Supporting Paper for the OS NC

3rd Workshop

18-19. September 2012

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Reliable Sustainable Connected

OS NC Supporting Paper:

Main Changes made for Public Consultation

As a **result** of the comments provided in the **2nd Workshop of the OS NC**, following **topics** have been **worked out** in the current version of the document:

1. **Interaction with other Network Codes: Emphasis on System Operation v Equipment Design**
2. **Clarification on some Concepts:** **CGM**
   Significant Grid User, Observability/ Responsibility area.
3. **Objectives of the OS NC:** **Key Principles of Contingency Analysis and Handling**
4. **Added Values of the OS NC**

Interaction with other Network Codes: Grid Connection Codes

Operational Security Limits

- **OS NC & Grid Connection Codes present different approaches:**

  system operation v equipment design.

- **Specific values cannot appear in the OS NC:**
  - **Operational thresholds are intrinsically related to system conditions:**

    Limits
    - Active power limit = f (circuit, time, weather conditions, load) => (short term ratings)
    - Fault level limit = f (circuit, switchgear, conductors, protection)
    - Mvar limit = f (dynamic system condition, generation pattern, demand, etc.)
    - Stability limit = f (dynamic system condition, generation pattern, protections, etc.)

  - **Operational thresholds for voltage and frequency will be different for different synchronous areas and in different timeframes**.

Interaction with other Network Codes: Grid Connection Codes

Operational Security Limits

=>To fulfil the OS NC principles: quantitative values to be set and periodically reviewed by TSOs (individually or in agreement with neighbours).

=>ENTSO-E Incidents Classification Scale introduces different thresholds into the classification principles:

- definition of loss of generation
- definition of loss of load
- frequency deviation
- percentage of peak load affected by black out

Clarification on some concepts used in the OS NC

- **Common Grid Model (CGM)**
- **Significant Grid User**
- **Observability area versus Responsibility area**
- **(further terms …) => tbd**

Clarification on some concepts used in the OS NC: Common Grid Model (I)

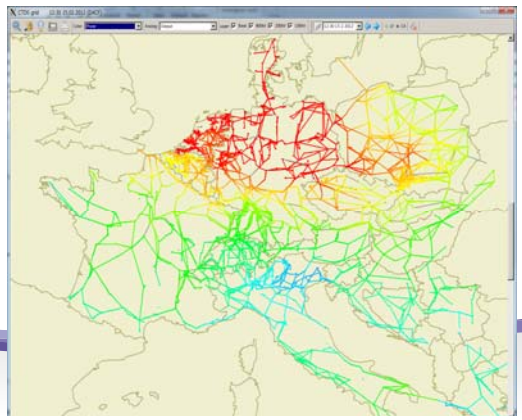
What is the CGM?

- The CGM is… an ENTSO-E wide data set for preparing a model which can be used to analyse different scenarios, which are:
  - **valid to perform security analysis and capacity calculation.**
  - **prepared for different time frames: Year ahead, Week ahead, Day ahead and Intraday**

Contingency analysis: OS NC & OPS NC

Capacity Calculation: CACM NC

- The CGM comprises…
  - **at least the transmission system of 220 kV and higher voltage network.**
  - **an equivalent model of the lower voltage grid with influence.**
  - **the sum of generation and withdrawals in the nodes of the transmission network.**

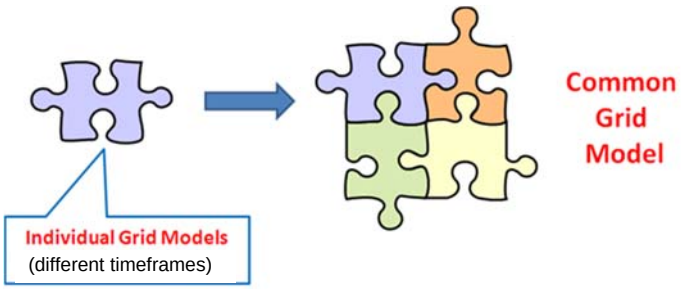


Clarification on some concepts used in the OS NC: Common Grid Model (II)

How is the CGM formed?

- The CGM is formed… **by merging the Individual Grid Models provided by every TSO.**

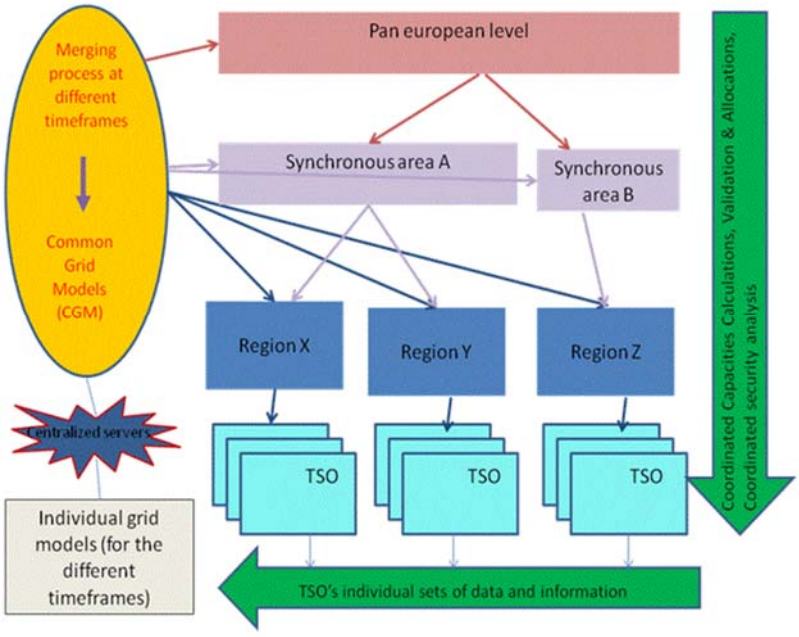
- Individual Grid Models are… **data sets provided by individual TSOs, relying on data from their own Responsibility Area, DSOs and Grid Users.**



Clarification on some concepts used in the OS NC: Common Grid Model (III)

Building the CGM: Overview

Actions performed on TSO level or coordinated on a regional level.



Clarification on some concepts used in the OS NC: Significant Grid User

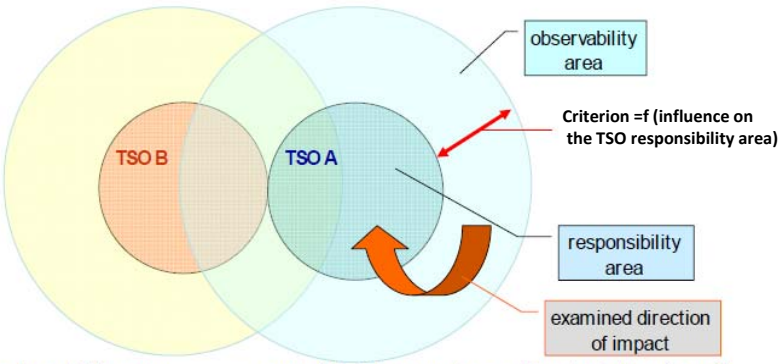
- SO FG => **Significant Grid User**: **"pre-existing grid users and new grid users which are deemed significant on the basis of their impact on the cross border system performances via influence on the Control Area's security of supply including provision of ancillary services".**

- Approach followed by the OS NC: **TSOs shall define the thresholds, defining the significance by considering the impact of a grid user on the cross border system performance, regardless of the connection point voltage.**

- **Significant Grid User thresholds are:**
  - **set by TSO;**
  - **operational thresholds and maybe changed in the future as system conditions change;**
  - **they may not be the same Significant Generating Unit thresholds set out in NC RfG.**

Clarification on some concepts used in the OS NC: Observability area versus Responsibility area

While performing the security assessment, the TSO has to take into account the influence of the surrounding grid on its responsibility area by analysing the external transmission network which has influence on its responsibility area : the so-called observability area.



observability area:	own grid + interconnectors + relevant neighbouring grid, taking into account effect of loss of related grid elements
responsibility area:	own grid + interconnectors assessment of impact of losses in the observability area

OBJECTIVES OF THE OS NC:
Key principles of Contingency analysis and handling

One goal: "No cascading with impact outside my border"

Two obligations:

1 - Each TSO to monitor the consequences of the events defined in its contingency list and warn its neighbours when its own system is at risk .

2 - Mandatory coordination by bi-multilateral/ regional actions to better assess consequences of any domestic TSO's decision.

Three behaviours

1 - Be aware of the risks.

2 - Best efforts to set-up remedial actions.

3 – Be aware of impacts of domestic operational decisions on neighbouring systems.

Risk assessment: a concern

Each TSO is only responsible for the operation of its own network. But it is required to inform relevant neighbors in case it assumes some risks to come from outside/ inside to be propagated abroad.

Inter-TSO coordination

Bilateral, multi-lateral or regional coordination to assess risks.

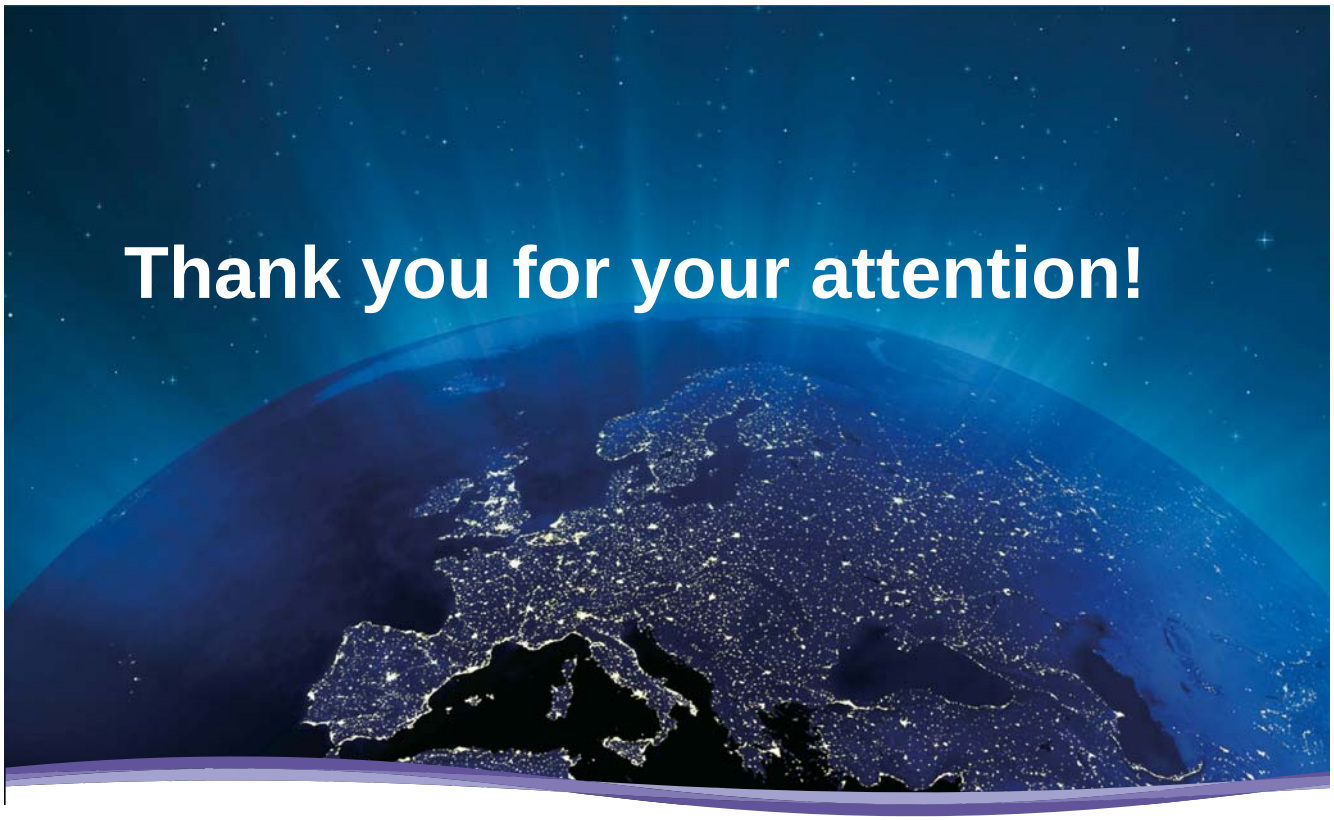
ADDED VALUES OF THE OS NC (I)

Added value	Related article of the OS NC
Same OS principles for System operation among European TSOs.	- The whole code
Improve the interconnected system safety and security.	- Articles 6 to 13
Optimise the detection of constraints in the Transmission System by enforcing coordination between TSOs and between TSOs, DSOs and Significant Grid Users.	- Articles 6, 11 - Chapter 4: Data Exchange
Reduce the risk of system-wide disturbances and the number of critical incidents.	- Articles 6 to 13
Enhance uniform treatment of Significant System Users across Europe.	- Articles 6, 8, 11, 13 - Chapter 4: Data Exchange
Enable the integration of RES, maximising the output from intermittent generation whilst maintaining security of the Transmission System operation in an increasingly dynamic and changing future.	- Articles 7, 8, 10, 11, 13 - Chapter 4: Data Exchange
Increase the potential for greater volumes of cross border exchanges, whilst ensuring existing levels of reliability are not reduced alongside ever increasing levels of RES intermittent output.	- Articles 7, 8, 10, 11, 13 - Chapter 4: Data Exchange

ADDED VALUES OF THE OS NC (II)

Added value	Related article of the OS NC
Prepare the network for integrating distributed generation.	- Articles 7, 8, 10, 11 - Chapter 4: Data Exchange
Make efficient and effective use of smart grid applications.	- Articles 7, 8, 10, 11 - Chapter 4: Data Exchange
Provide the adequate conditions for exploiting the demand-side potential and integrating advanced power electronic systems.	- Article 14 - Chapter 4: Data Exchange
Improve conditions for data collection, handling and exchange.	- Article 5 - Chapter 4: Data Exchange
Provide a framework for the compatibility of tools.	- Chapter 4: Data Exchange, but mainly in NC OP&S
Enhance the coordination of the tests between involved parties in order to ensure the correct functioning of all elements connected to the Transmission System.	- Article 14
Provide a common framework for the training of operators.	- Article 29

Thank you for your attention!



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