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Response to House of Lords Call for Evidence on Resilience of Electricity Infrastructure

1. Introduction

While Ofgem produces an annual report[1] on Electricity Capacity Assessment for the next 5 winters, as far as we know, reliable information about the resilience of the GB electricity infrastructure to peaks in demand and sudden shocks is not available on a planning timescale (20+ years).

The Call for Evidence notes that measures are being taken to improve capacity margins. While capacity margin is an indicator of resilience, we recommend that the main metric for characterising resilience is the probability of generation being unable to meet demand. This probability is then assessed against an agreed Standard - see Section 3. Meeting an agreed Standard should be a non-negotiable requirement in electricity planning. All proposals made for the Electricity System should meet the Standard.

Use of such a standard should be considered as best practice for assessment of resilience. The basic technology for it is well developed and has been successfully tested.

The calculation of the probability for security of supply should take account of all risks: risk of failure and non-availability of plant, risk that fuel will not be available, intermittency of renewable input, etc.

2. North American experience with resilience of the electricity system

In 1968, in response particularly to an extensive blackout in 1965 that had repercussions over the whole of the NE of North America, the National Electric Reliability Council (NERC) was established. This was based on voluntary agreements about standards. Further blackouts occurred, and in 2007 the NERC Standards became legally enforceable. Britain does have some enforceable reliability measures, but is a long way behind North America in putting a comprehensive set in place. It is recommended that the North American experience be used to inform the creation of a system that will seek to ensure resilience/reliability of the GB electricity system.

3. The GB situation

The National Grid Company(NGC) works, in a highly effective manner, with the plant and transmission available to seek to achieve security of supply. It has however no responsibility for what plant will be available in the future and does not assess the reliability of the system on a planning timescale. OFGEM' s role is market

regulation, not system planning. No body has responsibility even for assessing future security of supply for the GB system.

Appendix 1 gives the results of a recent assessment of the risk to Security of Supply based on comparison against a Standard as outlined in Section 1 of this response. This is based on the methodology used pre-privatisation and represents an alternative approach to that used for Reference 1.

The graph in the Appendix shows the predicted risks to Security of Supply up to 2036 and gives a direct comparison with the pre-privatisation Standard of 4% i.e. that in no more then 4 winters in 100 years would we fail to meet the System Maximum Demand .

4. Needed action

(Note that we do not make a distinction between 'resilient' and 'reliable'. They both refer to a state of acceptable risk of unsatisfactory outcomes)

Having a reliable electricity system is of prime importance to the nation. Both logic (that market arrangements do not address security of supply) and experience (e.g. the North American experience) lead to the conclusion that a national body is needed to seek to ensure that we do have a reliable electricity system.

In the absence of such body the risk that we will suffer blackouts similar to the North American experience is high. Good technology exists to reduce this risk to an acceptable level. It makes no sense to avoid using it.

The estimates of risk to Security of Supply should be produced from a system model[3] that would also take account of cost and other factors. Using such a model, the efficacy of various strategies for reducing the Risk (e.g. demand-side measures, use of standby oil-fired generators, putting mothballed generators back in to service, etc.) would be assessed leading to well informed decisions being made.

On behalf of IESIS

Iain A MacLeod
President

16.09.14

References

1. Ofgem *Electricity Capacity Assessment Report 2014* https://www.ofgem.gov.uk/publications-and-updates/electricity-capacity-assessment-2014
2. Mackenzie I *Bulk Electricity Reliability in North America* http://www.iesisenergy.org/sofs/Electricity-reliability-NAmerica.pdf
3. Gibson C M and MacLeod I A *Engineering the GB Electricity System* IESIS Journal of Engineering Vol 154 7-12 2014 Available at: http://www.iesisenergy.org/sofs/Engineering-GB-Electricity-System.pdf
4. National Grid Future Energy Scenarios http://www2.nationalgrid.com/uk/industry-information/future-of-energy/future-energy-scenarios/ 2014

Appendix 1 Estimates of Risk to Security of Supply

Figure 1 shows a graph of estimates of Risk to Security of Supply for the GB Electricity System from now until 2036. The graph shows that the Risk increases from the 8% actual in the 2013/14 winter to nearly 40% by the early 2020s as compared with the 4% Standard. The 4% Standard infers that one would expect a failure to meet demand once every 25 years. With the 40% risk, 2 failures every 5 years would be expected.

These estimates use a lower contribution from wind than used in reference 1. The graph indicates increasingly unsatisfactory levels of risk to Security of Supply up to 2023. This demonstrates the urgent need for analysis of this type based on the most reliable data for all generation in the system and the use of the most advanced statistical methods that are available.

The spreadsheet use to do the calculations can be viewed at: http://iesisenergy.org/sofs/Estimates-of-SofS-for-GB-system.xlsx

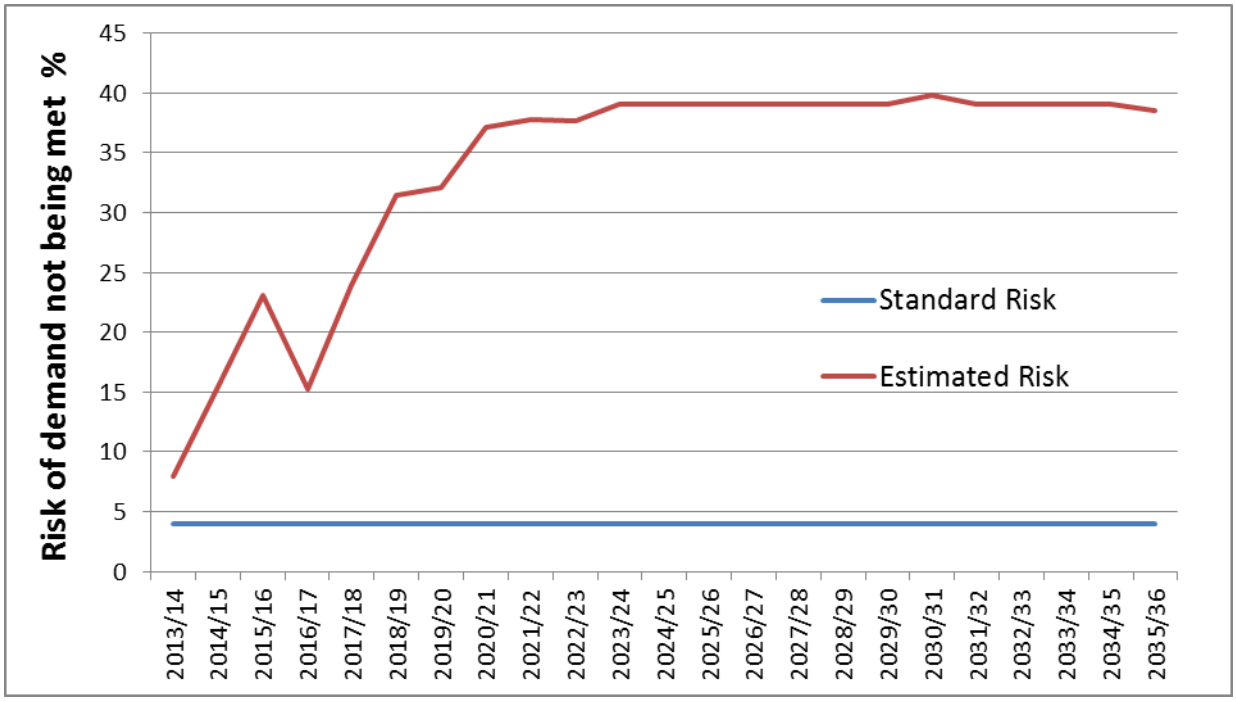

Figure 1 Estimates of the Risk to Security of Supply for the GB System up to 2035/36