

## ENTSO-E 1<sup>st</sup> User Group meeting on “Network Code for Requirements for Grid Connection applicable to all Generators” (NC RfG)

### FINAL MINUTES

#### AGENDA

<i>Introduction</i>		
10:30	Welcome, objective NC RfG user group and agenda	ENTSO-E
10:40	Introduction of all participants	all
11:10	Status NC RfG consultation	ENTSO-E
11:20	Questions	
<i>NC RfG implementation</i>		
11 :30 11 :45	Implementation NC RfG at national level <i>discussion</i>	COGEN Europe, Geode
12 :00 12 :15	NC RfG versus alternatives (CBA methodology) <i>discussion</i>	Eurelectric WG Thermal, EUTurbines
<b>12:30</b>	<b>Lunch</b>	
<i>NC RfG scope</i>		
13:15 13:30	Definition generator unit & classification <i>discussion</i>	VGB PowerTech, Euromot
13:45 14:00	Technology/regional specificities <i>discussion</i>	COGEN Europe, Eurelectric WG Thermal
<i>NC RfG requirements</i>		
14:15 14:30	Clarity in definitions and legal obligations <i>discussion</i>	Eurelectric DSO, Geode
14:45 15:00	Operational notification process & compliance testing/monitoring <i>discussion</i>	Eurelectric DSO, EUR
15:15 15:30	Fault Ride Through requirements <i>discussion</i>	EWEA, EUTurbines
15:45 16:00	Reactive power requirements <i>discussion</i>	Euromot, EWEA
16:15 16:30	Frequency and voltage ranges <i>discussion</i>	VGB PowerTech, EUR
<i>AOB &amp; Conclusions</i>		
16:45	Points not addressed in the agenda, general feedback	all
17:15	Main outcome and next steps	ENTSO-E
<b>17:30</b>	<b>End of Meeting</b>	

## ATTENDEES

<b>Association</b>	<b>Representative</b>	<b>Affiliation</b>
<b>CEDEC</b>	Herman Poelman	Alliander
	Marc Malbrancke	Inter-Regies
<b>COGEN Europe</b>	Gary Heaton	BDR Thermea Group
	Arnaud Duvielguerbigny	COGEN Europe
<b>EPIA</b>	Bernard Ernst	SMA
	Manoel Rekingier	EPIA
<b>EUR</b>	Jonas Persson	Vattenfall
	Francois Luciani	EdF Energy
<b>Eurelectric DSO</b>	Riccardo Lama	ENEL
	Pavla Mandatova	Eurelectric DSO
<b>Eurelectric WG Thermal</b>	Jorg Kerlen	RWE
	Giuseppe Lorubio	Eurelectric
<b>EUROMOT</b>	Mats Östman	Wartsila
	José Gómez	GE Jenbacher
<b>EUTurbines</b>	Peter Norris	Alstom
	Luce Guenzi	Solar/Turbomach
<b>EWEA</b>	Paul Wilczek	EWEA
	Frans Van Hulle	EWEA
<b>Geode</b>	(excused)	
<b>IFIEC</b>	Jean-Pierre Becret	Solvay
<b>VGB Powertech</b>	Philippe Lebreton	EdF
	Marius Stiller	RWE
<b>ENTSO-E</b>	Stephanie Bieth	RTE
	Anders Danell	Svenska Kraftnat
	Jako Kilter	Elering
	Edwin Haesen	ENTSO-E
	Mark Norton	Eirgrid
	Ralph Pfeiffer	Amprion
	Jerzy Rychlak	PSE-O
	Helge Urdal	National Grid
<b>observers</b>	Uros Gabrijel	ACER
	Tadhg O'Briain	EC – DG ENER
	Wouter Vancoetsem	CENELEC

## **1. Welcome and introduction of all participants**

The rationale for establishing the RfG user group in the course of the NC RfG development process is explained. This is also given in the user group invitation accepted by all associations present in the user group.

All participants briefly present themselves.

## **2. Status RfG consultation**

The web-based consultation on RfG ended on 20 March 2012. This resulted in over 6000 comments submitted. All are accessible at <https://www.entsoe.eu/consultations/document/docdetails.do?uid=0004-be44-30e2-8240-60ce&>

The aim of the first user group meeting is for participants to highlight the key points addressed directly by themselves as pan-European association or by their constituent members in the web-based consultation. The associations with whom ENTISO-E conducted formal bilateral meetings before the web-based consultation, represent about 10% of the comments provided. ENTISO-E clarifies it will not give final responses on stakeholder comments for directions towards the final NC RfG during this first user group meeting.

IFIEC mentions there was no means in the web-based consultation to give general comments. ENTISO-E emphasizes that the forum to provide and discuss these general comments is also this user group meeting which is assumed to represent most relevant stakeholders over Europe.

EWEA asks for clarification on the criteria for participation in this group. ENTISO-E refers to the open invitation letter published 30 January. All associations with whom formal bilateral meetings were conducted (see <https://www.entsoe.eu/resources/network-codes/requirements-for-generators/>) were invited. In addition the invitation was open to relevant European-wide associations of stakeholders not yet represented.

EUR comments there was no consultation on the agenda for this meeting proposed by ENTISO-E. All participants were requested to provide their 5 key issues. For reasons of time efficiency, but still aiming at covering most proposals, a draft agenda with nine items was proposed in which each participant had two presentation slots. In addition, all were free to send proposals for other topics or bring up additional topics. All user group participants agree that the overview of all key issues provided by all participants will be distributed and published.

EUR comments that according to the Terms of Reference, the agenda should have been distributed two weeks prior to the meeting. Although the initial scope of the first meeting and request for input was sent well in advance, the agenda was only distributed one week prior to the meeting.

IFIEC confirmed its interest to join the user group at a later stage. Given the specific stake of its members, ENTISO-E agreed with IFIEC's participation. As the agenda was already set, a short presentation of their key points will be inserted in the agenda.

The presentations prepared by all participants for the following topics will be published. The content of these presentations is not repeated or summarized in this document. These minutes only reflect the discussions in the user group meeting post each topic presented.

### **3. Implementation NC RfG at national level**

- Presentation COGEN Europe

ENTSO-E asks for clarification on the statements that on one side some requirements are to be dealt with by EU wide standards, while local/regional context is stated to be important as well. COGEN Europe points out that the definition test mentioned in Art 3.6 is of importance, as well as that the lower thresholds for CHPs need to be clarified.

EUTurbines refers to the FAQ which states that CHPs are to be treated case by case. As the total number of CHPs will be very high, the risk of overcrowding for case-by-case analyses or derogations is to be considered.

Eurelectric DSO states that for small units (type A and B) installers are not the technical experts on grid connection compliance and reinforced the concept that for those plants the certification and route to installation should be as simple as possible and that it should rely on documentation. Installation should be as simple as possible, using an industrial approach without too many phases. EPIA agrees that for small units a one-shop-stop is essential.

EUROMOT also agrees on having the installation process as short as possible and sees CE marking as a valid option for compliance testing.

Eurelectric DSO and CENELEC note that neither the discussed grid connection requirements, nor the testing thereof, are covered by CE marking. As for the time being there is no directive referring to a standard on this, CE marking cannot be applied.

EPIA states that manufacturers' self-certification could be used for the scope as well. Eurelectric DSO mentions the fact that self-certification may bring no particular advantage for type A and even B compared to a type test of a mass product in an accredited laboratory which is made once and is valid everywhere in EU, while increasing the level of complications in managing the process and possibly also the consequences towards manufacturers in case some self-certifications should eventually result wrong. CENELEC confirms that accredited laboratories can perform all tests at once, based on standardization, and deliver the specifications about where the equipment can be used and where not, based on different national implementations Europe.

ENTSO-E acknowledges the issue of mass installations and will consider a further streamlining of efficient operational notification procedure. The potential impact of a large number of small units is still present. Some studies in GB project 20M microCHPs which justify requirements for 1kW units given the overall system impact. COGEN Europe answers that a microCHP unit costs more than the conventional "boiler" alternative. Therefore, mass scale deployment to such level is unrealistic in the short-medium term (in times of crisis, public support is shrinking). As a proof of evidence, numbers of microCHP units fitted at customer houses are still very low. Furthermore, the NC allows for a periodic review of the requirements for new and existing power plants if a security issue for the electricity system may arise.

On the topic of microCHP technology COGEN Europe adds that the sterling Engine technology cannot operate over the proposed frequency without a major change or the inclusion of an inverter. The new VDE 4105 standard introduced in Germany states that the microCHP is exempted from the extreme frequency testing as it is deemed insignificant. A re-design of the currently approved unit would take between 3 to 10 years and would produce an unfair increase in the unit cost and loss of sales over the re-design period.

COGEN Europe notes that many CHPs consume electricity on-site and have no intention of participating actively in the electricity market so do not want to be constrained off.

ENTSO-E argues that if a unit connects to the system it has an impact on it in normal operation as well as during events, irrespective of the operation mode.

#### **4. NC RfG versus alternatives**

- Presentation Eurelectric WG Thermal
- Presentation EUTurbines

VGB Powertech supports the EUTurbines alternative on the reactive power capability requirement on type C synchronous generators. In addition, the link with operational codes is brought up. How does Art 12.2.b on reduction of active power output at low frequency relate to demand disconnection schemes?

Eurelectric DSO note they did not comment on type D generation as it is a TSO competence, nor did they comment technical details such as those of the prime mover for which the manufacturer has more competence.

VGB Powertech questions how costs are allocated when a more stringent requirement is set on generators with a higher cost impact, e.g. more stringent reactive power capabilities resulting in a higher nominal apparent power rating.

ENTSO-E argues that in the drafting of requirements the link was made to what has already been achievable in the past and implemented by grid codes and agreements.

Eurelectric WG Thermal expects TSOs to always set the most stringent value when a range of values is allowed for in a requirement. If not and a system event occurs, the NRA will set the TSO liable for not having chosen the more stringent possibility allowed in the NC. Therefore, Eurelectric WG Thermal wants to have only minimum values to be set. This still gives the TSO the opportunity to choose more stringent values if this can be justified according to national circumstances. ENTSO-E argues that in the case of these types of requirements, the decision at national level is always taken within an existing national legal framework (Art 4.3). TSOs do have the competence to propose adequate values.

#### **5. Short presentation of key points by IFIEC**

No specific questions

## **6. Definition of Generating Unit and classification of types**

- Presentation VGB Powertech
- Presentation Euromot

IFIEC states that a grid connection code should only define capabilities. Specific conditions for operation are to be prescribed in a grid access code. Eurelectric DSO states that the actual settings on conditions for operation are not in the scope of the NC RfG and this should be clear from the text. In this context ENTSO-E also refers to a network code on connection procedures which is to be developed within ACER's framework guidelines on electricity grid connections.

Eurelectric DSO agrees with VGB on the lower threshold for type A of 1kW and the voltage threshold for type D of 170kV. However, voltage is considered to play a role in the final application of code requirements. Capacity levels are the only relevant criteria for defining significance, but voltage levels define how to apply it. E.g. type C requirements should not be applied in MV networks.

IFIEC highlights that the phrase "Relevant Network Operator decides / imposes..." in some articles allows to adapt specifications to the real network needs but sees a risk of excessive specification by the additional words "unless national law gives the TSO authority to make such decision pursuant to Article 4(3)...".

## **7. Technology/regional specificities**

- Presentation COGEN Europe
- Presentation Eurelectric WG Thermal

EPIA asks why the present draft code does not allow for operators to purchase services from another unit, or a cluster of units.

ENTSO-E argues that not everything is tradable irrespective of the point of connection, e.g. reactive power injections. In addition a distinction is made between what is possible based on the operation conditions and what the unit is technically capable of.

EPIA notes that reserve arrangements are nowadays already market based.

ENTSO-E argues that it is a capability, so a contract for the lifetime of the plant. It would be unreasonable if closure of one plant, capable of providing certain services, would result in nearby plants having to close as well.

VGB Powertech states that while there is a link between ancillary services and regional specificities, general settings should be harmonized at the synchronous area level. ENTSO-E states that the code already mentions that TSOs are to coordinate.

IFIEC notes that the more units offer a service, the lower the market price is likely to be. In the context of type classification, it is considered appropriate to differentiate between the definitions of the four types between existing and new units.

## **8. Clarity in definitions and legal obligations**

- Presentation Eurelectric DSO

No specific questions

### **9. Operational notification process & compliance testing/monitoring**

- Presentation Eurelectric DSO
- Presentation EUR

EUROMOT asks for Eurelectric DSOs view on how FRT compliance testing is to be performed for type B units if compliance simulations are only considered as an additional tool. EUROMOT refers to German practices for MV FRT tests where simulations would be feasible as well. The question is put aside for the following topic on FRT.

ENTSO-E states that a streamlining of the Operational Notification process is already being considered for small units. The opinion of the participants is requested on the topic of self-certification.

Eurelectric DSO has the viewpoint that a DSO can self-certify that laboratories are accredited to perform required tests. What happens to all units if a single unit which was self-certified incurs a fault? Eurelectric DSO points out that the present code states that the Relevant Network Operator authorizes the certifier, but considers this should be a third party (see earlier discussion).

EUROMOT notes that to lower costs and administration for mass products, self-certification is an approved concept for safety issues.

EPIA states that a present issue with certification is that several tests exist throughout Europe.

ENTSO-E agrees that it is best if there is one test activity that covers all national parameters. Also not all requirements with which a generator would have to comply will be of cross-border nature. As such the relevance of standards is wider than only for network codes.

ENTSO-E comments that the requirements which leave flexibility have to be understood as boundaries and that a TSO has to provide a proper justification still if extreme values are chosen. In today's situation a justification in a given national process (consultation, NRA approval) is needed as well. EUR comments that from an industrial and risk assessment point of view, there is no option but considering that the extreme values of the ranges will be selected by the TSOs at some point.

ENTSO-E acknowledges that with a European Network Code there may be a period of uncertainty for generators as long as the code is not transposed at national level. To cope with this efficiently ENTSO-E is clarifying the definition of new and existing unit.

### **10. Fault-Ride-Through requirements**

- Presentation and article proposal EWEA

- Presentation EUTurbines

EUTurbines points out a possible ambiguous interpretation of the FRT requirements in the draft code. ENTSO-E notes that a FAQ was made on this topic, specifically to remove this doubt. Eurelectric WG Thermal claims that since the FAQ is not legally binding, the code itself should leave no room for alternative interpretation.

Some participants consider there are parts of the draft NC RfG that are overly specified whereas the FRT section is too little specified. ENTSO-E's position is to leave these decisions on conditions in which a unit is required to be able to meet a given FRT curve, to the national level. If a decision is to be taken at national level in accordance to Art 4(3), the NC cannot give further criteria on how to make these decisions for a specific requirement as the process is based on the national legal framework. Present FRT requirements depend not only on the voltage/time curve, but largely also on the pre-fault power factor at the connection point.

VGB Powertech states that a range of values makes users expect the worst case situation. EUTurbines notes there is always a constraint of physics, e.g. in weak grids there needs to be room for discussion and bilateral agreements. This is still possible by means of a request for derogation or in the national process for decision making.

IFIEC states that for aero-derivative turbines the obligation to resist to a 3-phase fault at 0 V longer as 130-150 msec is impossible with regard to transient stability, even with high level controller and quick-acting gas valves, because of both inertia and staggered re-ignition of the burners. Also the positive sequence voltage is proposed for the FRT requirement as well as a minimal retained voltage higher than 0V and increasing for lower grid voltage, because, on one hand, a "common mode" incident would be at 400kV and the remaining voltage will be significant at a generator output at lower voltage levels and, on the other hand, transient stability critical time increases strongly with remaining voltage. Eurelectric WG Thermal asks why a maximum boundary of the FRT shaded area is needed in this NC as more stringent requirements can always be imposed at national level according to Art. 6 of the NC.

EWEA declares that fast current injection in 3-phase short circuit is very challenging and prescribes behaviours more than capabilities. Eurelectric DSO states that the requirement on fast reactive current injection has no use in MV grids and proposes to shift these from type B to type C. Eurelectric DSO believes reactive power injection has to be defined by each RNO referring to the sustained voltage at the same voltage level.

ENTSO-E notes that some DSOs are explicitly in favor of requiring this capability for type B units.

## **11. Reactive power requirements**

- Presentation EUROMOT
- Presentation EWEA

VGB Powertech states that it also intended to create a proposal on the reactive power capability requirements. It considers the range in the draft code to be oversized, requiring a CBA. EUTurbines notes that there is not always a step-up transformer, giving the risk of oversizing.



EUROMOT proposes separate frequency/voltage ranges and reactive power capabilities to keep the requirements feasible.

ENTSO-E asks if there are comments on the reactive power requirements for the offshore chapter. EWEA proposes no different approach for onshore and offshore concerning present technologies. In addition EWEA proposes to delete connections to HVDC grids from the NC RfG and deal with this topic in the following HVDC connection code.

## **12. Frequency and voltage ranges**

- Presentation VGB Powertech
- Presentation EUR

ENTSO-E states (as explained in the RfG FAQs as well) that the frequency ranges are in line with IEC 60034 so a CBA to justify a significant deviation with present codes and standards is not required. VGB Powertech states that the potential related increase in frequency standard deviation bears the risk of a high additional cost.

EUTurbines states that the impact on generators with frequency deviations depends largely on the duration of these deviations and that it is the TSO's responsibility to bring the system back to a normal operating state.

ENTSO-E argues that a TSO plans the system with regard to secure and stable operation, but this does depend on the capabilities generators can and have to offer.

VGB Powertech raises a concern on the reliability of the OLTC transformer.

ENTSO-E asks for the relation between the reliability of the OLTC transformer and that of the other components of the facility.

## **13. Any other business**

EUROMOT asks whether an intermediate draft is planned to be released before the final code is submitted to ACER end of June 2012. ENTSO-E responds that this is not foreseen.

## **14. Conclusions**

All presentations and minutes of the meeting will be published. The following user group meeting is planned for 2 May.

End of meeting.