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26 September 2008

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Dear Mr Sleutjes

**Re: National Grid Response to the Long Term Electricity Network Scenarios Consultation**

We welcome the opportunity to comment on the development of the LENS scenarios, and appreciate Ofgem's efforts to engage the industry in this process. We are supportive of efforts to look long-term at the potential range of opportunities and threats that we, as an industry, must face. The questions posed in the consultation are included in the attached appendix, however, we thought it helpful if we summarised our views below.

- Scenarios are used extensively within National Grid. They inform and test our views as to how our networks will develop over the coming decades, including how to operate and maintain them. Consequently, we have an important role to play in the development and utilisation of these scenarios and look forward to engaging with Ofgem to move the process forward.
- As practitioners of scenario planning, we understand the need to be open minded and realistic concerning the range of LENS scenarios and the level of detail which underpins them. Whilst we may not wholly agree with every detail, in the context of the exercise, we have restricted our comments to important issues of principle.
- In light of the publication of the Government's renewable Energy strategy (RES) we need to understand how the LENS scenarios are influenced by Government policy. The RES is a helpful and informative document which clearly sets out the challenges ahead. The utility of the LENS project will be enhanced if the key initiatives described in the document are reflected in the Report. It is worth emphasising at this point that the connection of offshore and onshore wind generation to the transmission system, in addition to other low-carbon forms of generation, is a key component in the Government's proposed climate change strategy.

- To enhance the plausibility of the scenarios, the narrative must articulate the story on how 'obvious' barriers to their development have been overcome and how the relative energy efficiency, carbon efficiency and 'adequacy' of the fuel pathways compare. For example, we are concerned that many of the "green" scenarios may not contain sufficient renewable generation to meet the Government's 2020 renewable targets.
- We welcome the recognition that attention be given to funding and pricing of the expansion of (network) assets in the scenarios. However, the issue of *maintaining* the existing assets has not been adequately addressed. We also welcome recognition that the right balance of risk and reward must be struck when considering novel approaches to transmission investment. We also suggest that a clearer link is drawn between adequate transmission and distribution investment and the healthy and liquid energy markets which are frequently described in the scenarios.
- We would like to better understand the next steps in the process, particularly details on how Ofgem envisages that the LENS work will be applied in practice. We suggest however, that the scenarios are prioritised against probability of outcome, and that greater attention is spent on creating a self-consistent network topology and generation/demand pattern. Then, against the background of the Government's climate change ambitions, we can use the LENS and our own scenario work to inform our strategy going forward.

We look forward to participating in the forthcoming workshop and working with you and your colleagues as the LENS project is taken forward.

Yours sincerely.

Nigel Wilkinson

**Strategy Development Manager**

## **Appendix – Answer to Questions Posed in Consultation Letter**

### **Q1. (a) Do you agree that all five scenarios are plausible?**

The LENS process has been participative, including views from a broad range of industry participants; a process which contributes to the construction of plausible scenarios. Our view is that all of the described scenarios, with the possible exception of *microgrids* are plausible. In this section we are making two broad points applicable to the report;

- In the *microgrids* scenario, for the threshold of ‘plausibility’ to be reached, the challenges that the scenario poses, which are clearly articulated in section 5 of the Report, should be addressed and seen to be plausibly ‘overcome’ in the main narrative. This principle applies to the other scenarios.
- Applying end-to-end process efficiencies to understand the relative carbon emissions of one fuel pathway compared with another. This is particularly important in the more “green” scenarios.

In respect of the latter point above, we can draw from the examples in *Distribution System Operators*. We note that the narrative in this scenario refers to a ‘hydrogen economy’. The tables in section 8.3 (and also the narrative) suggest that this hydrogen demand appears suddenly in 2030, which we think is unrealistic. Furthermore, in *Distribution System Operators*, hydrogen is used to fuel vehicle fleets, which is an entirely plausible hypothesis. However, if the scenario is to remain internally consistent, care must be taken to account for end-to-end efficiencies in the fuelling supply chain; the so called ‘well-to-wheels’ efficiency. For example, with the amount of fossil plant suggested for this hypothesis in 2030, it could be that hydrogen production through the electrolysis of water may be significantly more carbon intensive than making it from natural gas – even though both are suggested pathways in the scenario.

### **Q1 (b) Do you agree that the draft scenarios report demonstrates that the five scenarios, between them, span a suitably wide range of plausible outcomes for GB electricity networks in 2050.**

It is unnecessary for a scenario planning exercise to cover all potential outcomes. However, in assessing adequacy of breadth – we must also take account of the scenarios’ relative probability. Those scenarios which make best use of existing assets (e.g. *Big Transmission and Distribution / Active Distribution Networks*) are likely to be much more probable than *microgrids*, for example.

The publication of the Government's Renewable Energy Strategy in the summer has underlined for stakeholders the immense challenge that lies before us. This study gives a clear indication of the magnitude of renewable electricity required to meet the targets. Whilst it is difficult to summarise a seminal piece of work in one paragraph, the clear message from the RES is that large, transmission connected, offshore and onshore wind energy will make a very significant contribution to the renewables target. In our considered response, submitted today, we have also outlined the extent of the commensurate challenge to the electricity transmission system. We believe that this major piece of work by the UK Government, and some of its prospective implications, should begin to influence the LENS scenarios.

In particular, Big Transmission and Distribution could be evolved to reflect more of the UK Government's aspirations. Government, stakeholders and regulator would then be able to recognise more of the RES policy ambitions within the LENS framework. We note that *Big Transmission and Distribution* is furnished with the infrastructure necessary to access power from offshore renewable networks and indeed, the scenario begins with an initial environmental impetus that weakens over time. Yet the scenario lacks the formal environmental drivers enjoyed by three of the other scenarios.

We think that a more useful version of *Big Transmission and Distribution* would have added an explicit environmental driver, but possibly retain a flavour of consumers 'delegating' their legitimate environmental concerns to Government and large organisations.

## **Q2. What are the scenario implications for networks?**

We recognise the relevance of many of the network impacts pertaining to *Big Transmission and Distribution* and also that there are issues of planning and 'implementation' in this scenario. We also agree that new technology could play a very significant role in this future and that more interconnection and closer co-operation with Europe is consistent with the narrative.

We agree that in such a scenario as *Big Transmission and Distribution* consumers may be more comfortable to leave the 'day to day' management of carbon emissions to their mandated Government and/or large organisations. However, we have concerns regarding the text in the last bullet point of section 5.1 vis a vie

*"... The desirability of managing a power network based on passive consumers given potential energy security and economic concerns does not seem logical. The implication here is that passive consumers may be undesirable from various important perspectives."*

This text can be interpreted as asking whether *Big Transmission and Distribution* is actually desirable, before then questioning the scenario's internal consistency. Moreover, given the excellent record of the industry and its regulator in providing secure energy in the past, we are surprised that consumers are more concerned about energy security in this scenario – than they are in *microgrids*.

Finally, against the background of significant large-scale renewables investment the following issues are likely to arise, and should be addressed in broad terms, within the narrative;

- what incentives exist for the renewable generation (and low carbon generation) to connect;
- how the society described in the scenario is motivated to consent to construction of the infrastructure;
- how investment in the network will be funded and incentivised;
- creation of an explicit link between adequacy of investment and a functioning electricity market (where it exists);
- how the offshore network has evolved.

### **Q3. Implications for regulation**

Within *Big Transmission and Distribution* it is correct that consideration must be given to funding and pricing the expansion of the assets. However, the issue of maintaining the existing assets has not been adequately addressed. We also welcome the recognition that the right balance of risk and reward must be struck when considering novel approaches to transmission investment. We note that funding sophisticated ICT and the retention of skilled engineers is an issue in *Distribution System Operators*. These issues would also be experienced by the transmission company in *Big Transmission and Distribution* – not least because this organisation must have the skills and technology to balance, in real time, demand with the variable power flows at the extremities of the network.

In the scenario *Energy Service Companies*, we agree with the view expressed that, in order to protect the interests of consumers, the regulation of heat networks is important.

Finally, we welcome the attention given to the issue of stranded investment in the scenario *multi purpose networks*. It raises the general point that long-term and stable regulation is important if the networks are to continue to attract investment capital.

**Q4. Is there follow-on work that should be considered after the close of the LENS project?**

We believe that we must now gain greater understanding of the probability of each scenario occurring. We appreciate that 'real-life' will outturn a superposition of many scenarios, but an understanding of their relative weighting, given the current environmental context and investment in the existing networks is important.

We are concerned that the econometric modelling may have underestimated in some cases the amount of renewable and low carbon energy needed to meet the Government's climate change ambitions. Moreover, the generation mix and its geographical dispersion indicated by the model must also be compatible with a secure network.

By prioritising the most likely scenarios, further attention could be invested in creating a network topology against a plausible generation and demand pattern.