Sir

Central Networks Response to National Grid Consultation - Operating the Electricity Transmission Networks in 2020 (June 2009)

Thank you for creating this opportunity for energy companies and industry participants to consider and debate this increasingly important subject. Central Networks is keen to engage with energy developments, and we have therefore provided succinct answers to the questions we feel are relevant to our business, experience and future proposals. This response complements that of our parent company E.ON UK, which addresses the broader issues raised. We would, of course, be happy to engage further in more detailed information and thought exchanges should that be appropriate as this process develops.

We firmly believe that electricity will play an increasingly important role in meeting the UK's climate change objectives. Networks will be central to this, including the incorporation of significant levels of both new electricity demand and distributed generation. There is a clear need to maximise the capacity of the networks, and also link generation and demand to minimise carbon production in real time, whilst simultaneously managing network constraints. This suggests the introduction of important new process and interfaces, with the emergence of a Distribution System Operator role working closely across the transmission / distribution interface.

Our responses to the relevant questions raised are below.



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Question 8: What is your view of future electricity demand growth and how would you quantify any uncertainty around this?

We have developed our own views on demand and generation growth, as no doubt have many companies, including assessments of the effects of the economic climate, and have no cause to challenge or extend those proposed by your paper. In addition to the overall assumption that you suggest, it is important to note, more particularly within distribution networks that the offsets between demand and generation do not necessarily cancel at a local level, and we therefore envisage the simultaneous management of demand, generation and the aggregated power flows within discrete sections of our networks.

Question 9: Are there other developments which will change the way that electricity will be consumed in 2020 that we should consider?

In addition to Smart metering, Electric Vehicles and Embedded Generation, we fully expect to see a significant increase in heat pump applications given their particularly energy efficient characteristics. Early signs of this demand have already started to appear in some local distribution networks. This will no doubt be accelerated by the provisions within the Renewable Heat Incentive and will be accompanied by the need for network investment to support load and ensure voltage regulation.

We also see the development potential for electric water heating to provide an effective, low technology energy storage technique, with associated demand side participation properties.

Question 10: Do you share our view that distribution companies, suppliers, aggregators and ourselves will all value and compete for demand side services?

Whilst largely agreeing with the description you provide, and the potential for demand side management techniques, we would like to further debate some fundamental questions. Firstly, should the driver of demand side management be energy price, as described, or the level of carbon production, perhaps simply described as a carbon merit order for power at any particular time? Secondly, is the objective to reduce the system peak demand, as described, or the overall level of carbon production? Or should the primary driver be to manage network constraints and avoid (or defer) reinforcement costs?

We can see a number of participants identifying some value in demand side controls, and this includes the distribution companies who could potentially

play a greater role in carbon optimisation, but as a minimum will need to manage network constraints arising from significant increases in demand and distributed generation effectively and efficiently.

We believe the DNO is uniquely placed to optimise carbon demand at a regional level given the very large number of customers, the market complexity and the local need to manage distribution network constraints.

In terms of functionality we currently envisage three generic types of demand side management –

- a) Autonomous, where devices react automatically to system conditions such as power frequency
- b) Customer driven, where the customer reacts to price or other signals (possibly using an automated home unit)
- c) Network operator driven, real time responses to network or generation conditions

Question 11: Are our assumptions around the number of electric vehicles in 2020 reasonable?

We in Central Networks are currently using similar assumptions for electric vehicle growth.

Question 12: Is it valid to assume that electric vehicle charging will be coordinated via a smart grid or something similar and will react to price signals?

It is our expectation that there will be a number of electric vehicle charging arrangements, including commercial stations. Whilst coordinated charging may well be appropriate for some of these, such as general home charging situations, not all be directly price (or carbon) led as there may be stronger or more immediate drivers of charging behaviour.

Question 13: Do you foresee a greater or lesser role from embedded and distributed generation than we have assumed?

Our current assumptions supported by stakeholder discussions suggest a somewhat greater role for distributed generation than you have suggested.

Question 29: Do you believe that a new approach is required in the development of System Operator to generation or demand control point interfaces for 2020?

There is undoubtedly a much enhanced requirement for a system operator process that includes the management of transmission and distribution networks, and links into customer demand and generation. We specifically envisage the distribution network operator having a requirement to manage thermal, voltage and possibly fault-level network constraints in real time in order to efficiently manage our networks and accommodate new demand and generation requirements, and within appropriate timescales. There is also a need to optimise UK carbon production in real time, and these carbon or price peaks will not necessarily coincide with the distribution network constraints. It seems unlikely that one system operator could sensibly manage and optimise generation, transmission and distribution for the whole of the UK, utilising the demand side opportunities of some 29 million customers and associated distributed generation. We therefore see a new Distribution System Operator role for the distributor, and welcome further debate on the responsibilities and interfaces with GB System Operator at the grid boundary.

Question 32: What criteria should National Grid use in developing any requirements for information regarding embedded generators? Are there other ways of obtaining this information?

We suggest that the output aggregation of the many small generators within a region is best undertaken by the Distribution System Operator, both real time and forecast, for each grid / distribution network boundary.

Question 35: What is your view on the potential of electric vehicles to provide balancing and other energy services?

Whilst we appreciate the theoretical possibility of 'vehicle to grid' balancing arrangements, current battery technologies are likely to preclude this, and we therefore envisage this service being restricted to demand side control rather than power provision.

Question 36: How much of the electricity demand in Great Britain do you think could be regarded as discretionary or deferrable and hence available for use as a Balancing Service or other energy service?

We have nothing to add to the assumptions proposed.

Question 37: What specific actions should National Grid take to facilitate Balancing Services from demand-side providers while maintaining the required quality and volume of service?

In common with several of our responses to the questions raised, we envisage the Distribution System Operator being uniquely placed to aggregate the complex regional activities and present useable services to National Grid at the grid boundary.

Question 38: Are there further aspects of storage or other storage technologies we should consider when looking forward to 2020?

As mentioned in Question 9 we also see the development potential for electric water heating to provide an effective, low technology energy storage technique, with associated demand side participation properties.

In conclusion, we view this as a very valuable and timely consultation document that raises important questions about the network operating regime in a very different energy world. Our belief is that networks will be central to future low carbon energy delivery, and there is a need for the distributor's role to change significantly to handle the huge local complexity and optimise regional generation and demand.

I hope this response provides sufficient input at this stage, but should you have any further questions, please do not hesitate to make contact. Furthermore, we would certainly welcome the opportunity to discuss and build upon some of the principles and ideas suggested.

Yours faithfully

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Head of Network Strategy and Development