"Draft Guidelines for Good Practice on Electricity Grid Connection and Access" An ERGEG Public Consultation Paper

Comments by EURELECTRIC
June 2009

INTRODUCTION

European energy regulators have undertaken in their 2008 work programme to analyse the needs and draft key concepts for common grid access and connection approaches throughout the EU electricity grids. A consultation document seeks to initiate discussion on ERGEG's input to the draft framework guidelines. This document is intended to serve as a background paper in drafting the input to the framework guidelines to be developed, by the Agency for Cooperation of Energy Regulators. The future framework guidelines would deliver principles upon which respective codes for grid connection and access will be developed by system operators.

EURELECTRIC welcomes the opportunity to comment grid access and connection approaches throughout the EU electricity grids. EURELECTRIC would like to point out that the need for any harmonisation in this field is not in all cases immediate. Recent problems in the electric system cannot be attributed to a lack of harmonisation in grid access and connection rules. For these reasons we recommend that the principle of subsidiarity is applied and any harmonisation regarding the grid access and connection is scrutinised thoroughly (and "harmonisation not pursued for the sake of harmonisation").

One should also clearly differentiate between framework guidelines that provide general rules and more detailed rules provided in technical codes, for which a consultation process is created under the third liberalisation package.

For many years experts from EURELECTRIC member organisations have participated with other grid users and regulators in the process of developing grid codes in Europe. EURELECTRIC recognises the need for continuous improvement and the specific role that regulators have in representing the interests of network customers, while ensuring the financial sustainability of network operators.

In 2008, UCTE and EURELECTRIC have agreed, with support of VGB, on a paper on electricity connection and grid access ("Technical Paper - Definition of a set of requirements to generating units"). The document was finally published on 6 April 2009 and can be downloaded from the UCTE website (http://www.ucte.org) This paper covers most of the topics addressed in the ERGEG consultation paper and provides positions and answers jointly agreed by TSOs and generators concerning roles and responsibilities, as well as technical details. We would like to refer to this paper for detailed comments form the generator's point of view.

SOME GENERAL COMMENTS

Coordination between TSOs and between TSOs and DSOs

EURELECTRIC would like to underline that there is a clear need for close cooperation between TSOs in the internal electricity market. Also close cooperation between TSOs and DSOs is required, given the growing importance of both distributed generation and smart grids. The connection of small scale generation units to the grid might potentially threaten grid security, but at the same time it will provide more options to the DSO to balance their area on a low voltage level thereby reducing stress on TSO level.

EURELECTRIC therefore sees exchange of information paramount so that TSOs and DSOs are better equipped to maintain a reliable and stable system.

The current queuing process for connecting new generation to the distribution grid stipulates a first-come, first-served approach. However, at the TSOs level this current queuing system may not allow the implementation of a diversified energy portfolio and an adequate connecting process should be defined. At the DSOs level EURELECTRIC believes that the current system can be maintained.

Long-term Grid Expansion Strategy to accommodate more distributed generation may be needed. A two-fold strategy, including supply management and capacity expansion in regions with high generation potential can be one option.

As a general comment references to any incentive/remuneration scheme in line with the investments required to fulfil all technical aspects mentioned in this document are missing.

Priority access for renewables and distributed generation.

The sustainability of the future electricity supply relies, in part, upon the successful expansion of renewable energy generation facilities. Each of these renewable energy systems has different characteristics in terms of availability of the supply source, such as wind, solar, biomass or hydro. In order to manage a diversified energy portfolio, grid access procedures must be established that accommodate the diverse energy supply envisioned. Priority of access for renewables is a key point that should be addressed in the implementation of the 3rd energy package.

Experience shows that large scale development of RES does not necessarily require both priority of access and dispatching. While we are not advocating any particular existing Member State regulation with regards to RES access to the grid and integration into the electricity system, some Member States have shown how large development of wind production is compatible with imposing on wind production the same operational discipline that applies to other types of generation.

The expansion of renewable generation will require major investment in electricity networks, since these resources are frequently installed in areas where there is no grid infrastructure (offshore) or in rural areas (onshore) where the existing grid does not have sufficient capacity to evacuate the output. Moreover the total RES capacity installed in a particular area might substantially exceed the local needs as it is often distant from the traditional locations of consumption. Regulators should recognise the need to reinforce

networks, authorising investments on a timely basis and allocating the appropriate remuneration (or authorizing the necessary grid tariffs) to TSOs and DSOs. Also cross border interconnection capacity needs to be significantly increased.

Renewable and other generators should act on a level playing field in terms of network access and pay their share of network costs. Such costs should be transparent and fairly distributed, computed for all generation technologies using the same criteria. Support levels for renewables will of course need to take these costs into account.

An ambitious support to RES is compatible with applying the same grid access rules to renewable and conventional generation: RES generators, as well as conventional units, should pay the cost of local grid connections. The decisions concerning grid connection must be based on security, quality or continuity of supply criteria, according to which the operator should direct the generator to the connection point with the appropriate technical characteristics such as short circuit impedance. Connection rules must also be objective and non discriminatory.

Planning of network expansion shall take into account expected installations both in RES and in conventional generation. Moreover investment and licensing timing of RES installations and grid development should be aligned. In order to minimise risks for investors and reduce inefficiencies, society cannot afford to have RES installations ready when there is no connection available yet (or vice versa).

Concentration of RES in areas ideal for generation but where there is little consumption and/or grid development could lead to excessive investment costs and overall loss of social welfare. This should be appropriately considered when determining zones where RES (e.g. wind farms) can be installed.

OTHER ISSUES TO CONSIDER

When there is a harmonisation on European level, how will connections to third countries be dealt with? Will EU take initiatives to make agreements with those countries?

Regarding to frequency, voltage and protection (sections 5.1.1., 5.1.2. and 5.1.3.), reference should be made to the relevant European (EN) and international (IEC) standards.

EURELECTRIC also recommends a clear distinction between low voltage (LV) and higher levels of voltage when defining connection and access rules.

Specific issues related to the scope and applicability of the document

1. Problem identification

1.1 para. 4 on harmonisation

Harmonisation, standardisation and interoperability should have regard to the economic and technical limitations of each network. For example, in general in Europe frequency deviations remain slight, so equipment would only need to cope with small variations, whereas in some other countries frequency deviations can be much larger. Harmonisation which only required equipment to cope with small frequency deviations would be impractical.

With regards to European and international standards existing procedures should be applied or adapted using existing structures (CENELEC, IEC, etc.).

3. Roles and responsibilities

EURELECTRIC agrees in general with all the roles and responsibilities set out in Section 3. Nevertheless, we call for a better cooperation on equal terms between the TSOs and DSOs where DSOs should also participate in aspects related to TSOs and vice versa.

3.2.3 *'Regulators shall have authority.. to modify the terms and conditions for grid connection and access'*

This should be limited by adding in the words *'subject to the safety and stability of the system and having regard to it's economic operation'.*

3.3.1 *'… Conditions for grid connection'*

'Grid connection' is mentioned in several contexts, sometimes referring to the Transmission network and sometimes to the Distribution Network. As TSO requirements often have an impact at the DSO level also, it is better to specify which network is being discussed i.e. '… Conditions for **Transmission** *grid connection'*

3.3.3 new

The TSOs shall make public on their websites the various steps and timing of the connection process, including the role and tasks to be performed at any moment by the grid requesting party.

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The DSOs shall make public on their websites the various steps and timing of the connection process, including the role and tasks to be performed at any moment by the grid requesting party.

Investors require a sound climate to initiate their projects which includes an appropriate estimation of the time to market for their new generation capacities. Within this time to

market process the grid connection approval and construction period plays a pivotal role. In order to enable a level playing field across Europe, EURELECTRIC recommends to include a clear timeframe in the Guidelines in which is defined when TSOs or DSOs shall deliver a proposition for grid connection according to 3.3.3 and 4.3.3.

3.3.4 *' The TSOs shall oversee that all users…'*

TSOs shouldn't have an active 'police' function because this would increase their costs. In stead, they must have the right to control that users meet the requirements for grid connection and access.

3.4. Distribution System operators (DSOs)°

3.4.1 *'The DSOs shall set the terms and conditions… for ex-ante approval by the national regulators*

An ex-ante approval by the national regulator will imply high bureaucratic costs. The regulator should only monitor the terms and conditions developed and established by the grid operators.

A more simple formulation would be: ***"The DSOs shall set the terms and conditions for grid connection and access to their networks."*** The rest of 3.4.1 could be deleted.

3.4.2 *'… provide all necessary data and information needed to evaluate the connection and access conditions'*

This statement is too broad – it could mean provide all network data, all equipment data and details of all future proposed developments on the system. There is a huge amount of work in this and it is of no use to anyone – in UK they provide Long Term Development Statement which takes a lot of work and is out of date when published. On the Transmission Network things are more predictable and change more slowly, and there is significantly less data. So it should be limited to providing details of Network connections and impedances.

Once a Group processing approach is adopted, this is of even less relevance at the Distribution level.

3.4.3 *' The proposition shall contain all relevant justifications'*

The justification may be related to other Generator connections which might be confidential, so is too broad.

3.4.4 *'The DSO's shall oversee that all users…meet the requirements…'*

DSOs shouldn't have an active 'police' function because this would increase their costs. Instead, they must have the right to control that users meet the requirements for grid connection and access.

3.5. Generation units

For further details see also *Technical Paper – Definition of a set of requirements to generating units* from the UCTE website (http://www.ucte.org).

3.5.1. Text to read: "***The generation units shall meet the requirements set in the terms and conditions defined by the TSO and/or DSO unless otherwise contractually agreed upon between TSO and/or DSO on one hand and the generator on the other."***

This is necessary to ensure that some generators are asked to provide what they can provide and that any discrimination of generation plants is not possible.

3.5.2. To add: "*The generation units shall provide all necessary* ***technical*** *data…*"

3.6 Consumption Units

A definition of a Consumption Unit is required.

3.6.3 *'consumption units.. provide data … to ensure secure real time operation'*

- is this intended to cover down to LV customers?

Should have words *' where required by the TSO /DSO'* added.

4. General provisions

4.1.1

The connection procedures, **applicable to all generating units if not otherwise specified,** *shall be elaborated and/or approved by the regulators as part of the terms and conditions for connection and access to the grid* **after appropriate consideration of stakeholders' interests or proper formal consultation with stakeholders if reasonable**.

The regulators should only monitor the connection procedures developed and established by the grid operators because of the high bureaucratic costs.

4.1.2 'grid connection should be … transparent and non-discriminatory'.

The concept of priority connection for RES is by definition discriminatory. This requirement may not be absolute, but should be conditional (conditions to be defined).

4.2.1 'Existing installations shall retain the technical features they had when they were connected to the grid.'

This formulation would potentially block future developments and is not in the interests of customers.

Proposed text: 'Existing installations shall retain the technical **connection** features they had when they were connected to the grid.'

4.2.3 'diverging positions on the possibility to connect between system operator and grid user, an independent expert may be utilised or submitted to regulators for settlement'

This will encourage disputes and delay other connections whilst the dispute is in progress. Having an expert is a waste of time as it will probably be appealed to the Regulator. To avoid delay have consultation between Grid and user and then immediate referral to Regulator and decision within 1 month.

4.3.1 Information Exchange

Existing European or national rules and standards must be considered in this regard. Requirement to comply with Power Quality requirements is not mentioned here, although referred to later in document.

4.3.2 '*Every significant generation and Consumption unit shall provide information…'.*

Significant is not defined and would be difficult to define – a large no. of small units in a sensitive area would require data.

Proposed text: '*Every significant generation and Consumption unit* ***identified in the respective grid rules*** *shall provide information…'.*

4.4.1 *'The system operator shall put rules in place to handle the access limitation situations…'*

Such rules for access limitation situations should be communicated only if there is a concrete grid limitation.

4.4.2 '*Access limitations shall be considered only if operational security is as stake and no other solution is available'*

So above means that Non-Firm access will not be considered as it would limit access?

5. Technical Framework for Grid Connection and Access

For further details see also *Technical Paper – Definition of a set of requirements to generating units* from the UCTE website (http://www.ucte.org).

5.1.1. Operating frequency

EURELECTRIC's general comment is that whichever frequency range is set by network operators, it can be done only in consultation with the generators / market participants..

5.1.2 Operating Voltage

5.1.2.2 '*equipment will remain connected .. during voltage deviations.. as far as no damage to the equipment is foreseen'*

This depends on the design of the equipment – if the equipment has not been designed to cope with the voltage variations it will be damaged, and hence will not have to comply with this clause. Underlined section should be omitted.

5.1.2.4. In the beginning of the para it should be inserted that ***national rules and standards should be considered. New criteria are not necessary.***

5.1.3. Protection scheme

5.1.3.3 'Protection systems of the generation and consumption units shall be equipped with back-up devices.' EURELECTRIC is in favour of avoiding unnecessary duplication of protection systems.

5.2. Generation Units

We are generally of the opinion that all services (e.g. black-start capability) that contribute to grid stability in a normal operating modus, or after a disturbed modus, should be subject to a bilaterally agreed or regulated services charge. This applies even more if additional investment is required to qualify the generation unit as black-start ready. The same is true for power system stabilizers (5.2.1.5) which require additional investment by generators. Furthermore, we question whether really all significant generating units need to be equipped with such a devices, or whether a smaller number in peripheral areas of a synchronous zone would be sufficient.

Therefore, we suggest an adjustment in order to express clearly that:

- Any extra investment to the benefit of the grid should be bilaterally agreed between TSO/DSO and the generating unit and financially remunerated.
- In case an agreement is not achievable, the regulator should establish rules for such an investment and define a method for remuneration.

5.2.1.4 *'System operator shall define requirements for step-up transformers affecting the design and operation'*

System operators are not transformer designers. System operators should only need to define the situations with which the step-up transformer must operate, and then the generating company commissions the design of the step-up transformer to meet these requirements.

5.2.1.8 '*generation unit shall be designed to withstand the* ***mechanical*** *stresses associated with any kind of fault'*

Omit the word 'mechanical' – units should also cope with electrical stresses.

5.2.6. Verification

5.2.6.1. Additional sentence to be added at the end of para: ***Any further tests should be remunerated by the requesting party.***

5.3. Consumption units

5.3.2.1 '*Consumption units shall compensate as far as possible their consumption of reactive power'*

This isn't a general rule. It depends on the concrete grid situation. We recommend to leave this sentence out.

5.3.2.2 '*economical sanctions to the consumption unit if recurrent'*

Leave out the words 'if recurrent'.

5.3.3.1 *' No interference resulting in electromagnetic perturbations with other consumption units…should be allowed'*

This is too broad – it means that if a customer operates within all limits required but an adjoining customer has poor equipment which will not operate correctly within the limits, then the first customer is to blame? Need a reference to limits in paragraph covering this point.

5.3.3.2 *Emission limits*

No mention of voltage dips or surges which are likely to be the most significant issue.

5.3.5.2 '*Load Shedding shall be carried out in a non-discriminatory way'*

Again this is too broad – it would mean that a critical process plant such as a paper mill or glass furnace would be load shed on the same basis as (say) Domestic Housing, when an interruption of 30min to the Domestic load would be tolerable whereas the same interruption to the critical load would have significant economic consequences. So Hospitals will be shed with Hotels/Pubs ?

'Load shedding should be carried out in accord with the general principles agreed with the Regulator unless there are immediate grounds for departure due to operational, safety, or economic criteria.'

5. Impact of the implementation of GGP on DSOs business and market

This section includes a number of comments from a DSO perspective.

5.2.1.6 *'shall remain connected to the network as long as possible to sustain the grid'*

No TSO or DSO would want something as vague as 'as long as possible'. The requirements should *be ' as required by the DSO/TSO under the circumstances outlined in the appropriate Grid code'*. This is essentially 'Fault ride through' and is defined in Grid code by graph.

5.2.2.2 '*Normal operating mode should be automatic control of voltage… power factor control shall have lower priority'*

The operating mode of the generator should be a matter for the TSO or DSO, to suit how the network operates. Constant Power Factor could be a more appropriate mode in some instances and the operating mode should not be prescribed in a regulator guide, but left to the discretion of the System Operator.

5.3.2.1 '*Consumption units shall compensate as far as possible their consumption of reactive power'*

This is unlikely to be welcomed by System Operators as it will make voltage control at night more difficult, and require large amounts of expenditure. Usually System Operators want loads to be at about 0.95PF as this leaves scope for System Operator to adjust at margin by varying voltage or switching out cables at night.

Also there are excessive costs in improving the PF beyond 0.95 as further reductions require excessive investments.

5.3.4.1 *Demand Response 'TSO and DSO shall involve consumption units as much as possible when designing and Contracting ancillary services'*

This states that regardless of cost, economy, efficiency or risk, Demand Response will be used as much as possible. Wording should be revised.

Better wording would be that '*Regulators shall promote the use of Demand Response by the TSO and DSO through the use of agreed processes which promote DR when it is in the public good and meets the economic, operational and risk targets set out by the Regulator.'*

5.4.3 *'DSO's shall design load shedding systems according to the requirements set by TSO's*'

DSO's may also wish to have load shedding scheme. Add in words underlined:
DSO's shall design load shedding systems <u>for TSO System Operators</u> according to the requirements set by TSO's'

5.4.3.4 '*Load shedding should be designed to allow distributed generation to support the system as far as possible'*

This sentence could have massive cost implications, both for System Operators and for DG. It says that regardless of cost, and to the greatest extent possible, all the extra equipment, control and investment required by the DG and the System Operators will be made, so that in the event of relatively rare events and for short duration, DG will be able to operate.

This is not practical or economic.

Proposed text: '*Load shedding should be designed to allow distributed generation to support the system as far as possible,* ***and be coordinated with developments on the distribution network that will allow distributed generation to support the system to the greater possible degree****'*

5.4.2.2 *'Reactive Power Flow between the TSO and DSO networks shall be avoided.'*

So DG connected at MV to a HV/MV station will have Power Factor equipment installed to avoid power flow at each such connection point?

5.4.4.3 *'protection schemes shall allow distributed generation to support the system'*

Again, radical redesign of networks with massive costs and excessively complicated protection schemes to cope with rare events.

5.6 new: Exemption for distributed generation

5.6.1 new *TSOs or DSOs shall agree with distributed generating units, which are installed to provide output to a single or a very small number of customers only, any exemption from grid connection rules in order to promote distributed generation.*

Beside large generating units, there is also a trend Europe-wide for decentralised and customized generation close to industry parks or large consumer, which generate their output almost exclusively to one or a very small number of customers. We advocate under those special circumstances some exemption from the principle grid connection rules which take into account the project specifics. It is hardly possible to consider all potential situations for customized generation in a single paragraph. Therefore, we recommend to leave it to TSOs, DSOs and generators mutual agreement.

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