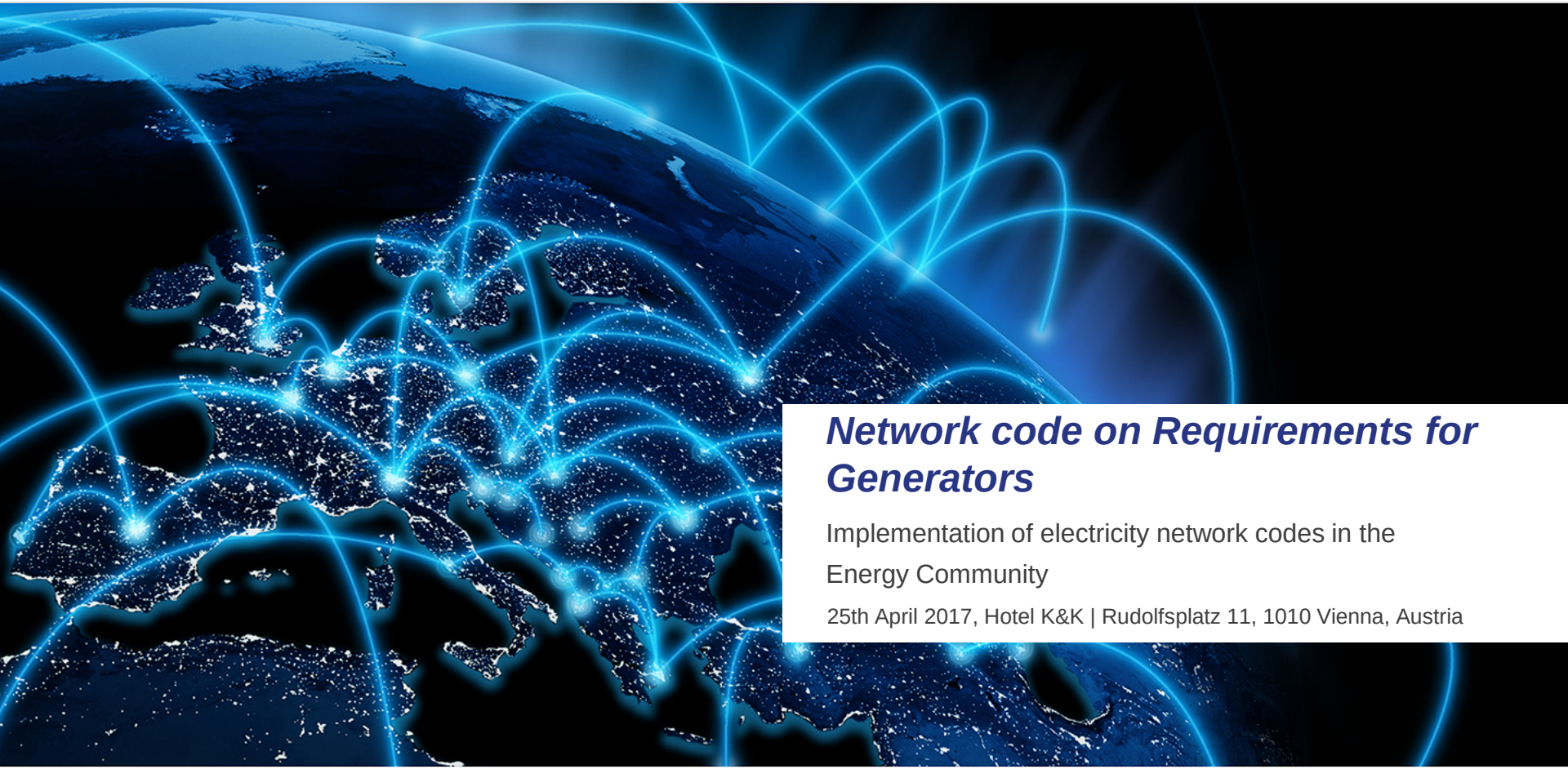


# *Network code on Requirements for Generators*

Implementation of electricity network codes in the Energy Community

25th April 2017, Hotel K&K | Rudolfsplatz 11, 1010 Vienna, Austria

# Proposal

| NC / GL | Standard adaptations | Reciprocity required? | Timeline |
|---|---|---|---|
| RfG | ☑ | ☒ | in one go |
| DC | ☑ | ☒ | in one go |
| HVDC | ☑ | ☒ | in one go |
| CACM | ☑ | ☑ \| ☒ | in one go |

## Two types of requirements

**Requirements of direct application (after being adopted by EnC) / "*exhaustive requirements*":**

- ✓ **An exhaustive requirement** contains all the information within the NC itself including parameters needed to apply the requirement.

**Requirements for national implementation:**

- ✓ **A non-exhaustive requirement** does not contain all the information or parameters necessary to apply the requirement. It needs to be further specified at national level when implementing the Network Code.
  - ✓ Requirements of general application
  - ✓ Site specific requirements
  - ✓ In progress – 2 years to complete – by …

# *Who implements it on a national level*
# *NC RfG Article 7*

- *Requirements of general application (RfG, Article 7 (1))*

  ***Requirements of general application*** *to be established by relevant system operators or TSOs under this Regulation* ***shall be subject to approval by the entity designated*** *by the Contracting Party and be published. The* ***designated entity shall be the regulatory authority unless otherwise provided*** *by the Contracting Party .*

- *Site-specific requirements (RfG, Article 7 (2))*

  ***For site specific requirements*** *to be established by relevant system operators or TSOs under this Regulation,* ***Contracting Party may require approval by a designated entity****.*

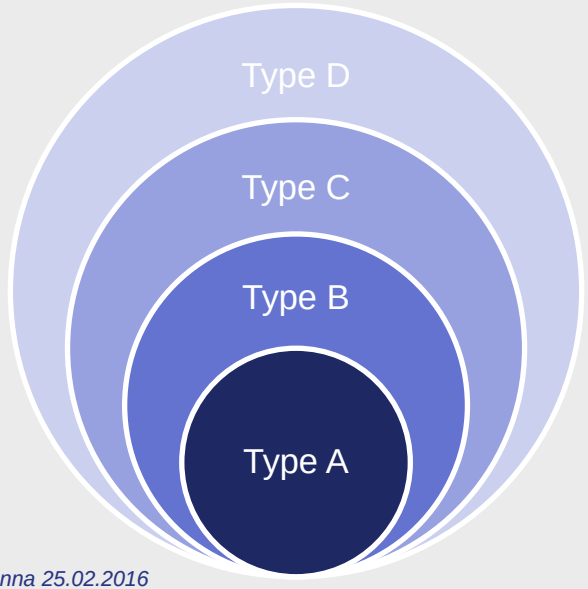
# *Significance … per requirement*

- Generator capabilities are defined from a system performance perspective and are therefore largely independent from technology
- Need to be sustainable to cope with evolutions in generation mix
- Significance is regarded per requirement

Wide-scale network operation and stability including European-wide balancing services

Stable and controllable dynamic response capabilities covering all operational network states

Automated dynamic response and resilience to operational events including system operator control




*Source: "**Objectives, key technical requirements and the way towards implementation - Dr. Ralph Pfeiffer**", ENTSO/E, Vienna 25.02.2016*

# Categories of power generating modules

| Synchronous area | Lower threshold for Type A | Maximum lower threshold for Type B | Maximum lower threshold for Type C | Maximum lower threshold for Type D |
|---|---|---|---|---|
| Continental Europe | 0.8 kW | 1 MW | 50 MW | 75 MW |
| Nordic | 0.8 kW | 1.5 MW | 10 MW | 30 MW |
| Great Britain | 0.8 kW | 1 MW | 50 MW | 75 MW |
| Ireland and NI | 0.8 kW | 0.1 MW | 5 MW | 10 MW |
| Baltic | 0.8 kW | 0.5 MW | 10 MW | 15 MW |
| | and | and | and | or |
| Voltage level | < 110 kV | < 110 kV | < 110 kV | ≥ 110 kV |

*Source: "**Objectives, key technical requirements and the way towards implementation - Dr. Ralph Pfeiffer**", ENTSO/E, Vienna 25.02.2016*

# *Title II - Key technical requirements (NC RfG)*

- ✓ Frequency Ranges (Type A-D)
- ✓ Limited Frequency Sensitivity Mode – Overfrequency (Type A-D)
- ✓ Limited Frequency Sensitivity Mode – Underfrequency (Type C-D)
- ✓ Voltage Ranges (Voltage levels 110 kV ≤ U < 300 kV) (Type D)
- ✓ Voltage Ranges (Voltage levels 300 kV ≤ U ≤ 400 kV) (Type D)
- ✓ Reactive Power Capability at Maximum Active Power (Type C-D)
- ✓ Reactive Power Capability below Maximum Active Power (Type C-D)
- ✓ Fault-Ride-Through Requirements (Type B-D)
- ✓ System Restoration Requirements (Type B-D)
- ✓ General System Management Requirements (Type B-D)

# *Title II - Key technical requirements (NC RfG)*

- ✓ Title III - Operational notification procedure for connection including cost benefit analysis:
  - ✓ The power-generating facility owner shall demonstrate to the relevant system operator that it has complied with the requirements set out in Title II of this Regulation by completing successfully the operational notification procedure for connection of each power-generating module described in Articles 30 to 37.
  - ✓ Cost benefit analysis for applying requirements on the existing generation units.

- ✓ Title IV – Compliance and Non binding guidance and monitoring of implementation
  - ✓ The power-generating facility owner shall ensure that each power-generating module complies with the requirements applicable under this Regulation throughout the lifetime of the facility. For type A power-generating modules, the power-generating facility owner may rely upon equipment certificates.

# *Non binding guidance – NC RfG Article 58*

1. ***No later than six months after the entry into force*** *of this Regulation on the EU level, the ENTSO for Electricity shall prepare and* ***thereafter every two years*** *provide* ***non-binding written guidance*** *to its members and other system operators* ***concerning the elements of this Regulation requiring national decisions.*** *The ENTSO for Electricity shall publish this guidance on its website.*
2. *ENTSO for Electricity* ***shall consult stakeholders*** *when providing non-binding guidance.*
3. *The non-binding guidance* ***shall explain the technical issues, conditions and interdependencies*** *which need to be considered when complying with the requirements of this Regulation at national level.*

## Implementation Guidance Documents (IGDs), visit the following link:

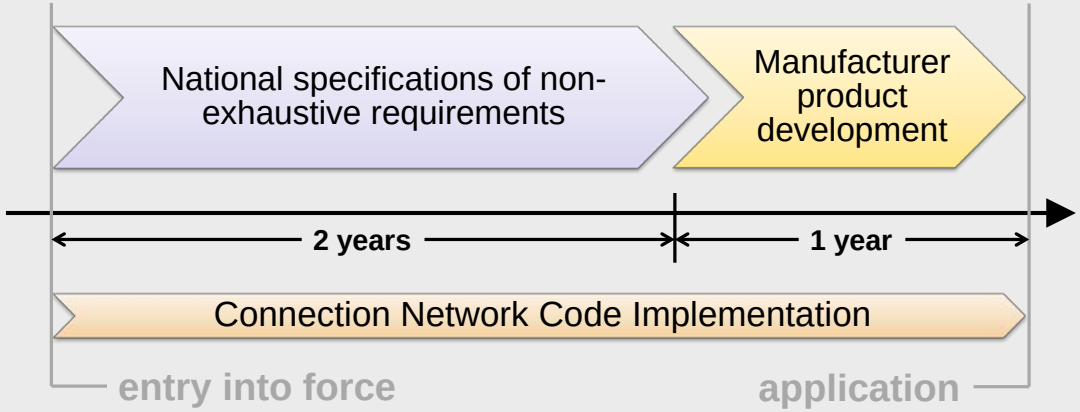
*https://www.entsoe.eu/major-projects/network-code-implementation/cnc/Pages/default.aspx*

***Source:*** *"Implementation of a network code on requirements for grid connection of generators", ENTSO/E, 03.10.2016*

# National implementation process

*National implementation processes are defined by the regulations and include:*

- *Approval of national specifications by the entity designated by the Contracting Party, i. e. the NRA unless provided otherwise by the Contracting Party*
- *Publication of these national specifications*




***Source:*** *"Implementation of a network code on requirements for grid connection of generators", ENTSO/E, 03.10.2016*

# For discussion

- ***Standard adaptation … ACER and ENTSO/E roles?***
- ***RfG can be implemented in “one go”?***
- ***Implementation deadlines and process (ENTSO/E support)?***
- ***CP-MS interface issue (reciprocity)?***
- ***Ukraine and Moldova (implementation specifics of non synchronized systems – CE or…)?***
- ***Any other obstacles?***

*Thank you*
*for your attention!*

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