

14th Sept 2020.

Mr. Jonathan Brearley,
Chief Executive Officer,
OFGEM,
10, South Colonnade,
Canary Wharf,
London, E14 4PU,

Dear Sir,

RIIO-ED2 Methodology Consultation.

This is my personal submission as you move forward with your proposals for the next electricity distribution price control which is scheduled to commence in April 2023.

Prologue.

If the good fairy came up to you and offered you 3% savings in energy across the whole UK electricity system for hardly any outlay with a guarantee that the quality of supply would not be adversely affected would you stop and listen? If she was then able to convince you that this would also reduce the generation CO2 emissions by the same percentage you may start thinking that this was your lucky day. If she also pinged her wand and said that she would give you, for free, some more capacity on your soon to be stretched distribution network, you would surely start checking on how much whisky was left in the bottle. But would you listen or would you sweep away the fairy dust and decline the offer in a belief that it must be a dream?

I invite you to read on.

Who is making this submission?

I make this submission as an individual customer who has taken a close interest in the performance and activities of DNO's over many years. My career spanned system design, operations, management, and main board director within the Electricity Supply Industry both before and after privatization. I was responsible for a number of far reaching national policy matters associated with improving customer care standards and the promotion of energy efficiency in the use of electricity. An example was the invention of the Guaranteed Standards of Service with penalty payments to customers for privatised industries. This was adopted by the then Secretary of State for Energy and is extant. Recently I have been involved in the creation of a local Neighbourhood Plan which sets the strategy and ambition for Boston Spa village and which contains emphasis on energy efficiency and environmental improvements. I am a member of the Stakeholder Panel of Northern Powergrid.

What is the submission about?

I observe that the present regulations challenge the industry players to improve the reliability of the supply and they have responded positively by addressing the targets which you have set. They have reaped rewards and been praised, for the innovative ways in which they have managed to reduce the number of interruptions and the number of minutes lost per average customer. Para 2.8 of your Overview makes the point precisely. But there is a fundamental omission within the present regulations which needs to be addressed. This omission has had the unintended effect of causing excess consumption by customers with its directly related and unnecessary CO2 emissions.

My objective is to cause you to consider introducing **Quality of Supply** regulation within RIIO-ED2.

Which questions does this submission relate to?

This proposal is in complete alignment with your declared objectives as described in Section 1 of your invitation to submit views, viz:

- Creating a smart and flexible energy system
- Delivering value for money for customers
- Keeping customer bills low
- Supporting a move to Net Zero

Whilst this submission has a narrow focus, it has relevance to many of the of questions which you pose in Appendix 6, including those relating to Net Zero (OVQ3-OVQ15), Needs of Customers (OUTQ3-OUTQ6), Vulnerability (OUTQ19-OUTQ22), Reliable Network (OUTQ23-OUTQ43), Whole System Approach (OVQ24-OVQ29).

What is the Justification and Evidence?

The UK statutory voltage range for LV customers is 230v + 10% - 6%. Hence the upper limit is 253v and the lower limit is 216.2v. Other EU countries operate with an upper limit of +6% ie 243.8v.

Present policies of DNO's is to run the 11kv system at a higher figure (typically 11.1kv - 11.3kv).

Local distribution transformers are generally configured with the off load tap change set to the higher end of its range. Design of the two different networks is not interlinked so any included excess voltage is cumulative. Policy and design recommendations are cautious and the system is deliberately run at the top end of the statutory range to allow for volt drop over the system. Voltage at customers terminals is rarely measured.

Remote customer generation has tended to raise the network voltage by back feeding from the far end. This is similar to a river running to the sea when the tide is coming in. For all these reasons customers are receiving voltages which are unnecessarily high. This unsatisfactory situation has existed for 25 years.

Now that Smart Meters are being installed voltage readings are automatically submitted to the data centres but only exceptional readings are flagged. This is a missed opportunity. The data could be used to monitor and target the voltage received by customers throughout the network.

Close consideration of actual voltages recorded by Smart Meters has revealed that most customers are receiving voltage within a range between 230v – 250v. At times of light load it is not uncommon for some customers to receive voltage in excess of the upper statutory limit. Very, very, few customers receive low voltage and complaints of low voltage are rare. There is bandwidth available for the voltage delivered at customers terminals to move down to a range of 220v - 240v. This will still leave a margin before the lower limit of 216v is reached.

The industry is considering a further reduction to a lower limit of 230v -10% = 207v ([reference ENA Technical Report 140](#)) and it has been established that the vast majority of equipment will work satisfactorily at that lower level. Hence it is inherently safe to reduce voltage and, additionally, lowering the voltage may improve the longevity of equipment.

Reducing voltage will reduce energy consumed. Whilst a direct straight line relationship between voltage and energy consumed cannot be claimed many studies have confirmed that a reduction of voltage will cause a reduction in energy across the whole system including the network and the customer. A figure close to 1:1 has been proffered by The Energy Networks Association ([Reference ENA Technical Report 140](#)) and the ENWL Class project ([Reference www.enwl.co.uk/zero-carbon/innovation/key-projects/class/](http://www.enwl.co.uk/zero-carbon/innovation/key-projects/class/)), which states ' The award-winning CLASS project successfully demonstrated that cutting edge voltage control can reduce demand for electricity, without customers noticing a difference to their supply'. Indeed, the industry uses voltage reduction techniques to reduce load under extreme conditions. It is sad to

see, in the body of the report and the Executive Summary, that almost all of the outcomes from voltage reduction are seen in the context of operational matters with scant regard to the benefits to customers.

There is an ongoing innovation project within Northern Powergrid which will use a derivative of real time Smart Meter voltage readings to send signals to the Automatic Voltage Control (AVC) devices on the primary network. The end result will be a feedback control loop so that voltage can be varied up and down within the statutory voltage range. The emphasis will be to optimise the voltage for the benefit of customers, the climate, and the network operator– mostly downwards when compared with present levels.

The expected benefits to be accrued are:

- a) Reduction of consumed energy by all LV customers (including the vulnerable and commerce/industry/NGO's).
- b) A commensurate reduction in energy production and CO2 emissions by the generators so helping towards the Climate Change Net Zero Target.
- c) A reduction of actual load on the LV system so releasing network capacity in readiness for the expected extra load which will come from decarbonisation initiatives such as air source heat pumps and EV's.

This is a WIN, WIN, WIN scenario.

Why has this initiative not been proposed previously?

Current OFGEM Regulations have not given any incentive to consider voltage at customer terminals. The regulations are silent on **Quality of Supply**. The present regulations only incentivise a reduction in minutes on/off.

Remote voltage meters (Smart Meters) have not been available until recently.

Distribution engineers and managers have traditionally been cautious and have tended to keep a bit of voltage 'in hand'. Possibly a relic of the period before voltage harmonization with Europe when the nominal voltage in UK was 240v.

Design policy has been in place for many years and has not been challenged.

DNO's are predominantly accountable to their shareholders and consequently concentrate on allowable costs and payment for performance. Decisions tend to be company centric rather than customer focused.

Reliability of Supply (average minutes lost and number of interruptions) has been the dominant driving force for innovation – ie rewards for responding to the Interruption Incentive Scheme (IIS).

When nominal voltage was harmonized in 1995 the UK did not use the opportunity to reduce target received voltage. This was a cautious and self centred decision by the industry which did not give sufficient consideration of the potential benefits to customers. The customers have not reaped any reward. Now, there is a moral imperative to act with all haste.

What is Proposed?

Within the new RII0-ED2 regulations there should be a need to monitor **Quality of Supply** at the customer terminals. The DNO's should be incentivised to use their innovative skills to ensure that the whole network is being operated in an optimal manner for the benefit of the customer and the environment.

Now that we have smart meters the remote sampling of voltage at customers terminals is readily available. The use of smart meters in this manner would demonstrate to the wider public a practical benefit of this high cost expenditure. The practical application of Smart Meters to make real energy and CO2 savings could potentially garner public trust. This will be essential as part of the transition towards net zero.

Epilogue.

The stars are aligned.

Millions of Smart Meters are sending live voltage readings from customers to data centres.

The world has woken up to the need to reduce CO2 emissions and governments are making legal agreements to help save the Planet.

Large organisations are having to refresh their approach to corporate and social responsibility and rebalance the needs of the different stakeholders. There is a moral imperative to seek changes.

In the UK new regulations for the 5 years ahead are being developed by OFGEM to focus minds and set meaningful targets for the monopolistic providers of energy.

There has never been a greater need, or a better opportunity, to bring about a positive step change in the management of voltage.

Now is the moment to act – for the sake of everyone.

Yours sincerely,

K H Jackson