UNION FENOSA distribución
GEODE 2nd workshop on electricity Network Codes

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1st of October 2014
Index

1. Network Codes & Framework Guidelines
2. The role of DSOs in the drafting process
3. NCs status and progress
The third package’ (EC) 714/2009

“The network codes shall be developed for cross-border network issues and market integration issues and shall be without prejudice to the Member States’ right to establish national network codes which do not affect cross-border trade. 

Art.8(7)”

cross-border flow’ means a physical flow of electricity on a transmission network of a Member State that results from the impact of the activity of producers and/or consumers outside that Member State on its transmission network; Art.2(2b)”
They shall cover the following areas- Art.8(6):

“a) **network security and reliability rules** including rules for technical transmission reserve capacity for operational network security;
(b) network **connection** rules;
(c) **third-party access** rules;
(d) **data exchange** and settlement rules;
(e) **interoperability** rules;
(f) operational procedures in an **emergency**;
(g) capacity-allocation and **congestion-management** rules;
(h) rules for trading related to technical and operational provision of **network access services and system balancing**;
(i) **transparency** rules;
(j) **balancing** rules including network-related reserve power rules;
(k) rules regarding harmonised transmission **tariff structures** including locational signals and inter-transmission system operator compensation rules; and
(l) **energy efficiency** regarding electricity networks.”
Therefore: network codes matter; they form the foundation on which the IEM is being built

Internal electricity market

**3 Connection Network Codes**
- set requirements for
  - Generators
  - Demand-side
  - HVDC connections

...day-ahead market coupling...

**3 Market Network Codes**
- set market rules for
  - Day ahead/intraday & Capacity calculation
  - Long-term timeframes
  - System balancing

...paving the way for offshore wind...

**4 Operational Network Codes**
- set common rules for
  - Assessing adequacy
  - Planning outages
  - System security
  - Emergency situations

...regional security coordination initiatives...
Connection Codes and System Operation Codes are here (until CACM is approved)

Emergency and Restoration is here

Balancing code was rejected by ACER and is resubmitted already

Request for FWGL

Framework Guidelines (max. 6 months)

Stakeholder Consultation & workshops

Stakeholder Consultation & workshops

Stakeholder Consultation

Consultation

Preparation of draft Network Code (max. 12 months)

Mandate letter

Decision

Comitology (+/- 1 years)

Legally binding Network Code

Member states
![Image of a diagram showing the delivery of the Third Package with timelines and steps involving the EC, ACER, and stakeholders. The diagram includes phases such as Scoping, Development, Approval, and Entry into force, with specific dates and actions listed for each phase. A disclaimer at the bottom states that the diagram provides an overview of the network code development process and that forward-looking dates are provisional until confirmed. Stakeholders are informed of events through official communication.

In accordance with ENTSO-E’s Network Code Development Process, an internal re-drafting and approval is done before public consultation and submission of the code to ACER.

1: In case ACER does not attach a recommendation to its opinion, ENTSO-E has the opportunity to resubmit the code.
2: Changes in process may occur if the Regulatory Procedure with Scrutiny is replaced by the Delegated Acts Procedure for Network Codes validation.
3: Some provisions are going through early implementation before this stage. Estimated implementation period varies from 18 months for NC OPS to 39 months for NC FCA. For NC EB, a 6 years phased introduction period is planned.
4: The amendment procedure is yet to be determined.
Comitology Process

Pre-comitology

- Commission assessment & redrafting
  - Assessment legal/substance
  - Impact Assessment
  - Inter-service Consultation
  - Translation

Informal meeting(s)

- Presentation of Draft Regulation
- Discussion of issues/solutions

Comitology

- Cross-Border committee
- Formal meeting(s)
- Positive vote

- EP / Council

- Adoption (qualified majority of MS votes)
- Scrutiny phase (EP/Council)

End of veto period

4-6 months

Final entry into force
Comitology Flow

Regulatory procedure with scrutiny (PRAC)

- Commission proposal
- Regulatory committee
  - voting by qualified majority

Approves draft measure: stage 2 - option A

No or negative decision: stage 2 - option B

OPTION A: Regulatory Committee approves draft measure

Draft measure

- AM
  - PARLIAMENT
    - Veto
      - NO
    - OR
    - COUNCIL
      - NO
    - QMV

COMMISSION

- New draft measure
- Legislative proposal

OPTION B: Regulatory Committee rejects draft measure or reaches no decision

Draft measure

- AM
  - PARLIAMENT
    - informed
    - COUNCIL
    - QMV

Veto

- NO
- COMMISSION

- New draft measure
- Legislative proposal
Regulation: Network Codes (Art 6) vs. Guidelines (art 8)

Both are directly applicable and legally binding regulations… but with some differences…

Regulation (EC) No 713/2009

1. Draft amendments to any network code adopted under Article 6 may be proposed to the Agency by persons who are likely to have an interest in that network code, including the ENTSO for electricity, transmission system operators, users and consumers. The Agency may also propose amendments on its own initiative.

2. The Agency shall consult all stakeholders in accordance with Article 10 of Regulation (EC) No 713/2009. Following that process, the Agency may submit proposals for amendments to the Commission. The Commission shall adopt proposals for amendments to network codes set out in Article 6(2).

3. The Commission shall adopt, taking into account the Agency’s proposals, amendments to any network code adopted under Article 6. Those proposals, designed to amend the essential elements of this Regulation by supplementing it, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 16(a).

4. Consideration of proposed amendments under the procedure set out in Article 23(2) shall be limited to consideration of the aspects related to the proposed amendment. Those proposed amendments are without prejudice to other amendments which the Commission may propose.

ACER Guideline on Article 7

- NC CACM
- NC EB
- NC OPS ?
- NC LFCR ?
2. The role of the DSO in the drafting process

- Eclusively experts nominated to DSO Technical Expert Groups

- ENTSO-E Network Codes Covered
  - Practical division according to thematic areas
  - Practical in terms of workload management
  - Meetings before respective DSO Technical Expert Groups meetings for efficiency reasons

-> Consisting of experts of the 4 DSO Associations: Eurelectric, EDSO4SG, CEDEC & GEODE
ENTSO-E’s role

“The ENTSOs will have an increasingly important role in market rule development as markets integrate. Consequently the accountability and transparency of the ENTSOs may need to be enhanced in order to retain the trust of stakeholders.”

“Although NRAs exercise oversight of individual TSOs, the ENTSOs are not currently subject to similar oversight. The current arrangements for regulatory oversight by the Agency are limited to monitoring and issuing opinions which are not binding in nature and so the ENTSOs are under no obligation to follow them. Against this background, we consider that, in the same way that national TSOs are regulated by NRAs, so should the Agency have effective oversight of the ENTSOs in respect of their EU-wide activities. These oversight arrangements should ensure that the European public interest is properly served and that the ENTSOs’ operations are undertaken efficiently and transparently. This may be of some significance where some ENTSOs’ members, although regulated nationally, are (inevitably) primarily driven by legitimate duties to their own shareholders. Further, since the ENTSOs, similar to national TSOs, do not face competitive pressures on their costs, we believe it is important that there is a degree of oversight at European level to encourage efficiency in the interests of Europe’s energy consumers.”
3. Network Codes Status & Progress

Requirements for Generators

• Technical requirements are increased respect to current practices: voltage, frequency, reactive power, fault ride trough, active power response...

• Those capabilities are not used and not a single CBA available -> ENTSO-E argument: those are capabilities for the future

• Possibility of retroactive application

4.1.1 DSO Analysis Shows that No. of Requirements ‘deviate from current practices’

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<th>Belgium</th>
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Moderation of protection systems as a particular issue for some countries – risk of generators’ & consumer appliances damages in islanding operation
DSOs issues

• Hardens and transfers to DSOs the burden of compliance monitoring --> 3 bn€ extracosts in contrast to standards & certifications

• Ignores the responsibility of DSOs in safety --> Islands!

• TSOs are given with regulatory attributions --> as supervision of contracts.

• Improves compliance monitoring for Type A generators

• The main part of the Code was not changed. Technical requirements for the generators prevail --> undesired islanding for DSOs

• Erases supervisory rights for TSOs
Compliance & Monitoring

Article 35 “The Relevant Network Operator shall regularly assess the compliance of a Power Generating Module with the requirements under this Network Code throughout the lifetime of the Power Generating Facility. The Power Generating Facility Owner shall be informed of the outcome of this assessment.

For type A power generating modules the Relevant Network Operator may rely upon equipment certificates in this assessment. “
Demand Connection Code

DSR - Consultation Draft Requirements (27 June 2012)

DSR was divided into four service categories that can be grouped into remote or autonomous controlled in Articles 15-18:

**Remotely controlled:**
- Demand Side Response Active Power Control (DSR APC)
- Demand Side Response Reactive Power Control (DSR RPC)
- Demand Side Response Transmission Constraint Management (DSR TCM)
- Demand Side Response Very Fast Active Power Control (DSR VFAPC)

**Autonomously controlled:**
Demand Side Response System Frequency Control

DSR requirements were either:
- Voluntary for the remote controlled categories, or
- Mandatory for devices defined as significant for remote control and for DSR SFC
DSOs issues

• Compliance monitoring -> Again a DSO duty. In a future context of all households participating in demand response… how much does it cost? Conservative estimations for 2020 indicate 3 bn€

• Supervisory/Regulatory attributions by TSO

• Not considered, evaluated or coordinated with demand side management for DSOs purposes.

And the most impacting provision for DSOs -> reactive power requirements (Art 16)
Network Codes on Demand Connection and Operational Security
Reactive power requirements for DSOs

David Trebolle,
Chair of DSOs TF System Operation and Balancing Codes

Brussels, February 2014
Introduction (1)

Reactive power is like... the froth in draft beer

- It does not have a purpose in itself
- It is always there
- You need it to some extent, but not too much and not too little
- You have only some control over it... it is the result of several factors

The type of keg, how full it is, how much you open the tap, how you hold the glass...
Introduction (2)

So reactive power requirements at T/D connection points could be seen as.....

... a barman (TSO) serving beer from a keg (DSO network)

✓ the barman wants to instruct the keg how much froth he needs
✓ ... but the keg has limited control over it, maybe it is almost empty and generates a lot of froth (networks during nights)
✓ so the barman imposes the installation of a new expensive device (capabilities in DCC) on the keg, which also needs expensive maintenance (losses in networks increased by NC OS)
✓ ... but maybe with proper coordination between the barman and the keg, it could have been avoided: changing the position of the glass, the way of opening the tap...

The barman and the keg comprise a system.
If they are not seen in that way, total costs will rise!
As a matter of fact, sometimes barmen own kegs ... and they do not require those devices for themselves!!!
Reactive Power requirements at T/D points

• The issue appears both in the Network Codes DCC (capabilities) and OS (operation)
  → the division between the codes makes it difficult to make a combined analysis
  → requirements and services in the DCC, RfG, LFCR and EB will also affect DSOs possibility to cope
  → ... and it cannot be decoupled
    (maybe this is the reason why it has not been better understood in previous stages...)

• It is not a question of allocation of costs, it is a question of lack of total efficiency (cost rise)
  → installation + operation costs (losses)

• It is not sensible to treat all the connection points in the same way because conditions differ widely and
  reactive power has local effects on voltage (but also system effects, see next point)
  → a case by case analysis is needed

• The law of physics and electrics show that fixing reactive power restrictions in the middle of the electrical
  system increase total system losses
  → TSO & DSOs together constitute the system in combination with production and demand

• If the reactive power capabilities and operation would be defined by TSO and DSO through joint analysis,
  installation and operation costs would be much lower
  → a system approach is needed. Current redaction of the codes leaves to the TSO the decision on
    investment and operation costs. Some TSOs could be tempted to minimize their own costs, but not
    the total system costs.

It is difficult to evaluate extra costs generated by these
“open texts” ... BUT WE HAVE TRIED ...
Evaluation of extra investment costs (NC DCC)

Basic ideas taken into account for the evaluation:
• Evaluation will be conservative;
• Difficult to know exact figures of connection points. EDSO SG survey and some estimations will be used → results have to be understood as order of magnitude;
• Installation costs are easy to evaluate taking some hypothesis → contained in our document;
• Costs will be for new installations (and existing ones decided by TSOs) → all T/D connection points will have to be refurbished during the next 20 years, so all connection points will be taken into account and annual costs will be estimated;
• A survey among DSOs is used to estimate the total number of T/D connection points → estimation: 11,000 T/D connection points in Europe;
• They have been classified according to voltages levels and typical sizes of substations, and applying NC DCC, reactive power requirements for each one of them have been calculated.

Total conservative extra investment costs in 20 years could vary among 13 and 72 billion € (650-3.600 M€ per year) → Coordination between TSO and DSO and Active System Management would make these costs tend to zero.
Evaluation of extra operation costs (NC OS)

Basic ideas taken into account for the evaluation:
- Impact of fixing Q requirement in TSO/DSO frontiers in active power losses for different distributed generation penetration levels (results from REserviceS project):
- Evaluation of extra costs on fixing Q requirement comparing to a smart operation (system approach → coordination TSO/DSO).
- Estimation of total power losses in Europe from power losses performance of one of our members with HV and MV networks → results have to be understood as order of magnitude;
- Pro rata with energy consumption → 3,181,000 GWh consumed in Europe (EU27) in 2010 (Eurostat);
- Final energy price for monetization of power losses → 70 €/MWh (medium price of European energy markets in 20 years).

Total extra operation costs in 20 years:
1. With actual DG from 12 to 80 billion €
   (600-4,000 M€ per year)
2. With a high penetration of DG from 18 to 110 billion €
   (900-5,500 M€ per year)

Coordination between TSO and DSO and Active System Management would make these costs tend to zero
NC DCC: DSO proposal for rewording of art. 16

→ flexible solution coordinated by Relevant TSO and DSO (1/2)

1. All Transmission Connected Demand Facilities and all Transmission Connected Distribution Networks, deemed significant pursuant to the provisions of this Network Code, shall fulfil the following requirements referring to Reactive Power exchange and control:

   a. With regard to Reactive Power ranges:

      i. Transmission Connected Distribution Networks and Transmission Connected Demand Facilities shall be capable to maintain their steady-state operation at their Connection Point in a Reactive Power range specified by the Relevant TSO, while respecting the provisions of Article 9(3) and the following conditions:

          • For Transmission Connected Demand Facilities without onsite generation (...);
          • For Transmission Connected Demand Facilities with onsite generation (...);

      ii. For Transmission Connected Distribution Networks, the Relevant TSO and the DSO shall analyse jointly the efficient technical and financially possible solutions and jointly agree on the optimal solution for the reactive power range and exchange between their Networks taking adequately into consideration the specific network characteristics, variable structure of power exchange and bidirectional flows and the reactive capabilities from Power Generating Facilities in the distribution Network. In case the agreement between the Relevant TSO and the DSO is not reached, the actual Reactive Power range specified by the Relevant Network Operator shall not be wider than 0.9 Power Factor of the larger of their Maximum Import Capability or Maximum Export Capability in import to 0.9 Power Factor of their Maximum Export Capability in export, while respecting provisions of art. 9.3. except in situations where either technical or financial system benefits are demonstrated by the Relevant TSO and the Distribution Network Operator through joint analysis.
NC DCC: DSO proposal for rewording of art. 16

⇒ flexible solution coordinated by Relevant TSO and DSO (2/2)

The scope of the analysis shall be agreed between the Relevant TSO and Distribution Network Operator and will consider the possible solutions and determine the optimal solution for reactive power exchange between their Networks taking adequately in consideration the specific Network characteristics, variable structure of power exchange, bidirectional flows and the Reactive Power capabilities in the Distribution Network, while respecting the provisions of Article 9(3):

- The use of other metrics than Power Factor to define equivalent Reactive Power capability ranges can be specified by the Relevant TSO.
- The Reactive Power range requirement shall apply at the Connection Point.

ii. Transmission Connected Distribution Networks shall have the capability at the Connection Point to not export Reactive Power (at nominal Voltage) at an Active Power flow of less than 25% of the Maximum Import Capability, except in situations where either technical or financial system benefits are demonstrated by the Relevant TSO and the Distribution Network Operator through joint analysis, while respecting the provisions of Article 9(3).

iii. The scope of the analysis will be agreed between the Relevant TSO and Distribution Network Operator and will consider the possible solutions and determine the optimal solution for reactive power exchange between their Networks taking adequately in consideration the specific Network characteristics, variable structure of power exchange, bidirectional flows and the reactive capabilities in the Distribution Network, while respecting the provisions of Article 9(3);

b. Without prejudice to the provisions of paragraph 1(a) of this article, the Relevant TSO shall have the right to require, while respecting the provisions of Article 9(3), the ability of the Transmission Connected Distribution Network to actively control the exchange of Reactive Power at the Connection Point as part of a wider common concept for management of Reactive Power capabilities for the benefit of the entire Network. The method of this control shall be agreed between the Relevant TSO and the Transmission Connected Distribution Network Operator to ensure the justified level of security of supply for both parties. The justification shall include a roadmap in which the steps and the timeline for fulfilling the requirement are specified.

c. The Distribution Network Operator shall have the right to apply to the Relevant TSO to be considered for Reactive Power management set out in paragraph b), while respecting the provisions of Article 9(3).
NC OS: DSO proposal of rewording of art. 10:
→ flexible solution in coordinated by Relevant TSO and DSO

(...)
13. While respecting the provisions of Article 8(13), each TSO shall define the Reactive Power set-points, power factor ranges and voltage set-points for voltage control in accordance with [NC DC], which shall be maintained by the Significant Grid Users and shall agree with or–DSOs with Connection Point directly to the Transmission System on the most efficient and secure way to perform this control, while respecting the provisions of Article 8(13). DSOs shall in turn be able to define voltage control instructions to Significant Grid Users connected to the Distribution Network in order to respect the instructions of the TSO.

(...)
17. Each TSO shall maintain voltage ranges and each DSO and Significant Grid User which is a Transmission Connected Demand Facility shall maintain the power factor or Reactive Power flows at Connection Points within the ranges specified in Article 10(13) and in Article 16 of [NC DC], unless an agreement is defined between the TSO and the DSO foreseeing the active voltage control by the DSO in accordance with Article 16(1)(c) of [NC DC], or unless another value is defined in accordance with national legislation for Significant Grid Users which are Transmission Connected Demand Facilities who are not subject to or are derogated from [NC DC].

(...)
High Voltage Direct Current Code

Network Code on: HVDC Connection

Code Overview
Purpose: Sets requirements for HVDC connections and offshore DC connected generation.

Status: A Public Consultation on the Preliminary Scoping Document finished on 7 June 2013. ENTSO-E is continuing discussions with stakeholders to produce a draft which will be published in November.

Contents: Requirements for long-distance HVDC connections, links between different synchronous areas and offshore DC connected Power Park Modules such as offshore wind farms,

Low affection to DSOs (at least in the short-medium term)

Source: ENTSO-E
To sum up connection codes...

Source: ENTSO-E
Operation Codes

Key Challenges

- Security Principles
- TSOs' Roles, Methods
- Data Exchange

Objectives

- To operate the electrical system in a safe, secure, effective and efficient manner
- To enable the integration of innovative technologies
- To apply same principles for different systems
- To make full use of information and communication technologies

Topics

- Operational Planning & Scheduling
- Load-Frequency-Control
- Staff Training & Certification
- Emergency & Restoration
- New Applications

Source: ACER Framework Guidelines on Electricity System Operation (Fig.2, p.8)
FG System Operation Codes

• The network codes developed according to these FG will be applied by electricity system operators and significant grid users…

• Main objectives:
  Maintaining security of supply
  supporting the completion and functioning of the internal market in electricity and cross-border trade, delivering benefits to the customers and facilitating the EU’s targets for penetration of renewable generation

Significant grid users: pre-existing grid users and new grid users which are deemed significant on the basis of their impact on the cross border system performances via influence on the control area’s security of supply including provision of ancillary services.
DSOs Position Paper on System Operation Codes (1)

• Close cooperation between TSOs in system operation is a precondition for successful achievement of the IEM by 2014

• Power system decentralization requires redefinition of roles & responsibilities. BUT one size does not fit all – varying needs and technical capabilities of the network and its users must be taken into consideration

• DSOs’ varying impact on cross-border performance depending on:
  ➢ voltage levels they operate
  ➢ the degree of penetration of distributed generation
1. DSOs need to execute instructions by the TSO, modified in line with capabilities and security of their networks and provided at T/D connection point.

2. The DSO will procure flexibility under efficient conditions and must have the possibility to choose among these tools for managing their grids.

3. Congestion in relevant DSO networks may cause an incident that could spread up to transmission level. Relevant DSOs should thus be able to modify distributed generation programmes if security standards are not fulfilled and/or to minimise the risk of islanding operation.

4. TSO not to have direct access to information on users connected to DSO networks. Nor direct orders should be given by TSO to them. Always through DSO.

5. DSO to provide TSO with operational information (for MV & LV network only necessary aggregated information), only on active, not on reactive power.

6. No one-size-fits-all solution for info-exchange level – network codes not to prescribe installation of DSO network equipment other than the one related to overall secure system operation.
Position Paper on System Operation Codes (3)

Voltage Control

1. **Voltage Optimisation** requires a system approach. Requirements of reactive power at T/D connection point should not increase system losses and should be agreed with DSO.

2. **TSO** to provide voltage at T/D connection point within an agreed bandwidth. Any requirement to DSO should be complied at T/D connection point.

3. Relevant DSO to be able to fix voltage/reactive power/power factor setpoints to significant grid users connected to its grid.

Security Analysis & Outage Planning

1. Relevant DSO needs outage planning information from TSO, relevant neighbouring DSO and significant grid users.

2. Relevant DSO needs an observability area on TSO affecting network and relevant neighbouring DSO networks for performing security analysis.
Operational Security Code

**General Provisions:** Subject matter, Definitions, Scope, Regulatory aspects, Confidentiality, Relation with National Law

Article 15: Operational Testing Monitoring and Investigation

Article 16: Operational Training and Certification

Article 11: Dynamic Stability Mgmt.

Article 13: Congestion and Power Flow Management

Article 10: Voltage Control and Reactive Power Mgmt.

Article 9: Contingency Analysis and Handling

Article 8: Frequency Control Mgmt.

Article 7: System States

Articles 17-30: Data Exchange

Articles 1-6: General Provisions

Articles 31-41: Compliance, Derogations, Liability, Final provisions
Operational security main principles:

1. This is the “umbrella code” and fixes the principles for the rest of the codes.
2. DSO not considered anymore as system user. Already recognized as System Operator.
3. Missing definition for Relevant DSO -> all DSOs affected
4. Costs to be recovered also by DSOs.
5. Emergency plans, remedial actions, redispatch, etc. should be set and applied with the participation of affected DSOs. Involvement was achieved.
6. Information about distribution networks connected facilities to be provided through DSO -> concern
7. Extra cost estimations presented in Ljubljana
But the key concerns raised in our letter to ENTSO-E (dated 01/03/12) prevail

• The NC is not in line with the principal ACER FG objective of ‘achieving and maintaining a satisfactory level of operational security allowing for efficient utilization of the power system & resources’ (p.16) with respect to:

1. Applicability to all DSOs
2. Reactive Power Requirements at T/D connection points
3. Compliance monitoring & testing

• Requirements for coordinated information exchange between TSOs, DSOs & network users (p.16) required by ACER FG are not fulfilled!

4. Not respecting DSO Role as a System Operator
Conclusions & Recommendations

Initial CBA revealed substantial inefficiencies of the code: Preliminary estimation reveals additional cost that can be avoided of at least 6 billion €

ACER & the European Commission should ensure consistency in their policies & take a system approach

• The OS code should fully consider Significant DSOs as System Operators and not as System Users.

• Prevent creation of additional barriers to smart grids development which is key for integration of renewables and demand response programmes.

• Explore synergies that are necessary for development of smart grids in a most cost-effective way possible

• Take a system approach: allow for flexibility & do not allow short term interests to result in system in higher costs for final customers in the long term
Amendments introduced in last version after DSOs-ENTSO-E discussions (i)

- Recitals included regarding TSO-DSO cooperation (recitals do NOT have legal enforceability)

(5) Cooperation between TSOs and DSOs should be promoted as cornerstone of such an electric power supply system in Europe, which is necessary for integrating all available resources in an efficient and sustainable way. Moreover, cooperation of TSOs and DSOs at the Connection Point is essential to minimise investments, reduce cost and electrical losses.

(6) Integration of variable renewable generation represents a challenge for TSOs and DSOs who have never before had to cope with such a degree of volatility and unpredictability. The network code shall contribute to ensuring that the TSOs and DSOs have the operational tools they need in order to fulfil their obligations and that DSOs can support TSOs in ensuring Operational Security. Any measures that would impose barriers to new technologies and solutions for managing the volatility and unpredictability, including Smart Grids and the creation of new system services, should be avoided.

- Compliance is aggregator’s responsibility
Amendments introduced in last version after DSOs-ENTSO-E discussions (ii)

- Reactive power requirements maintained, but DSO may give instructions to users (Art 10.13)

Each TSO shall define the Reactive Power set-points, power swings and voltage set-points for voltage control in accordance with [NC RE]. They shall be maintained by the Significant Grid Users or DSOs with Connection of newly added capacity to the Transmission System, while respecting the provisions of Article 8(13). In turn, they in turn be able to define voltage control instructions to Significant Grid Users connected to the Distribution Network in order to respect the instructions of the TSO.

- Improvements in information exchange (Art 16.9,16.10):

Transmission Connectors shall be entitled to gather the relevant structural, scheduled and real-time information from the neighbouring DSOs. DSOs shall cooperate to define the exact scope of information to be exchanged in each case.

A TSO can use the Regional Security Coordination Initiative with some of the tasks that it shall perform in accordance with this Network Code, while retaining the sole responsibility and liability for its TSO. In such a case, the TSO shall inform other TSOs, about this delegation, so that these Regional Security Coordination Initiatives can get all the data and information needed to perform the tasks entrusted to them.

Concerns still prevail (to be dealt with during pre-comitology)
Amendments introduced in last version after DSOs-ENTSO-E discussions (iii)

- Duplication of communication channels has been improved, but still a possibility:
  - Data of DN users should be be provided to TSO and/or DSO (articles 24, 25, 26)
  - This should be agreed between TSOs and DSOs:

  TSOs and DSOs shall define in order to define and agree on effective processes for providing and managing data exchanges between them, including, where required for efficient network operation, the provision of data related to Distribution Networks and Significant Grid Users. Such processes shall be governed by the principles of efficiency and proportionality.
Operational Planning and Scheduling Code

General Provisions: Subject matter, Definitions, Scope, Regulatory aspects, Confidentiality, Relation with Network Law

Articles 1-6

Security assessment Articles 8-14
Outage planning Articles 15-25
Adaptation Articles 26-33
Scheduling Articles 34-37

Building Scenarios and Elaborating Common Grid models
REGION COORDINATION
Non-European seasonal coordinated adequacy assessment
Schedule notification

Requirements In all timeframes

Performing coordinated analysis and forecasts
Planning process framework
Adequacy and ancillary services monitoring
Schedule coherency verification

Low implications for DSOs (all traspassed to OS information exchange)

Articles 31-41

Compliance Derogations Final provisions
Load Frequency Control and Reserves

Process Activation Structure

- Frequency Containment Process → Stabilization
- Frequency Restoration Process → Regulate to Set-Point Value
- Reserve Replacement Process → Restore FRR
CHAPTER 11 CO-OPERATION WITH DSOS
Article 68 RESERVE PROVIDING UNITS CONNECTED TO THE DSO GRID (I)

1. TSOs and DSOs shall collaborate and use reasonable endeavours to facilitate and enable the delivery of Active Power Reserves by Reserve Providing Groups or Reserve Providing Units located in Distribution Networks.

2. The Reserve Connecting DSO and each intermediate DSO shall process the application of a Reserve Providing Unit or Reserve Providing Group connected to its Distribution Network within 2 months after provision of the notification and all the required information including:

a) voltage levels and Connection Points of the Reserve Providing Units or Groups;
b) the type of Active Power Reserves;
c) the maximum Reserve Capacity provided by the Reserve Providing Units or Groups at each Connection Point; and
d) the maximum rate of change of Active Power for the Reserve Providing Units or Groups.
3. During the Prequalification of a Reserve Providing Unit or Reserve Providing Group connected to its Distribution Network and in accordance with applicable legislation each Reserve Connecting DSO and each intermediate DSO shall have the right to set limits to or exclude the delivery of Active Power Reserves located in its Distribution Network in cooperation with the TSO and in a non-discriminatory and transparent way based on technical arguments such as the geographical distribution of the Reserve Providing Units and Reserve Providing Groups.

4. In accordance with applicable legislation each Reserve Connecting DSO and each intermediate DSO shall have the right to set temporary limits at any point in time before reserve activation in cooperation with the TSO and in a non-discriminatory and transparent way to the delivery of Active Power Reserves located in its Distribution Network. The respective TSOs shall agree with its Reserve Connecting DSOs and intermediate DSOs on the applicable procedures.

5. In accordance with applicable legislation, the respective TSOs shall agree with its Reserve Connecting DSOs and intermediate DSOs on procedures and methodologies for the information exchange required in relation to Prequalification and the delivery of Active Power Reserves, including the notification of the Reserve Connecting DSO and intermediate DSOs.
Network Code Emergency and Restoration
(further actions to come)

2nd Draft Published, Public Consultation in mid October and some concerns:

• None of the technical requirements on LFDD schemes are justified.
  - Based on a study where DSOs are not taking part but they will have to implement!!
  - Clear lack of information and involvement

• Use of the capabilities of small type A installations in the design of the Defence Plans!
  - Such requirement does not seem reasonable and would end up to be extremely costly
  - Duplication of channels

• The text allows direct communication/control by TSOs of generating units connected to the Distribution Network.
  - Based on the experience from the NC Operational Security which was accepted by ACER, the drafting team does not intend to change all these references
  - Duplication of channels

• Requirement on relays’ inspection every five years
To sum up system operation codes...

Source: ENTSO-E
With decentralization of the power system, distribution NETWORKS are becoming SYSTEMS

- Ensuring the security of their system and the quality of service
- Market facilitation
- Transparent & non-discriminatory access

Source: EURELECTRIC 10 Steps to Smart Grids
Access of aggregation to the balancing market is one of the possible uses of aggregated flexibility.
Explore synergies between different uses of aggregated flexibility

Source: EURELECTRIC

DSO Constraints Management with the ‘Traffic lights approach’
Conclusions & Recommendations

Delete article 22(3)

Provide DSOs with the technical information they need
Article 23 COOPERATION WITH DSOs  (Version 06.08.14)
1. Each DSO shall respect the terms and conditions related to Balancing pursuant to Article 27.
2. DSOs, TSOs, Balancing Service Providers and Balance Responsible Parties shall cooperate to ensure efficient and effective Balancing.
3. Upon request of the TSO, each DSO shall provide, in due time, all necessary information to perform the Imbalance Settlement to the Connecting TSO in accordance with the terms and conditions related to Balancing pursuant to Article 27.
4. No later than twelve months after the entry into force of this Network Code, each TSO and Reserve Connecting DSOs within the TSO’s Responsibility Area shall jointly elaborate a methodology for costing costs resulting from actions taken by DSOs pursuant to [Article 68 Reserve Providing Units connected to the DSO Grid] of the Network Code on Load-Frequency Control and Reserves for submission to the NRA if no such methodology or national legislation is already covering these matters. The methodology shall provide for a fair allocation of costs taking into account the responsibilities of the parties involved and shall allocate costs to the real originator of costs.
5. Any limits defined by DSOs pursuant to [Article 68 Reserve Providing Units connected to the DSO Grid] of the Network Code on Load-Frequency Control and Reserves that could affect the provision of this Network Code shall be reported without delay by the DSO to the Connecting TSO.
To sum up network codes...

Of course this is not exhaustive. There are further extensive links between codes...

Easy... right?
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