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Energy Networks Association

ERGEG Consultation Public Consultation Paper
Towards Voltage Quality Regulation in Europe

The Energy Networks Association (ENA) is the body funded by the UK's electricity and gas transmission and distribution network operators. It also has, as Associates, a number of other network asset owners and operators, including two UK independent electricity distribution operators.

Established in 2003, it replaced the now defunct Electricity Association on electricity network matters and, in 2005, broadened its scope to incorporate the new gas distribution licensees.

It operates as a lobby on behalf of the networks sector, as a standards body and as a key link with the regulator Ofgem on matters in common across the network companies. It also coordinates industry Health, Safety and Environment activities and plays a leading role in communications work of the Energy Emergencies Executive (E3). It also coordinates and administers joint industry programmes in collaboration with Government, regulators and other industry actors.

1 Overview

The two fundamental issues raised are the extension of scope of EN50160 to transmission voltages and the need for improved quality of supply taking account of the balance of the costs against the benefits of improved quality of supply.

It seems that the other issues being raised, whilst representing interesting views on some rather detailed specific items, do not amount to a statement of alarming shortcomings in EN50160 but rather point to a need for natural development and improvement of these items of detail. Many of the points raised were addressed in the development of EN50160 and some certainly can be improved; such improvement is always possible in any technical document. The relatively new involvement of European Regulators may result in a different balance in the discussions and a fresh perspective that is to be welcomed. We give below more detailed comments on specific issues raised under Chapters 4 and 7 of the paper.

The document suggests that mean or average values would be more helpful. It is not at all clear that such values are of any practical use to electricity users or to Regulators since the values will vary within an envelope appropriate to the particular installation every day, with wider variations on a weekly and seasonal basis, for example. Due to the

inherent behaviour of actual networks we do not believe that any standard can usefully describe PQ elements in terms other than an envelope.

2 Transmission Voltages (EHV)

The development and operation of the UK transmission network is currently specified in the Grid Code. This is drawn up by the TSOs through a consultative process involving generators, DSOs and major energy users, under the authority of the UK Energy Regulators. This system works well. For larger supplies, new connections are designed on a different basis from that used in a number of other European countries, taking account of the specific requirements of the new load and the specific electrical environment to which it will be connected. This approach has, over many years, proved to be cost-effective and very satisfactory in meeting the needs of users. The UK systems also use a different approach to the regulation of voltage and frequency within the transmission system from many other European Countries. There is real concern that adding TSO requirements to EN50160 would lead ultimately to replacing the current system of UK standards and practices at TSO level, with no obvious benefits and many obvious disadvantages to energy users. Any such change needs to be undertaken with caution, with a recognition of these fundamental differences, involving a protracted transition period and only if economically justifiable.

3 Improved Quality of Supply

The issue of improved quality of supply raises the question as to where the pressures are coming from for any general improvement. From the UK's perspective such calls are not coming from electricity users generally, upon whose shoulders the costs would ultimately fall. There is currently a good and reasonable balance between the needs of energy users and the performance of most widely dispersed current-using equipment under existing supply conditions.

From time to time problems emerge as a result of developing technologies. An example would be the impact of voltage dips on electronic equipment that developed so rapidly in the 1980s. This development took place at the same time as the development of EMC as a general issue. Experience shows that manufacturers of equipment do respond to their customers' needs when such issues arise. Standards were developed to identify the issue and equipment evolved at relatively low marginal cost to provide appropriate levels of immunity. Voltage dips now have little impact on users of modern pcs and other electrical equipment.

On the other hand, voltage dips can impact very detrimentally on, for example, large manufacturing facilities. In such cases, specific solutions have to be found to specific production issues against a background that faults on the public networks and faults in the plant cannot be eliminated, no matter how much is invested in the supply network.

It is clear that energy users in general would not be willing to meet the costs of a higher quality of supply that impacts on very few users with special needs. These special

needs are currently addressed, and can realistically only be addressed, on an individual basis.

4 Specific Comments on Chapter 4 Recommendations (7a)

Improve definitions and measurement rules (4.1)

Whilst accepting that some improvements are possible, some of the perceived weaknesses in existing definitions seem to arise from inadequate understanding of the interaction between one definition and another. For example the comment on rapid voltage changes is addressed by the definition of voltage fluctuations. It is these fluctuations which actually cause flicker problems, rather than single voltage changes. Also, flicker can arise from voltage fluctuations from large industrial processes remote from the local network and not necessarily due to the local fault level.

In respect of the definition of voltage dips, many power quality instruments use the present EN50160 threshold; changing it would be detrimental to the use of these.

Limits for voltage variations (4.2)

In the UK supply voltage limits apply 100% of time, except for exceptional circumstances. Provided the exceptional circumstances are clearly described and allowed for, a limit based on more than 95% of the week should be possible. However the 10 minute evaluation period is necessary to reflect tap-changer operating times and short-term unusual combinations of circumstances. This is a question of balance, reflecting the fact that the use of equipment is substantially random at the level of individual supply points. Equipment is generally very resilient to short-term voltage variations outside the +/-10% Uo range.

Enlarge the scope of EN 50160 to high and extra-high voltage systems (4.3)

Comment on the extension to EHV was made at the beginning of this response. In respect of HV systems, the values given in EN50160 already reflect the impact of HV system performance at the lower voltage levels. Information provided for HV systems and above would therefore be of direct interest to very few rather large energy users, whose needs are normally thoroughly addressed by individual discussions. It is not clear that the work involved is very worthwhile.

Avoid ambiguous indicative values for voltage events (4.4)

EN50160 could not establish limits for voltage dips as the number in any given period is largely beyond the control of the network operator, being primarily dependent on the location of extreme weather events and other faults, including interference with cables and overhead lines by third parties.

It seems that Regulation of voltage dips would not be enforceable at realistic cost, as measurement at all user installations simultaneously is not practical.

Consider duties and rights of all parties involved (4.5)

In reality, products differ widely in their immunity so the definition of a single curve to describe the tolerance of all is not possible. Indeed within any particular product type there can be substantial differences in immunity level, reflecting the ways in which manufacturers have chosen to meet their customers' needs. It seems fundamentally wrong to seek to establish legal or contractual responsibility within a public standard.

Introduce limits for voltage events according to network characteristics (4.6)

This proposal seems unworkable and directly contrary to the needs of equipment manufacturers and users, both of which would generally prefer one product standard to be applicable at every likely point of use.

Develop the concept of power quality contracts (4.7)

For most energy users, a standard such as EN50160 is all that is necessary to establish an agreed level of quality. In the UK, users seeking a higher level of quality can and do find satisfactory solutions in discussion with the DSO/TSO, based on individual circumstances. It is not clear that an intermediate form of "standard contract" would add any value or be of any great use.

5 Answers to specific questions on the recommendations to CENELEC for revising EN 50160 (7b)

What is an appropriate responsibility-sharing curve between equipments and grid in the voltage-duration plan (both for voltage dips and swells)?

EN50160 is not the place to define responsibility and the proposed approach to establish a general immunity curve is completely impractical.

What is an appropriate way of protecting equipment against damage or failure due to short-duration overvoltages (voltage swells): limits for voltage swells (as events) or a shorter time interval (than the today's 10-min in EN 50160) for averaging continuously measured values (related to supply voltage variations)?

This is at present an issue for the individual equipment product standards taking account of the characteristic of the specific products. It seems inappropriate to seek to transfer the manufacturers' legal responsibility into EN50160.

Are there benefits, further than customer protection (for instance: reduction of losses), important enough to give reasons for reducing the range of voltage variations from Un ± 10 % to a narrower band?

No clear justification has been put forward for reducing the range of voltage variations. The present range has been found to be acceptable and economic over many years in most European countries.

How to consider random year-by-year variations in setting limits especially for voltage dips and other events correlated to weather influence?

Voltage dips and interruptions of supply due to faults are largely random events. Any correlation can only be retrospective as an indicator over time of the maintenance of the network performance.

For some topics (as for instance voltage steadiness within the tolerance band) the research made already available aggregate voltage quality indexes; should those aggregate indexes be used for regulatory purposes? Why or why not?

Most users would not benefit from regulatory intervention in this area but only specific customers. Voltage quality indexes may be useful for a customer who wished to optimise the point or manner of obtaining a new connection. However, specific customers already connected see no benefit and they are able install their own monitoring equipment if they wish.

How can power quality contracts be defined in order to focus improvements in voltage quality levels according to customers' preferences?

In respect of a specific user with specific identified needs, this issue seems to be outside of the scope of a Regulator's interest. The needs of users in general can be adequately covered by a standard such as EN50160. The contractual relationship between the network operator and the user should remain outside of EN50160.

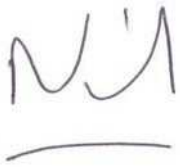
6 Answers to questions on the future of voltage quality regulation (7c)

Which are pros and cons of introducing national VQ limits and requirements by the national regulators? Do you believe that a "two level" option (definitions and measurement rules set homogeneously at EU level; limits set country by country by relevant authorities) can be a more effective way for improving or at least not deteriorating voltage quality?

A two level approach seems fundamentally opposed to the EU concept of a single market. It may be that for transition countries, for example, a timescale will need to be set for any necessary improvement. To establish national limits would be entirely contrary to the needs of industry and users.

I trust that you will find this response useful . If we can be of any further assistance then please contact David Crawley david.crawley@energynetworks.org who will be happy to help.

Yours sincerely



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