# 8th Grid Connection European Stakeholder Committee (GC ESC)

Thursday, 14 December 2017 from 10:00-16:00
Martin's Brussels EU Hotel, Charlemagne 80, Brussels 1000

## Draft Minutes

| Participants | | | |
|---|---|---|---|
| Uros | GABRIJEL | ACER | Chair |
| Jakub | FIJALKOWSKI | ACER/E-control | As of item 8 |
| Elaine | O'CONNELL | European Commission | As of item 4 |
| Michael | WILCH | EDSO for Smart Grids | |
| Ralph | PFEIFFER | ENTSO-E | |
| Ioannis | THEOLOGITIS | ENTSO-E | Via phone |
| Sonya | TWOHIG | ENTSO-E | Items 1-4 |
| Stela | NENOVA | ENTSO-E | Secretariat |
| Alexander | DUSOLT | ENTSO-E | |
| Thanh-Thanh | LE THI | ENTSO-E | |
| Alberto | BRIDI | CEDEC | |
| Marc | MALBRANCKE | CEDEC | |
| Luca | GUENZI | EUTurbines | |
| Klaus | OBERHAUSER | VGB Powertech | |
| Thomas | LESCARRET | EURELECTRIC | |
| Sanni | AUMALA | EURELECTRIC | |
| Sebastien | GRENARD | EURELECTRIC | |
| Thomas | SCHAUPP | CENELEC | Via phone |
| Daniel | FRAILE | WindEurope | |
| Raju Addala | SRINIVASA | EUGINE | |
| Mustafizur | RAHMAN | EUGINE | |
| Michaël | VAN BOSSUYT | IFIEC | |
| Mike | KAY | GEODE | |
| Brittney | BECKER | EASE | |
| Bernhard | SCHOWE-VON DER BRELIE | EFAC | |

## *1. Opening*

### *1.1 Welcoming address and Draft Agenda*

The GC ESC Chair Uros Gabrijel (ACER) welcomes the participants to the 8th GC ESC meeting. After a brief tour de table, the agenda is approved.

### *1.2. Review and approval of minutes from previous meeting*

The minutes of the 7th GC ESC meeting are approved (available here).

### *1.3. Follow-up actions from previous meeting (available here)*

***Action 1*** *of 7th GC ESC minutes: the Chair notes that ACER has not received examples from stakeholders in MSs regarding substantial modifications. The item remains open until feedback is received.*
***Action 2:*** *Following up on the ESC request, ENTSO-E has decided to respond by either reference to the national NC implementation websites when those exist, and an email address of the responsible entity for each MS that can collect questions. This information is available in the ENTSO-E* ***Active Library*** *and it is updated on a regular basis if new information becomes available.*

***Action 3*** *on the ENTSO-E update to the timelines and activities foreseen for the system inertia cross-committee and cross-code is addressed under agenda item 14.*
***Action 4*** *on the EC questions regarding the need to apply the FRT to type A generators is presented under agenda item 4.*
***Action 5:*** *ENTSO-E, with the help of stakeholders, should work further to establish the background of the questions as raised in the CENELEC paper and establish the current relevant baseline with regard to the various technologies of type A for RfG for all types of requirements. As no input from stakeholders has been received on the topic by ENTSO-E, the item remains open. Stakeholders are invited to contribute to establishing the baseline, including information available from different regions, and to provide inputs to the questions raised.*
***Action 6****, ENTSO-E will formulate the questions in the issue logger, upload the questions and subsequent answers and inputs received, is addressed under item 3.*
***Action 7:*** *On the Active Library, ENTSO-E has followed up with EURELECTRIC on aligning the Monitoring Template for non-exhaustive requirements. The updated template as agreed by both ENTSO-E and EURELECTRIC is available in the Active Library, and the information in it is continuously updated (*here*).*
***Action 8:*** *ensuring consistency between the CBA for CNCs and SOGL within the stream of work on the SO codes' implementation, the proposal has been taken by ENTSO-E, considered and also discussed in the EG CBA. The current version of the IGD can be used and there will be further updates. The CBA group's reply is that the final draft of mid-December 2017 can be used for the SOGL consultation purposes. By all means – the official process of internal validation and the public opinion will not be overlooked – and therefore any draft will be shared with a visible disclaimer, which should include the note that IGDs are not binding and are in theory easier to be updated when required. This also implies that even if the final IGD would be available, it can only be used as a valid reference but still subject to changes.*

### *1.4. Review of ToR*

The Chair and GC ESC members agree that there is no need to update the GC ESC ToR.

### *1.5. NC High-Level Implementation Group (NC IMG)*

Sonya Twohig (ENTSO-E) provides an update on the work of the High-Level Implementation and Monitoring Group, chaired by the EC. The ToR of the group have been published and are available on the websites of the EC, ACER and the ENTSOs (here). The group is expected to provide high-level non-binding guidance on the NC implementation and on strategic matters where appropriate and can be used for escalation of specific matters as agreed with the Chair and the members of the relevant ESC. The last meeting of the NC IMG took place on 29 November and the conclusions are available on the EC website and ENTSO-E website here. The main topics discussed include the amendment process including the particular amendment raised in respect of the RfG, the set-up of a data provision agreement between ACER and ENTSO-E, the ENTSO-E Transparency Platform roadmap for improvement, and the ENTSOG functionality platform, ACER's guidance document on amendments, among others. **Further updates from the group can be provided in the GC ESC meeting in March 2018.** The link between stakeholders and the NC IMG will be further ensured through the ESCs.

All information regarding the group's ToRs, objectives, meetings and minutes is available on the websites of the EC, ACER, ENTSO-E, and ENTSOG.

### *2. Connection Network Codes implementation*

Ioannis Theologitis (ENTSO-E) provides a brief overview on the ongoing work of the EGs on HP, CBA and CM (available here).
The HP EG is now in its 2nd phase of work 2 whose focus is on high penetration and for the needs of the content in IGD HPoPEIPS. The challenge for the group is that the engagement varies due to resources or due to lack of alignment of subgroups and it is not so easy to move forward as planned initially. There will be further content assessment and organization of the group to strengthen alignment and engagement of the members of the EG. Group webinars will take place on 15 January and 5 February and a physical meeting in March 2018. **ENTSO-E is working on the High Penetration IGD, an update on the ongoing work will be given at the next ESC.**

Daniel Fraile (WindEurope) notes that the main challenge to keep members involved on HP is the speed of the WG convenor puts to the work, and it is difficult for industry to follow-up with such technical topics. Ioannis welcomes the feedback so that WG on HP can be adapted as much as possible to fit everyone both content and organization-wise.

Regarding the EG on CBA, the objective is to finalize the draft IGD for cost-benefit analysis, with a consultation expected for January-February. From ENTSO-E perspective, the work and discussions have been constructive and the work was completed on time. The structure of the new IGD covers the NCs where a CBA is required and distinguishing between different cases (CBAs for class and individual derogations and for retrospective application).

Regarding the EG on CM, ENTSO-E is trying to initiate the group again and to liaise with CENELEC more closely to collaborate on this topic. Next step will include a survey at CNC level how technical requirements will be checked by each TSO/DSO/country once the CNCs apply, and assessment on the need for harmonization on compliance testing and simulation.

Ioannis Theologitis (ENTSO-E) notes the 3rd public workshop on frequency stability parameters took place on 4th October and focused on 4 IGDs, which had not been presented/discussed in previous workshops. More information on the outcomes of the workshop is available on the ENTSO-E website (here). The next steps of the roadmap include a public consultation closing on 21st December (available here). ENTSO-E will review the comments received and will provide replies. The final IGDs on frequency stability parameters will be available by end-January 2018. Afterwards, ENTSO-E will continue to work on updating analysis at SA level to prepare for updates of recommendations for non-exhaustive requirements according to the NC implementation framework.

Michael Wilch (EDSO for Smart Grids) is very interested in getting engaged and commenting on the IGDs, but agrees that a parallel consultation on 8 IGDs for 1 month is a challenge for his organization to align internally members' comments and recommends a longer consultation period if possible.

Thomas Lescarret (EURELECTRIC) thanks ENTSO-E for the efficient work done in the 3 workshops he has attended. He has been pleased with the materials given and with the answers received regarding the ENTSO-E studies linked to non-exhaustive parameters.

ENTSO-E thanks for the proposals and will reconsider future consultation processes especially if several complex consultations are run simultaneously.

***3. Issue Logger tool (Q&A logger tool): follow-up on questions from previous meeting***

Stela Nenova (ENTSO-E) provides an overview on the updates and functionalities of the Q&A logger tool, which currently includes a number of questions raised at previous GC ESC meetings and 3 questions from the SO ESC. As requested at the 7th GC ESC, the tool includes now a guide to help users understand and interpret better the information provided in it, as well as easy search and filtering options. The Q&A logger tool will be used to log and address questions from all three ESCs. Stakeholders are invited to share with ENTSO-E their feedback and any additional suggestions they would find useful to have in the tool.

The Chair notes that according to the process for updating the tool, the ESC can look at the open questions at each ESC meeting and review the status of open questions upon a consensus.

It is further noted that signing a disclaimer is necessary for all ESC members who intend to provide contribution to the Q&A logger tool as some of the documents uploaded may contain further data about the authors that may require compliance with data protection rules.

ENTSO-E welcomes any other comments and suggestions on features of the tool can be further improved.

***4. FRT for type A generators: ENTSO-E responses to EC questions***

Ralph Pfeiffer (ENTSO-E) provides a view on the ENTSO-E answers to the 2 questions raised by the EC at the 7th GC ESC meeting to ENTSO-E (available in the Q&A Logger tool and here) with regard to the need for FRT capability of type A generators and mapping on who has or intends to implement and for what purpose. ENTSO-E carried out a survey, which shows that 7 TSOs claim to already have in their current connection rules FRT requirements applicable to power generating modules, which would be of Type A according to the national choice for the RfG A/B-threshold.19 TSOs do not have such requirements. 7 TSOs consider there is an immediate technical need to apply FRT requirements to PGMs while 19 do not see such immediate technical need; 3 of those have the requirement at national level though. Potential benefits of FRT capabilities include high potential of rapid development of type A RES power generation modules in the near future (mainly PV connected at LV), mitigation of risk of disconnection of huge amounts Type A generation during fault in HV grid, and fostering RES penetration, among others. The coverage varies with the majority considering most Type A generators are considered to be PPMs, a number of respondents also considering equitable performance/behaviour of SPGMs and PPMs, and a few still planning to evaluate the coverage depending on near/future system needs. Regarding the timing of applicability, in most cases, the requirement is intended to be introduced together with the NC RfG implementation, and in a few cases the timing will depend on the evolution of the volume of Type A PGMs. The majority of respondents considers an amendment of NC RfG not necessary for introducing FRT requirements for Type A power generating modules, but one third would consider an amendment helpful to achieve better legal certainty on the matter.

Elaine O'Connell (EC) explains that the EC is looking at RfG and it seems that some of the scope falls outside the RfG. In the future, it can be considered if in regard of stability during faults type A generators have a cross-border impact, but currently an amendment to the code was not considered a priority by the NC IMG. The NRA-approved banding thresholds are in compliance with RfG, and it is key to ensure that NRAs cooperate through ACER. This has been discussed and confirmed at the NC IMG meeting in November 2017. Elaine O'Connell (EC) clarifies further that NRAs can decide banding to be on a slightly different level, the upper limit is defined in RfG but not the lower limit, so it is possible that a generator of certain size falls under type B in one country and under type A in another.

Marc Malbrancke (CEDEC) asks for a confirmation whether instead of introducing a requirement for type A there is an alternative by just lowering type B banding to include more generators in that category.

Mike Kay (GEODE) asks if the TSO can apply FRT requirement to band A generators. The answer seems to be no, but this can be done if the A/B boundary is dropped. Mike Kay said that it was likely, in that case, that GB might end up without band A at all.

Ralph Pfeiffer (ENTSO-E) notes that from a TSO point of a view and from a German implementation perspective, the understanding on that is different: the thresholds are an issue. There are still type A generators remaining even if the thresholds are moved. Regarding national implementation process and understanding of legal framework, Germany has made a national choice and there is confidence that under the current RfG framework FRT requirement for type A generators can be introduced. He points out that the EC's view to apply FRT to small generators by lowering the type A/B threshold shall be considered as an opinion only and not a definite/binding interpretation of RfG, since the EC is not in a position to interpret its own legislation as stated numerously in previous meetings.

Mike Kay (GEODE) notes that uncertainty remains, and agrees with the EC on the interpretation of the law. He learned in GB that FRT requirements for type B in RfG are fine but only deal with voltage profiles but phase-shift associated with transmission fault can be an issue (i.e. still type B to trip even though they are fully compliant with the RfG), and RfG is not addressing those.

The ESC acknowledges the answer provided by ENTSO-E in the Q&A logger tool.

The Chair recalls the question on whether a European standard may impose more stringent requirements than RfG from EC in 2016, 2nd bullet on Art. 7 (available here), and Elaine O'Connell confirms that the EC view is as previously answered. If a European standard imposes a stricter limitation for a certain requirement than what is specified in the Network Code, Member States should not use that European standard to circumvent the EU legislation. There is a hierarchy in legislation and the Network Code is a directly applicable EU Regulation.

The Chair notes that this view can be included in the overall answer from ENTSO-E, as well as Elaine's explanation that banding is key and standardisation plays a role in providing European harmonization.

Thomas Lescarret (EURELECTRIC) informs the ESC that CENELEC wonders if they should include FRT capability for type A and type B; voting on the standards is expected in March 2018, and several questions are linked.

Michael Wilch (EDSO for Smart Grids) notes DSOs acknowledge it is not a straightforward solution to lower the type A/B threshold – if many requirements are introduced for small generators, which would be of type A otherwise, it might not be efficient from a system perspective, and this may be a problem from a DSO perspective.

Ralph Pfeiffer (ENTSO-E) notes the TSOs had the same discussion and whether lowering the threshold is a proper way, considering that it brings lots of additional requirements to small generators.

The Chair notes that NRAs have been discussing various options, and they are aware of them.

### ***5. RfG - Establishing the current relevant baseline with regard to the various technologies of type A for RfG for all types of requirements***

As a follow-up of the 7th GC ESC meeting where the issue was raised, ENTSO-E is expecting to receive stakeholder views on this topic but has not received contributions yet.
**The Chair notes the point will remain open for the next GC ESC meeting – stakeholders are encouraged to provide feedback to ENTSO-E.**

### ***6. Frequency Stability Parameters – update on public consultation from ENTSO-E***

The ENTSO-E update on the public consultation has been provided under item 2.

Luca Guenzi (EUTurbines) reiterates his support to the various initiatives and the work of the EGs where EUTurbines actively participates and contributes, and appreciates the work done by ENTSO-E throughout the year (slides available **here**). He recommends a few improvements that could be beneficial regarding the future processes and related workshops, mainly: the establishment of the EGs is endorsed because of the brainstorming discussions with stakeholders and sharing the editing of the IGD text; references to technology-specific information provided by ENTSO-E should be shared and discussed in advance with relevant technology associations. It would be beneficial for stakeholders if they could see a follow-up of the meetings (ex. a summary of the inputs given and the Q&As which were discussed).

***7. Do we need an update of the network code on Requirements for grid connection of generators? VGB & Eurelectric presentation***

Klaus Oberhauser (VGB) explains that some inconsistencies and uncertainties have been identified between RfG and SOGL in several areas, mainly the classification of PGMs, measurements precisions, max. voltage on 400kV networks, and battery storage (slides available here). **Regarding the classification of PGMs**, the problem is that if a small PGM falls under type D suddenly, then it is treated under SOGL under the same classification. This reasoning may fit well to big nuclear power plants but if it has to apply to a small PV module at an industrial site, connected at/above 110kV this module needs to be classified as type D, nobody would be able to install RES and cogeneration modules in industrial sites. A solution is needed.

**Regarding measurement precision of frequency and frequency response insensitivity**, there seems to be a conflict between the requirements for insensitivity and dead band as defined in NC RfG Art. 14 (table 4), which are defined at European level as non-exhaustive requirements, and between the SOGL Art. 154, which requires a frequency response insensitivity of a specific value for CE (10mHz), leaving no room for national specifications even though the RfG requirement is non-exhaustive.

**Regarding requirements for max voltage in 400kV grids**, there appears to be a discrepancy between the requirements in RfG Art. 1 and values in table 6.2. and SOGL Art. 27 and Annex II, table 2 with regard to limits for the voltage of equipment to withstand in a normal state of the 400 kV grids. A potential solution proposed by VGB and EURELECTRIC could be to modify the time duration in the NC RfG Table 6.2 in the lines 1.05 pu-1.10 pu to "As specified by the TSO according to the characteristics of the connecting grid."

Thomas Lescarret (EURELECTRIC) explains that **battery storage devices** are currently not subject to RfG but as new technologies come along, battery storage can provide useful services to the networks in the future. However, SOGL is based on the classification of NC RfG and he wonders whether SOGL provisions can be applied to battery storage even though they are excluded from the RfG. In addition, he notes that it might be useful to consider the development of common requirements for batteries at European level.

With regard to **pumped storage devices**, the main question is that according to RfG Art. 14.3, the same FRT requirement applies to both operating modes of pumped storage devices (generating and pumping). However, due to the hydraulic phenomena in the penstock, it is technically justified to allow different characteristics for the two types of mode depending on the grid situation.

Thomas Lescarret (EURELECTRIC) notes that the CENELEC proposal to complement RfG provisions by standards can be technically justified for smaller PGMs to ensure a level-playing field across Europe, but should not lead to a similar standardisation with unique values for larger PGMs. Eurelectric and VGB propose the creation of an ad-hoc group under the ESC to discuss the issues raised among all stakeholders and to propose solutions.

The Chair concludes that joint topics between SOGL and CNCs have to be tackled together. Some of the aspects raised were already tackled in the development of SOGL. In addition, CENELEC's work does not appear so transparent to the ESC and to ACER. ACER has not seen the proposals made by CENELEC, only the questions which were raised in the ESC. Regarding the idea to create an ad-hoc group on those topics, the Chair notes that the issues pertain to the wider stakeholder interest in the scope of both the SO and the CG ESC, and there is no added value of an ad-hoc approach as the topics will be brought back to the ESC in any case.

Marc Malbrancke (CEDEC) explains that regarding the classification of PGMs (problem of type D in industrial sites), in BE the derogation process will probably be used and some derogations could be expected as this appears to be the only solution at the moment, unless the proposal is to go for a type D small photovoltaic systems. This can of course only be solved properly through the process of NC amendments at a later stage.

Michaël Van Bossuyt (IFIEC) does not welcome the idea to resolve issues by derogations, as a derogation would be granted only temporarily. If a PGM cannot fulfil a requirement today due to insuperable technical restrictions, they will possibly not do this in the future either, and one would depend on the TSO to ask for a derogation or do a CBA to ask for a derogation and approval. This does not seem like a good solution and is not the preferred option for industrial sites. An update is needed on that. A derogation should only be an exception while it seems to be becoming the standard for certain issues. The problem is that it neither gives a real solution, nor certainty and visibility for investors.

Klaus Oberhauser (VGB) notes that a European solution on this is needed, not just a Belgian one. The options are either to handle this as a derogation to be valid all over Europe or in another way.

Michaël Van Bossuyt (IFIEC) clarifies that one can ask the TSO to apply for a class derogation to the NRA. It is up to the TSO to decide on a time limit. An NRA might not accept a derogation and this links further with the ER/SOGL and may mean a change in the classification.

The Chair clarifies that Art. 63 allows to include a CDSO and the derogation could also be a DSO action.

Michaël Van Bossuyt (IFIEC) reminds that if a class derogation is for an entire control area, then the TSO is the one requesting it. The main problem is with photovoltaic systems in industrial sites which are not in CDSO grids. In this case only a TSO can apply for a class derogation. According to the Belgian document, it says that the derogation is for a limited period of time.

Ralph Pfeiffer (ENTSO-E) explains that regarding classification, in case of an assumed clash between SOGL and CNCs, one has to look at the intention and the objectives of the codes, which can help eliminate such clashes: the CNCs are for connection capabilities while SOGL is for operational settings. Operational settings often define specific values within ranges, while CNCs require that technical capabilities shall make ranges feasible. In the long term, it may be necessary to change operational settings but one still needs the technical capabilities to apply a new setting. Ralph Pfeiffer (ENTSO-E) explains that regarding standards, the same logic would be applicable. He agrees that more transparency would be helpful on the substance on standards for connection from CENELEC's side. He understands the derogation can also be without specific time limits.

The Chair notes that the NC says that the NRA shall specify the duration of the derogation, but there is no reference for a specific time and does not exclude derogations unlimited in time. **The ESC agrees with the Chair proposal that items identified as cross-codes need to be discussed jointly with SO ESC, and a common approach to addressing these issues is needed. The 4 questions as raised by VGB and Eurelectric will be considered as cross-codes issues for SO and GC and will be discussed jointly with the GC ESC and SO ESC in a session at the next meeting (the classification of PGMs, measurements precisions, max. voltage on 400kV networks, and battery storage). Also, Eurelectric can invite informally the ESCs members for brainstorming on these issues. Other such topics can be added as well to this brainstorming workshop if suitable.**

The Chair reminds that based on the ToRs, once such cross-codes issues are identified, the ACER chairs ensure consistency of the discussions across the ESCs (including MESC where relevant). If more such items are identified, they should be shared with all stakeholders in time and soon enough so that other stakeholders can prepare to discuss them.

The Chair further reminds that Article 7 of Regulation 714/2009 refers to the amendment (AM) process formally including ACER's role and ACER's guideline on the AM process (available here).

Elaine O'Connell (EC) explains that in the current legislation for the AMs, it depends on how significant the amendment is. It can be done relatively quickly, if it is a minor change. However, depending on whether the amendment is substantive, the EC should first do an impact assessment, which takes time. This doesn't change who can propose AMs on the NCs. The CEP is discussing on how the AMs can be done - through delegated or implementing acts. Currently, as described by the Chair, if a substantial change is required, it has an impact, but the EC needs to have a view on that and then see the time it takes for the AM. An AM can be initiated through this ESC, but then it needs to go through the official EC processes. Article 7 of Regulation 714/2009 describes the long way through ACER, i.e. a formal amendment of stakeholders is first proposed to ACER, ACER then consults publicly and provides justification, etc. However, there is also a faster process where the EC initiates an AM process based on its own assessment. The Chair commented that what would be useful to address in the joint session on the issues raised above is whether it can be deemed that the potential changes are urgent or if only small tweaks could resolve the issues without the need for a quick/significant AM.

Mike Kay (GEODE) notes that storage is generation in terms of the effects on the network and from the perspective of the connection codes, which are technical documents, we should be very wary of treating storage differently from generation. He was worried that we should respect the physics and make commercial exceptions very cautiously if they are not to lead to unintended future consequences.

**The Chair concludes that some of the topics raised in the slides which are not joint for GC and SO can be discussed and addressed in March.** Regarding the question on battery storage and if common requirements are needed for those mature technologies, there needs to be a solid understanding of the current penetration of those technologies. **The Chair invites stakeholders to share in advance their knowledge on how mature the battery storage technology is, what the current and planned penetration rate is, etc.** ESCs will discuss at the next joint meeting if common requirements are needed now and what would be the best vehicle for introducing any requirements.

Elaine O'Connell (EC) explains that some EU level legislation on batteries is also under discussion in the framework of the CEP and the NCs. The recast of the Electricity Directive proposes a definition of energy storage. The developments on that have to be followed as there can be an EP/Council position regarding the scope for new NCs to be developed in the future.

**The Chair notes that on pumped storage devices, supporting documents from the development of the code should be taken into account. CENELEC is encouraged to be more transparent regarding the scope of the standards, also to facilitate discussions on the details.**

Michael Wilch (EDSO for Smart Grids) agrees to this approach, but notes that one should be restrictive when applying European regulation on generation technologies, as it has to be ensured that there is a cross-border effect before there is a decision to amend the RfG, if at all.

The Chair reminds that this is the reason for asking stakeholders to provide further information on the baseline of technologies. He recalls that national grid codes apply currently to battery storage technologies. However, ACER does not have access to standardisation working bodies, and is not involved in drafting of standards.

### *8. Differentiated requirements within same category A, B, C and D*

Sebastien Grenard (Eurelectric) presents the questions of DSOs regarding discussions in some MS on the differentiating requirements in the same category (slides available here). He explains that generators must be divided in different categories A, B, C and D according to RfG Art. 5. The question is whether requirements set by TSO or RSO should be the same for generators within a specific category e.g. Type B, and whether the TSOs are allowed to specify different values for synchronous machines and power park modules, or different values based on power thresholds? The open issue relates mostly to subgroups on power range.

The Chair reminds the question regarding different requirements for synchronous generators and PPMs was partially discussed in the ESC in September 2017 and has been also addressed by the EC in September 2016.

Elaine O'Connell (EC) explains that from a practical point of view, it is difficult if there is banding at national level, that within that there are also different bands.

The Chair reminds that national implementation will diversify the banding in Europe. In ENTSO-E's template file it can be seen that proposals vary between neighbouring countries. Any additional modalities would not help to harmonise the bandings.

Ralph Pfeiffer (ENTSO-E) explains that if one looks at the structure of the code, the intention during the drafting was 4 categories, not 6 – with regard to same or different parameters for requirements, there can be requirements that apply in general and some that apply specifically for synchronous generators and PPMs. If there is a wish to have different requirements, there are possibilities in special sections only for certain requirements.

Michael Wilch (EDSO for Smart Grids) acknowledges the intention behind the code and the number of categories, but he is not sure if it is allowed to define subcategories on a national level, which is a question that comes up on several occasions (for example, looking at reactive power capability needs).

### *9. Commission feedback*

Elaine O'Connell (EC) provides an update on the status of NCs and GLs: SOGL (2017/1485) entered into force on 14 September 2017, the EBGL (Com Reg 2017/2195) and the Emergency & Restoration (E&R) NC (Com Reg 2017/2196) were respectively adopted and published in the OJEU on 23rd and 24th November and are expected to enter into force on 18th December.

***10. Standardisation progress – updates***

Thomas Schaupp (CENELEC) responds to earlier questions from the discussion regarding standard prEN50549: the standard is written like a grid connection standard, and anything concerning the actual connection to the grid is not under CENELEC. The intention is to define the functionalities, performance can be configured as needed, and default settings are proposed, but final choices may differ. Regarding the question on transparency of CENELEC's work towards the ESC, Thomas Schaupp (CENELEC) regrets to hear about this perception as he has not been aware of the concern but welcomes suggestions on how to address this. Regarding electric energy storage, Thomas clarifies that this is included in the scope, as long as the device is discharging/feeding into the grid. If it is not in discharging mode, there is no strong requirement but just a recommendation to keep the same behaviour as generation.

Thomas Schaupp (CENELEC) provides an update on the status of development of standards prEN50549-1&2 and the timelines for finalizing the documents (slides available **here**). Some delays are expected compared to the original timelines due to an extended period by 2 months for addressing comments and implementation matters. The estimated time for publication is in July 2018. CENELEC's TC8X WG 3 needs further clarification on one question which is still open, i.e. whether a European standard may impose more stringent requirements than imposed by NC RfG and whether MS may use such a standard. On FRT, standard prEN 50549 is drafted by CENELEC to include requirements for FRT for type B and a recommendation for FRT for type A but not a requirement (only if technically feasible). CENELEC considers that prEN50549-1&2 are in line with RfG and MS can choose to use them as part of the national implementation of RfG. Once published, the standards should be seen as technical standards according to Recital 27 of RfG.

Regarding transparency, the Chair notes the request of the ESC is to receive if possible the draft standards from CENELEC so those can be publicly shared in the ESC platform. However, if that is not possible, all ESC members, including the Chair, and NRAs, are interested in learning about the scope of the standards and obtaining the draft documents.

Thomas Schaupp (CENELEC) notes he needs internal verification with CENELEC before he could share the documents but will keep the ESC informed. The standards can be normally procured at the National standardisation bodies across Europe. They went through consultation earlier in 2017. For the next ESC, he offers to prepare a brief overview on the content of standards and related RfG articles.

**The Chair welcomes this proposal, but encourages CENELEC to provide such an overview as soon as possible before the next ESC meeting and to share this with ESC members. National implementation processes are ongoing, and in case CENELEC would like national regulators to discuss those topics, the information would need to be shared as soon as possible. The EC is interested as well to understand better what is behind the questions raised by CENELEC.**

Michael Wilch (EDSO for Smart Grids) asks if CENELEC could provide a brief overview on which kind of generation the standards apply to more specifically and to which connection level, as there are 2 documents, on LV and MV and same scope as published in 50549-1&2, so he assumes that these documents are relevant for type A and B modules.

Thomas Schaupp (CENELEC) further explains that CENELEC took into account all requirements for type A, B generation plants, and does not go into details of grid connection but defines functions. There are functions for the frequency operating range, reactive power capabilities and a way how to control them, FRT requirements including min ROCOF, interface protection (out of RfG scope but important for DSOs), starting/reconnecting to the grid after idle time, after fault as also defined and relevant for RfG, so there is the complete scope of all requirements in RfG for type A, B and all which is needed for operating the system safely.

The Chair reaffirms that the request for further information on the standards still stands: it would be of interest to know how those functions are described, exhaustive or open to implementation, if there are defined ranges to choose values from, etc.

Thomas Schaupp (CENELEC) explains that RfG lacks details for implementation of non-exhaustive requirements, which are needed by manufacturers for the design of their product. CENELEC does not define a threshold frequency as such but defines what influence it has, how to calculate actual power, or whether there is max power limitation. Standards should provide details without limiting the configurability, define a parameter and what it does, a default value for the parameter, and require that this parameter is configurable so that a value can be chosen in a given country.

***11. ACER RfG Implementation monitoring report***

The first implementation monitoring report on RfG has been published by ACER (available here).

The Chair presents the conclusions and recommendations of the report, with a focus on first RfG provisions which were due to be implemented by mid-2017 (non-binding guidance on implementation (Art. 58), list of relevant information for implementation monitoring (Art. 59.2), criteria for granting derogations (Art. 61(1)), and transitional arrangements for emerging technologies (Title VI). ACER finds that on the first two requirements (Art. 58 and 59.2), ENTSO-E and ACER have complied with in due time. Regarding art. 61(1), only 11 NRAs have complied with the requirement on time, 7 faced delays and 4 did not report their status. Concerning compliance with Title VI, 5 NRAs did not submit feedback and ACER interprets this as if they have failed to comply with the requirements.

The ACER report recommends that NRAs coordinate better with each other any withdrawal of classification as emerging technology (ET) pursuant to art. 70 of RfG using the framework of the Agency. As the report further finds, the lack of NRA empowerment for the approval/withdrawal of classification as ET influences the efficiency of coordination at SA level. ACER recommends that MSs consider empowering NRAs for the withdrawal of classification as ET to avoid misalignments and incoherence in the implementation of the RfG, and to ensure that all relevant information is taken into account when deciding on potential withdrawal of such classification. In Q2/3 2018, ACER will issue a similar report following on the provisions regarding DCC and HVDC implementation. Also, the Agency is working on establishing a consolidated register of NRAs' derogation decisions which will be published on the ACER website.

On the implementation monitoring of the non-exhaustive requirements, ACER will be looking at this aspect in 2018. Among other sources, ENTSO-E's Active Library, ongoing work in the GC ESC, the standardisation process and ENTSO-E's report will be used in this activity.

***12. Feedback on ENTSO-E consultation process***

On behalf of the DSO associations, Sanni Aumala (EURELECTRIC) provides some observations and recent experience with regard to some ENTSO-E stakeholder consultations and workshops, and would welcome improvements of the ENTSO-E consultation process (slides available here). Some challenges encountered by stakeholders include a limited forward visibility on upcoming consultations, very short/insufficient consultation timeframes and notification periods. Stakeholders would appreciate if the consultation hub showed the upcoming consultations in addition to the past and ongoing ones, and encourage ENTSO-E to strive for longer consultation periods than 1 month where possible, especially when a number of complex consultations run in parallel. This would provide better visibility forward on upcoming consultations as well as more advanced notice on the opening of the consultations. The KORRR experience has been challenging for the DSOs with regard to legal and cross-document consistency questions.

Ralph Pfeiffer (ENTSO-E) welcomes feedback and explains that regarding the duration of consultations, it will depend on the specific framework and legal limitations for submission of each document. ENTSO-E will work on improving processes regarding the structure of information and announcements. The objective of the frequency parameters' workshop has been to present to stakeholders the ENTSO-E thinking in progress on the topic, and it has been part of the roadmap and the overall approach as presented and agreed at the ESC.

Daniel Fraile (WindEurope) supports the comments of Eurelectric and shares his concerns that given a short consultation period of 4 weeks, the challenge is that stakeholders do not have a preliminary view on the content of the documents to anticipate better the issues which are being consulted upon. Smaller associations have limited capabilities to provide quality input in case more consultations are running simultaneously in a very short period of time.

Luca Guenzi (EUTurbines) explains that sharing the draft content of the consultation documents in advance would be highly appreciated by stakeholders as it would help them prepare adequately and allow them provide quality input.

Michaël Van Bossuyt (IFIEC) shares his experience from the MESC, where it has been challenging to provide constructive input if the content is not shared in advance. Based on experience with other consultation processes, he would recommend a workshop and a draft document be shared with stakeholders before a public consultation has been launched to allow for enough time for discussions and alignment of opposing views, also within the respective stakeholder associations.

ENTSO-E thanks for the feedback and proposals provided by stakeholders and welcomes any additional suggestions for further improvements. ENTSO-E plans to update its stakeholder consultation process and the document as part of a new proactive stakeholder approach in early 2018 and will take the feedback already gathered into this update. Stakeholders will be notified on how they can contribute further to this process in January 2018.

**The chair invites ENTSO-E to discuss in March how the lessons learned have been included in the revisions of ENTSO-E's deliverables and in its forward stakeholder engagement approach.**

***13. Next meeting dates***

| GC ESC | SO ESC | MESC |
|---|---|---|
| 8 March, ENTSO-E | 7 March, ENTSO-E | 6 March, Eurelectric tbc Brussels |
| 4 June, ACER | 5 June, ACER | 8 June, CEER, Brussels |
| 14 September, ACER | 13 September, ACER | 4th September, ENTSO-E, Brussels |
| 13 December, ENTSO-E | 14 December, ENTSO-E | 5th December, CEER, Brussels |

***14. System Inertia Roadmap – joint GC-SO ESC topic***

Ralph presents ENTSO-E's holistic approach across the codes to the topic of system inertia and related issues on stability (slides available here).

System inertia is an essential feature for frequency stability and has an increasingly important impact on system stability in the context of increasing displacement of synchronous PGMs by power generating units connected through power electronics. It will require accordingly different user design to meet the challenge of emulating the transient behaviour of those synchronous PGMs leaving the system. Depending on the size/characteristics of a synchronous area, frequency stability becomes a major concern under "normal" operating conditions considering single contingencies (e.g. IE or GB) or in case of larger system disturbances (e.g. CE) already nowadays with an increasing tendency.

**Within the context of the CNCs**, requirements will be defined to ensure that system users are equipped with technical capabilities to ensure adequate performance under normal and disturbed operating conditions to contribute to maintain and restore system security (such as synthetic inertia of power park modules in RfG, very fast active power control through demand response in DCC, and synthetic inertia of HVDC systems). A series of Implementation Guidance documents (IGDs) have been developed to guide the national decision-making and its preparation. Future studies will inform those detailed technical specifications and analyse improvements on system stability, but also to identify possible drawbacks. All CNC requirements related to synthetic inertia/very fast active power response are non-mandatory at European level and can be made mandatory at national level, if required by the relevant TSO. Moreover, they are non-exhaustive requirements, which introduce the capability as such, but would need further specifications at national level.

**From a system design perspective**, the TYNDP scenarios per synchronous area and per MS provide a basis for further long-term analysis on the development of system inertia but they do not identify tipping points and reference incidents at this stage.

**From a system operation perspective**, ENTSO-E will perform inertia studies as per the SOGL to serve as an indicator of the overall system stability development (relevant parts of Art. 38-42, Art. 127, Art. 141 and Art. 153). Each TSO performs an annual dynamic stability assessment (as a minimum condition) while the inertia studies at SA level are anticipated to be completed in June/July 2019 (two years after SOGL EIF). Inertia studies will be reviewed periodically and updated every 2 years. A number of workshops will be carried out in parallel at synchronous and country level as part of the SOGL implementation.

**From a market perspective**, open questions to investigate include the consideration of inertia as an ancillary service and the role of the market procurement of virtual inertia, cross-border trade, technical limitations etc.

ENTSO-E will first work in parallel on studies on long-term system development and performance (SD) and dynamic stability assessments (SO) to help identify tipping points, reference to incidents to maintain stability and security, then define further technical capabilities of system users and afterwards, define ancillary services and appropriate market products for delivering inertia.

Regarding next steps, there is a TSO DSA (dynamic stability assessment) workshop in February 2018 following an earlier internal TSO workshop in November 2017. A public workshop will be organized in May 2018 about the studies on inertia, where stakeholders can provide further comments and feedback on the topic, to be subsequently followed by regular stability and inertia analysis**.**

Daniel Fraile (WindEurope) comments regarding the background on the need for more inertia, there is more RES but also other elements have an impact on the system (more HVDC, larger nuclear installations, etc.). He notes that IGDs should help with national implementation of RfG but it is not clear if the recommendation on synthetic inertia should be taken now or for the future work. He would recommend more clarity on whether this applies to the current IGD and RfG or for later implementation.

Ralph Pfeiffer (ENTSO-E) clarifies that ENTSO-E considers inertia in all scenarios. The challenge is to manage both situations with high penetration of RES generation and the opposite with many synchronous generators running on the system. The upcoming TYNDP 2018 is putting more emphasis on inertia to better highlight the challenges. He notes that synthetic inertia can still be requested in the future (initial RfG implementation is for May 2018), and be introduced at any point of time without amendments needed.

Luca Guenzi (EUTurbines) wonders if there is anything on frequency containment in the studies to avoid frequency overshooting indicated in the presentation as "mitigation measures" related to inertia. Ralph Pfeiffer (ENTSO-E) clarifies that countermeasures are included as the objective is to keep frequency stable.

Michael Wilch (EDSO for Smart Grids) notes regarding system performance and dynamics, for TYNDP there are a lot of consultations on the scenarios, but this is not the case for system stability studies. More public awareness regarding this aspect as well as a public discussion on the scenarios and assumptions considered for the system stability analysis could be beneficial, given the context of large generation-load imbalance after a system split half-way through as in the past (event on 4 November 2006). He wonders if it can be assumed that something like that will not happen again. It can be to the advantage of ENTSO-E to have a public consultation on that aspect and stakeholders would like to be able to provide feedback. At the previous workshop there was no discussion on the scenarios but it can be debated whether it is relevant (certain probabilities and if relevant for designing the system).

Ralph Pfeiffer (ENTSO-E) comments that regarding CE, in the workshop in March 2017 on frequency stability, there were discussions on the studies and on how to mitigate such disturbances and the probability of such events happening again (like the 4 November 2006 example, such events would happen as a result of an unfortunate combination of several elements). ENTSO-E will consider these points internally from a transversal perspective. He considers system splits rather a no-regret event of low probability and high consequences.

Jakub Fijalkowski (ACER) notes that regarding Art. 38 and 39 of the SOGL, the methodology would be approved by NRAs, but first inertia needs should be determined, then, if needed, a methodology for new inertia to be approved by NRAs, considering different options to address missing inertia. Issues related to TYNDP and system operation can be combined to reduce complexity. If inertia is a product, it might come together with incentives or mandatory requirements. Discussions with NRAs on this topic are welcome. He notes that stakeholder input is very important on the assumptions of scenarios, and stakeholders can help figure out if inertia is needed and how the methodology will be defined. Some benchmarking can be then allowed for NRAs and presented at workshops. On Art. 39 of the SOGL, he recommends that the study which has to be delivered for 2019 is taken as a cornerstone and other things to be structured around that, including a consultation on this, while also ensuring alignment with TYNDP and relevant inputs.

The Chair notes that studies on long-term system development should include system control and operation developments. ENTSO-E should allow for stakeholder contributions to ensure that all aspects are covered.

Daniel Fraile (WindEurope) notes that regarding the market aspects, he shares the view of NRAs and a more detailed discussion on this would be beneficial as this will have a big impact on consumers. There have been some first discussions on this in Berlin in October 2017 with the TSOs and the wind industry, so he would like to challenge the same issue regarding the underlying conditions and how probable those are. He is not convinced the current system studies reflect the real system behaviour so he welcomes more work on this before the requirements are defined.

**The Chair encourages ENTSO-E to take these comments into account for the inertia roadmap and upcoming follow-up actions on it and into its cross-committee considerations as well as to provide opportunities for stakeholders to contribute to the various studies.**

***15. Follow-up actions:***

1. Follow-up action 1 from 7th GC ESC: Stakeholders are invited to submit to ACER examples discussed in MSs regarding substantial modifications. The item remains open until further feedback is received.

2. Follow-up action 5 from 7th GC ESC: ENTSO-E, with the help of stakeholders, should work further to establish the background of the questions as raised in the CENELEC paper and establish the current relevant baseline with regard to the various technologies of type A for RfG for all types of requirements. Stakeholders are invited to contribute to establishing the baseline, including information available from different regions, and to provide inputs to the questions raised. The item remains open until further feedback is received.

3. ENTSO-E will provide an update on the work of the Expert Group on High Penetration at the next GC ESC.

4. The 4 questions as raised by VGB and Eurelectric will be considered as cross-code issues for SO and GC and will be discussed jointly with the GC ESC and SO ESC in a session at the next meeting (the classification of PGMs, measurements precisions, max. voltage on 400kV networks, and battery storage). ESC members are invited to provide any relevant background material or add additional cross-codes topics in good time before the meeting.

5. The topic raised by VGB and EURELECTRIC which only pertain to the GC ESC (the pumped storage devices) can be discussed and addressed at the next meeting in March. Stakeholders are invited to share any relevant information in good time before the meeting.

6. CENELEC should provide an overview on the content of the standards as soon as possible before the next ESC meeting and share this with ESC members (including how the functions are described in the standards, exhaustive or open to implementation, if there are defined bands to choose values from, if mimicking or transposing RfG if non-exhaustive requirements are defined, etc.)

7. ENTSO-E should provide an update in March how the lessons learned have been included in the revision of ENTSO-E's consultation process. As part of this work, ENTSO-E should reconsider future consultation timelines especially if several complex consultations are run simultaneously.

8. ENTSO-E should take into account the comments provided by the ESC for the inertia roadmap regarding the stability scenarios and in its upcoming follow-up actions on these scenarios, and take those into its cross-committee considerations. ENTSO-E should provide opportunities for stakeholders to contribute to the various studies.