

ENTSO-E connection network codes Implementation guidance documents

A EURELECTRIC response paper

August 2016

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We speak for more than 3,500 companies in power generation, distribution, and supply.

We Stand For:

Carbon-neutral electricity by 2050

We have committed to making Europe's electricity cleaner. To deliver, we need to make use of **all low-carbon technologies**: more renewables, but also clean coal and gas, and nuclear. Efficient electric technologies in **transport and buildings**, combined with the development of smart grids and a major push in **energy efficiency** play a key role in reducing fossil fuel consumption and making our electricity more sustainable.

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We support well-functioning, distortion-free **energy and carbon markets as** the best way to produce electricity and reduce emissions cost-efficiently. Integrated EU-wide electricity and gas markets are also crucial to offer our customers the **full benefits of liberalisation**: they ensure the best use of generation resources, improve **security of supply**, allow full EU-wide competition, and increase **customer choice**.

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Europe's energy and climate challenges can only be solved by **European – or even global – policies**, not incoherent national measures. Such policies should complement, not contradict each other: coherent and integrated approaches reduce costs. This will encourage **effective investment to** ensure a sustainable and reliable electricity supply for Europe's businesses and consumers.

EURELECTRIC. Electricity for Europe.

Dépôt légal: D/2016/12.105/44

KEY MESSAGE

- Europe currently has three connection network codes: Requirements of Generators (RfG), Demand Connection Code (DCC) and High Voltage Direct Current (HVDC). RfG already entered into force on 17 May 2016 with the remaining two expected to be enforced end of summer 2016.
- The Member States have the obligation to implement these codes no later than three years after their entry into force. Within this timeframe the Member States have two years to define the national specifications for the so-called **non-exhaustive requirements**.
- In order to support the implementation at national level and also in line with the legal requirements of these network codes ENTSO-E has drafted a set of 18 non-binding implementation guidance documents which have been put forward for consultation. These guidance documents are addressed to the transmission system operators and other system operators concerning the elements of the codes requiring national decisions. They shall explain the technical issues, conditions and interdependencies which need to be considered when complying with the requirements of this Regulation at national level.

Questionnaire

Rate-of-change- of- frequency withstand capability (RoCoF)

Its objective is to give advice on what considerations are appropriate before selecting a national value for RoCoF withstand for generators within scope of RfG. Consider also the relevance of the fully exhaustive withstand values in NC HVDC for both HVDC and for HVDC connected PPMs.

The full IGD can be accessed here https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

4. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

The text is not very helpful in explaining the particular difficulties in specifying and measuring RoCoF. We expected a proposal for a RoCoF value and measuring window with a detailed argumentation or at least a methodology how to come to these parameters. This is a key challenge across Europe and could have usefully been explained.

A guideline on how to measure df/dt (method and eg measurement time window) should be specified in the IGD, or an explanation of how it is expected that consistent measurement methods will emerge. The text should also recognise that a specific single value for all synchronous areas would lead to inefficient investment.

Furthermore, the reference to TS50549 has no value because a TS is not a standard.

It is quite wrong to say that (on page 5) the DSO needs to take care to use the parameters defined by the TSO. Art 13 1(b) of the RfG is very clear that the RSO specifies this. Liaising as appropriate with the TSO.

It is the responsibility of the power generating facility owner to apply the right setting, not the RSO. The RSO has a compliance role, but it is the PGF owner who needs to take care.

General (other) comments

This IGD, in common with the other IGDs provides relevant background information, but does not actually provide any guidance – therefore having guidance in the title is a misnomer, both in the CNCs and in the documents. It does however discharge the letter of what Article 58 3 in the RfG requires.

Making non-mandatory requirements at European level mandatory in a country

Its objective is to give guidance on how to proceed, when deciding if a non-mandatory requirement should be made mandatory in a specific country where the need for this requirement can be demonstrated.

The full IGD can be accessed here https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

5. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process? NO

Does the content of the IGD cover the technical issues of this topic appropriately? NO

Comments on the technical information within this IGD

This IGD is unnecessary and confers some inappropriate status on non-mandatory requirements compared to other requirements. The CNC are minimum requirements, and it is recognised that member states may need to provide more detailed guidance to achieve safe and reliable operation – i.e. Article 21 of Regulation (EC) 714/2009.

In any case, each and every requirement that is over and above the provisions of the CNC must have an economic rationale that is or has been tested by the normal economic tests of the NRA.

General (other) comments

A complete list of the non-mandatory requirements (and classified as exhaustive or non-exhaustive requirements) would be useful for all stakeholders.

Cost-benefit analysis

The purpose of this IGD is to collate the main considerations when preparing national processes for implementing CBAs, including the benefit of input from third parties.

The full IGD can be accessed here https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

6. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

The IGD indicates the CBA categorisations. The three items include only cost/benefits for TSOs and power generating modules. However, applying some requirements could also affect Distribution System Operators (costs or benefits). Therefore, they should also be part of the cost/benefits items. Lack of guidance on this seems to be defaulting on what is legally required which is also proposed in the KEMA report recommendation.

General (other) comments

A series of dedicated workshops is needed to define a CBA methodology accepted by all stakeholders.

In general a fixed methodology is preferable, however it has to be possible to differentiate the methodology depending on the expected impact, e.g. to determine whether a 10 kW asynchronous wind turbines should obtain a derogation should not be the same process as for a 300 MW windfarm.

Parameters of non-exhaustive requirements

Its objective is to give a general overview on the non-exhaustive parameters of the NC RfG, DCC and HVDC which will need a national choice and to provide a general guidance on these parameters. Specific guidelines on some technical issues are foreseen in other IGDs (e.g. Voltage issues, Frequency parameters, restoration issues).

The full IGD can be accessed here https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

7. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

This IGD has a useful checklist, however, this IGD summarises general aspects that need to be taken into account when defining non-exhaustive requirements but there is no detail on the method to be used for each parameter. For example this IGD states that the relative amount of RES will impact a number of parameters, but no examples or procedures are proposed to help Member States to define them.

General (other) comments

These tables could be provided to the participants in the Grid Connection ESC. This overview should then indicate the non-exhaustive requirements, the intention (in a first stage) decision (in a second stage) of each Member State.

In particular, for manufacturers, certifiers and Distribution System Operators who are dealing with smaller generators, a public list with the different parameters for each member state would be very helpful. In order to have an efficient certifying process, and thus an efficient grid connection process, a product certificate must cover most Member States, otherwise it would be too expensive to certify the products.

Compliance monitoring

Its objective is to give guidance on the compliance of equipment connected to the system with the technical requirements forming part of the Connection Network Codes and as detailed within these.

The full IGD can be accessed here
https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

8. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

The IGD emphasises the need for equipment certificates for type A, for notification procedure and compliance monitoring. For types B/C/D it is also possible to use equipment certificates in the notification process instead of relevant tests or simulations. The IGD also summarises simulations and tests required for types B/C/D for compliance assessment.

General (other) comments

The IGD mentions equipment certificates, but does not explain what their content is, or how they are elaborated. In addition, it is unclear how equipment certificate could be used considering there are no standards to link them to. Further explanation on this point would be very useful.

Furthermore, explanation on what to do if no certificate is available for Type A generators and DSR units should be included in the IGD.

Reactive power management at transmission/distribution interface

The purpose of this IGD is to collate the main considerations associated with the 3 requirements in NC DCC for reactive power exchange, including changing needs to regulate voltage as embedded RES capacity increases and availability of transmission based capacity reduces.

The full IGD can be accessed here
https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

9. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

The link between the choice made at national level for the thresholds for Types B, C & D power generating modules in the T/D reactive power requirements should be more emphasised. If only types A & B are connected to the distribution network, there will not be many reactive power sources available on the distribution networks apart from investing in reactive power compensation equipment.

Annex 2 of the IGD should be more detailed (assumptions, requirements etc). It gives an example of a cost benefit analysis in Ireland which cannot be taken for granted anywhere else.

General (other) comments

As mentioned in the IGD, the reactive power compensation needs depend on the local situation. It is therefore difficult to justify the same reactive requirements at T/D interface in national power systems. More flexibility should be left on the implementation of these requirements in order to optimise the corresponding investments.

In addition, we disagree with the "system characteristics" section. We propose to express in a better way the issues that should be considered to properly locate reactive compensation equipment:

"The consequences of greater contribution from Renewable Energy Sources (RES) in context of system voltage and availability of reactive power capability has to be considered. ~~With the highest level of RES penetration many synchronous generators will be displaced at the times of high RES production (e.g. windy/sunny). This removes a key source of reactive power. In many countries during such conditions the generation (mainly from RES) is located away from the system/load centres to coastal areas (e.g. large wind) and also embedded (e.g. solar photovoltaic (PV) and smaller wind).~~

Moreover, ~~the development of underground cables in the distribution grid and even the transmission grid and the development of embedded generation in the distribution networks (including closed distribution networks) have an increasing impact on the reactive power flows at the interface between transmission and distribution networks. The above leaves the transmission systems with less reactive resources to:~~

- ~~–Be able to compensate the reactive demand of the DSO networks, and~~*
- ~~–Cope with its own transmission-related reactive demand.~~*

(...)

Furthermore, per unit cost of static reactive compensation equipment (reactors or capacitor banks) is typically increasing with the voltage level at which it is connected. Nonetheless, it should also be noted that the size of the compensation equipment and the voltage level are related; large equipment is designed for HV and VHV levels and vice versa. Therefore, one single 150 MVar capacitor bank at VHV or HV level can be much more cost-effective than a dozen of 10 MVar capacitor banks at MV level because smaller sizes requires more number of breaker, relays and auxiliary components than the higher size banks.

(...)

~~Consequently, ENTSO-E believes that the voltage stability of the system should be supported by all the stakeholders (including the TSOs). This view was generally supported by stakeholders. However, ENTSO-E acknowledged the view that the requirement should be limited to transmission connected users only.~~

~~Some requirements exist already in some countries, for generators and/or for customers and distribution system operators, but they need to be improved and the provision of reactive support spread (and hence harmonized) across Europe in order to cope with the new challenges. In Annex 1, the results of a survey on the currently applied requirements on reactive power exchange on the TSO – DSO / Demand facilities interface are shown for different countries / TSOs.~~

Overall system performance is improved, either technically or economically, if appropriate measures are taken concerning reactive power management for transmission connected distribution networks or demand facilities at the connection point. Reactive power delivered where needed is more cost effective, allowing also for loss reduction, higher active power loading, less need for system reinforcements and lower capital cost of lower voltage installation. Voltage stability is also recognized as an important basis for system security. The Cost Benefit Analyses (CBA) provided in the “Call for Stakeholder Input” and supplemented by additional synchronous areas analysis (see FAQ 22) have shown that from a socio-economic viewpoint the total cost to meet the DSO system need for reactive power is lower if the reactive compensation is undertaken lower down in the system (closer to the demand) than if invested at the higher voltage level. The results of this CBA are shown in Annex 2. However, it should be considered that locating reactors or capacitors banks “closer to the demand” does not imply necessarily to place them in the same voltage level”.

Reactive power requirement for PPMs & HVDC converters at low / zero active power

Its objective is to give guidance on considerations relevant to defining the need for reactive power at low active power operation, including impact of otherwise switching capability on and off whenever an active power is exceeded or gone below, as the power source (e.g. wind) or set-point varies.

The full IGD can be accessed here
https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

10. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

These resources are primarily provided by users i.e. generating units, third party HVDC circuits and demand side response

General (other) comments

What about HVDC circuits owned/operated by TSO?

Post fault active power recovery

Its objective is to give guidance on the purpose of these requirements and on how to proceed when implementing the requirements on post-fault active power recovery for Type B Synchronous Power Generating Modules, Type B Power Park Modules and HVDC systems.

The full IGD can be accessed here
https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

11. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

Whilst providing useful background information the text does not seem to add anything that is not fairly straightforward and obvious from the CNCs.

General (other) comments

This IGD contains real proposals that can be used in Member States as basis for discussions with stakeholders after confirmation of figures by the manufacturers. (In another document ENTSO-E has exaggerated / ignored the real characteristics of wind turbines)

Fault current contribution from PPMs & HVDC converters

Its objective is to give guidance on the purpose of these requirements and on how to design these specific requirements for power park modules or HVDC systems connected to distribution or transmission networks to deliver an adequate reactive current injection during short circuits and after fault clearing when the voltage has not recovered.

The full IGD can be accessed here
https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

12. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

The technical description of this IGD does not describe the possible impact on the distribution network protection system when PPM connected to radially operated distribution networks provide fault currents. Even though it could have a positive impact on the voltage stability on the transmission network, it could also alter the distribution network protection plan.

General (other) comments

This is a new subject for all. ENTSOE has organised a dedicated conference with EWEA in 2013. It is regrettable that not more technical information is drafted in this IGD. Now every Member State has to do the job independently which means a waste of time and efforts.

The RfG code lets the treatment of two phase faults to the Member States. Nothing is drafted in this IGD to help Member States.

Several references made to documents are not readable by external agents. As better way of working (see IGD "reactive power at low / zero active power").

Need for synthetic inertia for frequency regulation

The purpose of this IGD is to define under what system circumstances SI should be considered including considerations of forward needs, what are the alternatives, how could the functional requirements be defined and what is the readiness of technologies.

The full IGD can be accessed here
https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

13. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

The sentence "Limit how deep the frequency can fall after a major disturbance (using largest infeed loss as the criterion)" should be further clarified. What is the impact of this error on the IGD? See also the last sentence in this IGD.

In the list to keep the system inertia H at a high value, ENTSO-E has forgotten the most important item : synchronous compensators.

General (other) comments

A conclusion has to be added: too soon to impose measures in wind turbines.

In the ENTSO-E study "Frequency Stability Evaluation Criteria for the Synchronous Zone of Continental Europe (March 2016)" it is specified that "At least for Continental Europe...system split scenarios have been identified as the most severe ones; compared to tripping of loads, HVDC-links, and generation during interconnected operation."

Frequency related parameters for non-exhaustive requirements

Its objective is to give guidance on considerations on national choices for all frequency related non-exhaustive aspects.

The full IGD can be accessed here
https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

14. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

The frequency parameters have to be harmonised at the level of the synchronous area. We expected a detailed proposal based on real arguments and on experiences. But we did not find such details in the IGD. What is the reason for this text?

Also this IGD contains a table describing all articles of the codes. We propose that ENTSO-E would produce a more general table for all readers of all the NCs.

General (other) comments

The IGD does not contain any proposal for an item really to harmonise at the level of the synchronous area. Will it be defined together with stakeholders, e.g. at the GC ESC? Or will it be defined without involvement of stakeholders?

Instrumentation, simulation models and protection

Its objective is to give guidance on considerations for how to add practical details at national level on these aspects / processes.

The full IGD can be accessed here
https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

15. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

When possible, the IGD should provide the most challenging existing value of the parameter, as a general value.

The RSO should be aware of users' desire to avoid embedded plan having to interface with more than one network operator system. Users prefer single connection covering, grouping and configuration.

General (other) comments

It makes no sense to go for the most challenging and as such the most expensive requirement without any argumentation. At least a sound argumentation and a CBA should be delivered. What should the TSO do with the awareness? What is the added value of this statement?

Voltage-related parameters for non-exhaustive requirements

Its objective is to give guidance on considerations on the non-exhaustive voltage parameters of the NC RfG, DCC and HVDC needed to make the national choices.

The full IGD can be accessed here
https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

16. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

Collaboration TSO - TSO is needed when several TSOs operate in the same country.
If faults are quickly cleared by the protections there should be reactive power to the network.
For systems with low inertia, priority shall be given to reactive power.

General (other) comments

What about Cross Border Collaboration between TSOs in the same synchronous area?
These two statements are in contradiction. Advice on how to handle this is not part of the IGD.

Determination of the thresholds for Types B, C & D power generating modules

The purpose of this IGD is to collate the main considerations in defining lower MW boundaries for the type B, C and D as defined in the NC RfG.

The full IGD can be accessed here
https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

17. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

The IGD summarises the technical differences which will apply between the different types (A/B/C/D) of power generating modules. This helps the national implementation by clearly defining the differences between each type.
However, the IGD does not give any methodologies that could help set up the limits. Methodologies describing the following items could be helpful:
-future frequency capacities requirements,
- the future reactive power requirements,
- the description of the future needs in terms of voltage ride through stabilities and
- the future needs in terms of power injection observability.

General (other) comments

The different power generating types endorse different technical requirements which can be totally different (example for type B: observability and voltage ride through capabilities). Having integrated such different requirements can make the choice of thresholds difficult. For example, a power system could need low threshold for type B to improve power production observability, but voltage ride through capabilities cannot be applied for small power generating modules.

Reactive power control mode

This IGD gives guidance relating to the choice of control mode for reactive power and allowing the selection to reflect the national / local needs. When choosing relevant national parameters, considerations include how to link from steady-state operation to dynamic fast fault current contribution.

The full IGD can be accessed here
https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

18. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

The different possibilities of reactive power control are described in the IGD. However the method to choose between the three options and the choice of control parameters is not described in the document. Regarding the link between RfG and DCC requirements for reactive power, it is important to remember that types on distribution network will determine reactive power sources available of reactive at the interface.

General (other) comments

Harmonisation

Its objective is to give a general overview on further harmonisation via the national implementation process. Reflecting that a system engineering view and associated collaboration is driving this process. Could standards help to create desired further harmonisation?

The full IGD can be accessed here
https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

19. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

The RfG contains an item that is very susceptible for harmonisation: the classification of PGMs. What will happen if a threshold is set by one country at 100 kW and at 1 MW by another country? The IGD does not provide an answer.

General (other) comments

The main issue about harmonisation is not described: what is the hierarchy / relationship between European codes and national requirements? (See GC ESC dated 6/6/2016).

Real time data, communication and redundancy

Its objective is to give a general overview of the different categories of information flows (e.g. DSO-TSO, DSO-DSO, DSO-Generating unit) and its purposes.

The full IGD can be accessed here
https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

20. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

The IGD should make a clear link between the Transmission System Operational Guideline and the ER Network Code.

The application of the requirements on these operational codes will be based on the requirements established in the application of the RfG code in terms of information to be sent to the relevant TSO or the relevant system operator.

General (other) comments

This IGD contains only provisions yet stipulated in the codes.

We support that TSO and DSO shall “Cooperate to find practical effective overall least cost solutions to pass on required information.”

Special issues for Type A generators

Its objective is to give guidance on how to deal with small units largely “off the shelf” with less individual engineering and considerations but that could represent a significant share of the installation present in a country.

The full IGD can be accessed here https://consultations.entsoe.eu/system-development/entso-e-connection-codes-implementation-guidance-d/consult_view

21. For this IGD please give us your comments on:

Do you consider this IGD helpful to reasonably support the national implementation process?

Please select only one item

☐ Yes ☐ No

Does the content of the IGD cover the technical issues of this topic appropriately?

Please select only one item

☐ Yes ☐ No

Comments on the technical information within this IGD

The abbreviation LFSM is not used in the RfG code. This should be harmonised.
There is nothing in this IGD that suggests how the TSO can gain assurance of compliance where Art 13 2(b) is invoked, i.e. how will the overall characteristic be proved from a collection of random behaviours. How will the distribution of tripping frequencies be validated?

General (other) comments

The IGD considers that Cenelec standards fix the worst case values of frequency ranges and RoCoF and that all equipment's will fulfil these requirements even if national values are different. For other frequency parameters, the co-ordination within the synchronous area is emphasised.

EURELECTRIC pursues in all its activities the application of the following sustainable development values:

Economic Development

- ▶ Growth, added-value, efficiency

Environmental Leadership

- ▶ Commitment, innovation, pro-activeness

Social Responsibility

- ▶ Transparency, ethics, accountability



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