



Geode Workshop on Electricity Network Codes

NC RfG and NC DCC

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Overview Network codes for Electricity

Indication of relevant codes/guidelines for DSOs

Connection Related Codes

- Requirements for Generators (NC RfG)
- Demand Connection (NC DCC)
- HVDC Connection (NC HVDC)

System Operation Codes/ Guidelines

- Transmission System Operation (GL SO)
 - Operational Security (OS)
 - Operational Planning & Scheduling (OPS)
 - Load Frequency Control & Reserves (LFCR)
- Emergency & Restoration (NC ER)

Market Related Codes/ Guidelines

- Capacity Allocation & Congestion Management (GL CACM)
- Forward Capacity Allocation (GL FCA)
- Electricity Balancing (NC EB)

- **NC RfG: Requirements for Generators**
 - Positive voting in Cross-Border Committee on 26 June;
 - Translations still ongoing, scrutiny phase will start soon;
 - Adoption and publication to be expected by end of 2015;
 - Latest version of the code: 26 June.

- **NC DCC: Demand Connection Code**
 - Will be discussed in Cross-Border Committee on 15 and 16 October; if possible voting on 16 October.
 - Translations ongoing;
 - Target: publish code before end of 2015...
 - Latest version of the code: 30 September.

Attention points for DSOs

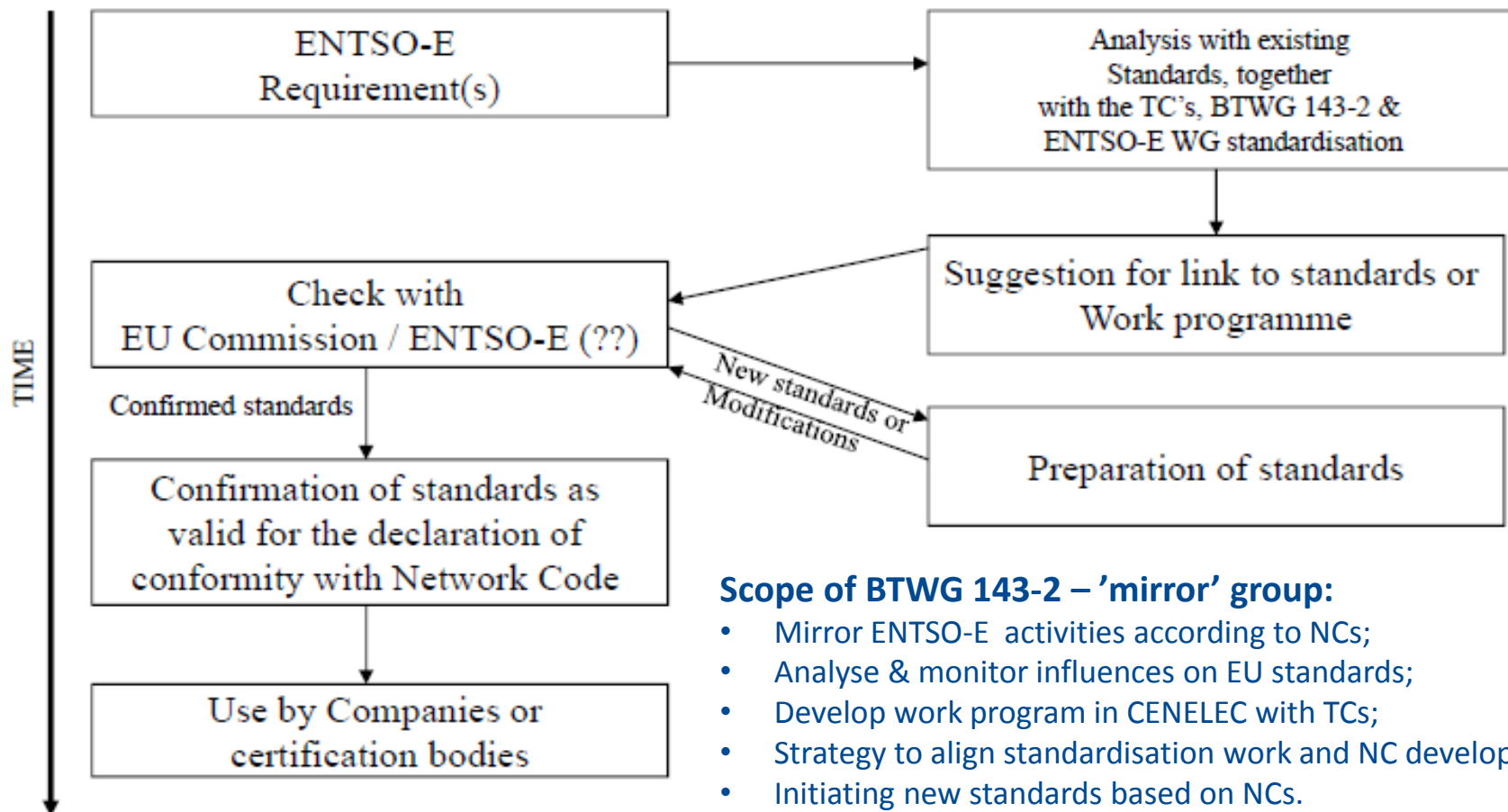
Connection related codes

DSOs' main attention points in the connection codes:

- **Use of 'Relevant system operator' puts DSO in active role in connection codes to enforce requirements, but at the same time also requirements imposed on DSO-TSO interconnection points and on distribution systems.**
- **Recovery of costs**
 - Costs borne by regulated system operators are recovered.
 - Recovery of costs to be done 'in a timely manner through network tariffs or appropriate mechanisms'.
- **NC RfG (1/2)**
 - **Equipment certificates and standardisation work needed for mass market installations (types A & B)**
 - Equipment certificates delivered by Authorized Certifiers will help considerably;
 - Indispensable to rely on EU standards for NC RfG implementation, mainly for compliance testing and monitoring.

Attention points for DSOs

Standards – EU NCs – relation: via CEN/CENELEC ‘mirror group’



Scope of BTWG 143-2 – ‘mirror’ group:

- Mirror ENTSO-E activities according to NCs;
- Analyse & monitor influences on EU standards;
- Develop work program in CENELEC with TCs;
- Strategy to align standardisation work and NC development;
- Initiating new standards based on NCs.

Attention points for DSOs

Connection related codes

DSOs' main attention points in the connection codes:

- **NC RfG (2/2)**
 - **Clear definition of the connection point and the corresponding expected performances is required**
 - Code should clearly distinguish system performance required at connection point from technical requirements at unit level;
 - Power facility owner should ensure that both the PGM and the power generating system at the connection point complies with the requirements.
 - **FRT obligation for type B generators is questioned on LV network**
 - To ensure that faults on distribution networks are cleared appropriately, DSOs will have to override FRT requirement in the event of a distribution fault;
 - FRT capability is tradable-off for network reinforcements, need for FRT on type B should be kept in grid connection rules at MS level.

Attention points for DSOs

Connection related codes

DSOs' main attention points in the connection codes:

- **NC DCC (1/2)**
 - **Requirements on reactive power exchange at TSO/DSO interface are not cost-efficient and should only be used as last resort solution**
 - Both requirements remain ($\cos \phi > 0.9$ and no export below 25% of P);
 - DSOs' arguments on non efficiency of these requirements not taken on board by ENTSO-E;
 - Even with the DSOs' text proposal (which seemed to be an acceptable compromise) there is still the risk that after a joint analysis, TSOs impose the requirement;
 - Link with NC OS: a study was performed by DSOs from which was learned that the reactive power issue is not so much a problem of cost allocation, but rather to keep in mind a global efficiency perspective.

Attention points for DSOs

Connection related codes

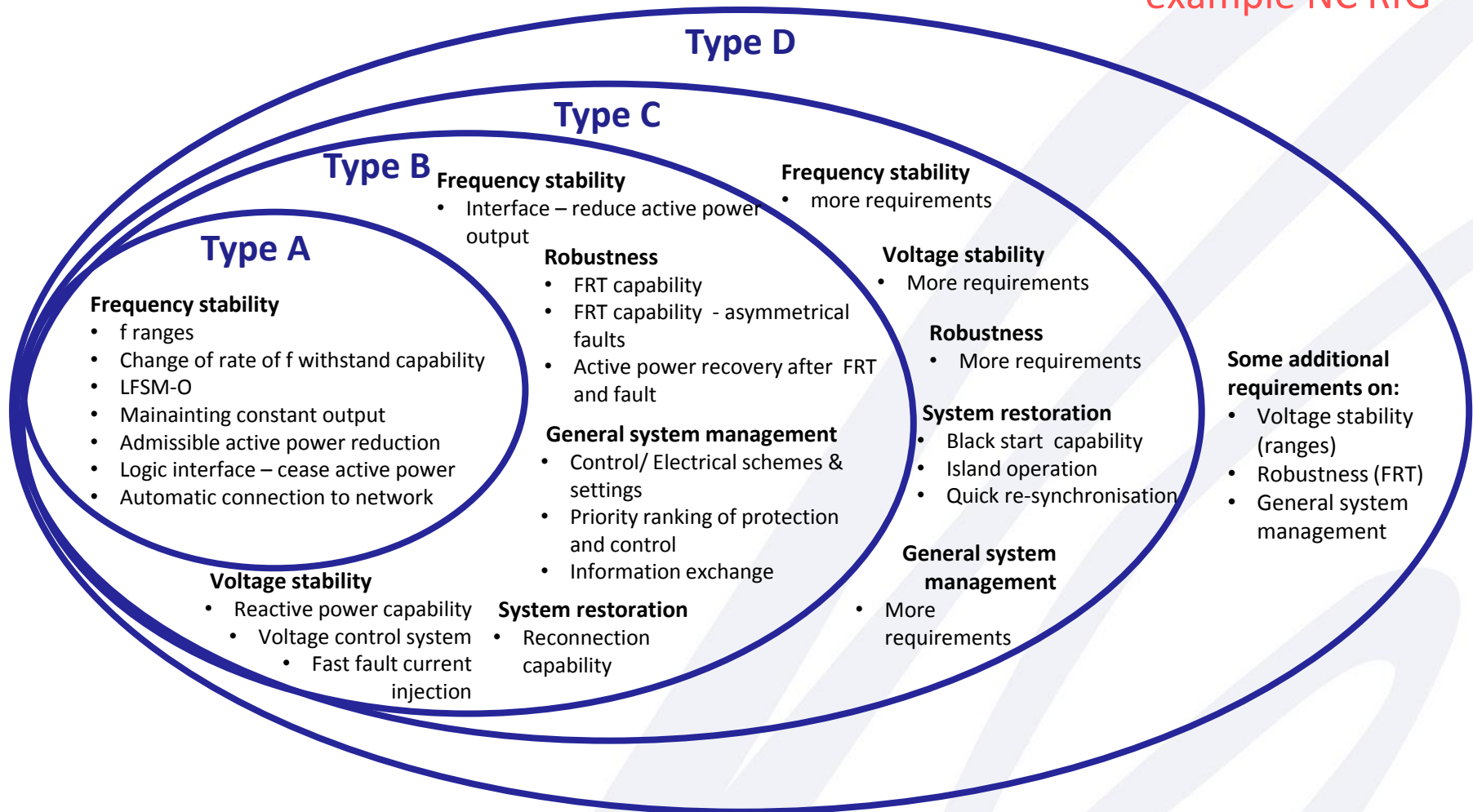
DSOs' main attention points in the connection codes:

- **NC DCC (2/2)**
 - **DSR requirements would probably better fit in another regulation**
 - Initial 5 DSR services remain in last version, but are now all provided on a voluntary basis;
 - Not purpose of code to define requirements to grant access to services beyond connection point;
 - Code must provide requirements for physical network connection granting and its consequences.
 - Requirements related to service delivery would better fit in relevant codes and/or standards dealing with related services conditions → non-compliance would result in denial of access to the service, but not to network.
 - **Administrative burden should not be underestimated**
 - Simulation models – obligation to use simulation models;
 - Operational notification – obligation to check introduced documents on DSR < 1000V;
 - Compliance monitoring & simulations – obligation to check compliance of DSR.

- Content overview (1):
 - Definitions
 - Application to existing PGMs (power generating modules)
 - Determination of significance/definition of PGM types (A,B,C,D)
 - Regulatory aspects / recovery of costs / public consultations / stakeholder involvement / confidentiality
 - Requirements
 - General requirements for all PGMs (Synchronous & onshore/offshore Power Park Modules)
 - Requirements for Synchronous PGMs
 - Requirements for PPMs
 - Requirements for offshore (only AC-connected)

Impact on national level

example NC RfG



- Content overview (2):
 - Operational notification procedure for connection of new PGMs
 - CBA in case existing PGMs have to comply
 - Compliance monitoring/testing/simulations
 - Derogations
 - Transitional arrangements for emerging technologies
 - Final provisions
 - Entry into force OJ publication + 20 days
 - Applicable as from a 3 year period (with exception of a few articles/paragraphs on application to existing PGMs, decisions on proposals for requirements/methodologies, guidance & derogations)
 - ATTENTION: within 2 years of entry into force, RSO submit proposal for (non-exhaustive) requirements or methodology for approval ! (art.7§4)

Impact on national level

example NC RfG

- Impact on national level (1):
 - ‘Relevant System Operator’ (RSO) → TSO, but also DSO !
→ throughout the NC almost always reference to RSO.
 - Application to existing PGMs:
 - If important modification (and new connection agreement is needed);
 - At proposal of the relevant TSO (public consultation, qualitative and quantitative CBA) → decision by ACER - assessment every 3 years possible;
 - Determination of thresholds between type A, B, C, D PGMs:
 - Relevant TSO to propose thresholds (or changes) in coordination with adjacent TSOs and DSOs (public consultation) – every 3 years possible.

Impact on national level

example NC RfG

Belgium

in discussion



Connected to distribution network

- Impact on national level (2):
 - Technical requirements for type A, B, C, D will have to be evaluated, some parameters to be defined;
 - Examples:
 - Frequency → parameters mainly defined by the TSO (in some cases involvement of the RSO);
 - Robustness (e.g. FRT) → parameters defined by the TSO;
 - System management requirements:
 - Control schemes and settings → coordination between TSO, RSO and owner of generator;
 - Electrical protection schemes and settings → defined by the RSO;
 - Existing (national) legislation should be checked → gap to be analyzed and necessary actions taken:
 - Modification of legislation / technical prescriptions/instructions
 - Modification of contracts, ...

- Impact on national level (3):
 - Operational notification
 - Type A: installation document
 - RSO to define document (use of equipment certificates)
 - Notification of operation and decommissioning → electronically
 - No reference to EU standards !
 - Type B, C: power generating module document (PGMD)
 - RSO to define document (use of equipment certificates)
 - Notification of operation and decommissioning → electronically
 - No reference to EU standards !
 - Type D: E(nergisation)ON, I(nterim)ON, F(inal)ON, [L(imited)ON]
 - RSO to define format (use of equipment certificates)
 - No reference to EU standards !

Impact on national level

example NC RfG

- Impact on national level (4):
 - Compliance monitoring – specific article on tasks of the RNO:
 - RSO to assess compliance throughout lifetime of PGM (for type A equipment certificates suffice);
 - RSO may request compliance tests and simulations according to a repeat plan;
 - RSO to list all information and documents to be provided in compliance process;
 - RSO to define responsibilities in compliance testing, simulation and monitoring;
 - RSO may participate in compliance testing;
 - RSO to provide technical data and simulation model of network for setting up simulation.

- Impact on national level (5):
 - Derogations:
 - Can be asked by the owner of a generator;
 - But also, by an RSO (for types of generators connected to its network):
 - Request to NRA (detailed, specifying which requirement for which type generator, a CBA – unless reasoned application for exemption);
 - If RSO = DSO or CDSO → NRA will ask relevant TSO to make assessment;
 - NRA takes final decision;
 - ACER monitors the derogations;
 - Emerging technologies:
(requirements do not apply, except the operational notification)
 - Only for type A PGMs;
 - Submission to relevant NRA;
 - All NRAs of synchronous area to decide on classification as emerging technology;
 - Classification may be revoked;
 - Final provisions:
 - Amendment of contracts and general terms and conditions → in compliance with regulation.

Impact on national level

example NC RfG

- Summary regarding the impacts on national level:
 - Determination of thresholds for type A, B, C and D generators;
 - Definition of non-exhaustive requirements;
 - Evaluation of exhaustive requirements (e.g. impact on protection systems);
 - CBAs to be carried out for:
 - Application of requirements to existing PGMs;
 - Derogation of requirements;
 - Recognition as an emerging technology;
 - Implement operational notification;
 - Implement compliance monitoring, testing (simulation).

Impact on national level

example NC RfG

- All these new requirements will have an impact (more or less, depending on MS) on existing national/regional requirements and practice in the MS:
 - adapt existing or introduction of new legislation;
 - adapt existing or introduction of new procedures, testing methods, ...;
 - adapt existing contracts between parties (DSO-TSO, DSO-grid user,...);
 - adapt existing or introduction of new ICT tools;
 - ...