Common Grid Model and Operational Planning Data environment (OPDE) concepts and development

Jean-Philippe Paul

System Operation European Stakeholder Committee
14 March 2017
Coordinated Security Analysis
Evaluate consequences of contingencies in the interconnected grid, plan remedial actions including coordinated ones.

Outage Planning Coordination
Coordinate planned outages on equipment with cross-border influence to avoid security issues.

Coordinated Capacity Calculation
Optimize available capacity for cross-border trading while ensuring the security of the grid.

Short and Medium Term Adequacy
Assess the adequacy of the grid in short and medium term.

At the basis of all services lies a Mathematical Power Flow Model → the Common Grid Model, which allows to simulate the future behaviour of the grid.

Improved Individual and Common Grid Model Delivery
For agreed future time horizons, TSOs create forecasts of their individual grid, share them with each other and merge them to a pan-European Common Grid Model.
Common Grid Model – WHY?!

• Grid Operation in interconnected meshed grid requires strong operational planning

• Operational guidelines stipulate strong requirements for grid modelling to be used for operational planning purposes: from year ahead till intraday

• Market Processes (capacity calculation) also heavily depend on an accurate common grid model as an input
CGM Process

Individual grid models for different timeframes

Year ahead
Month ahead
(Week ahead)
D-2, D-1 ahead
Intraday

Quality Assurance Gate

Model merging

Coordinated capacity calculation
Regional operational security coordination
Regional outage coordination
Regional adequacy assessment
From SOGL/CACM requirements to implementation by all TSOs and RSCs

**SOGL (CACM)**
- Operational planning activities to be coordinated
- RSCs to provide 5 services based on CGM
- All data shared in a common Data Environment (OPDE)
- Common format definition

**CGM Methodology**
- Data quality controls
- CGMA (Alignment of Net Positions) service
- CGM process

Applications & general services

Define and Implement !!

CGMES 2.4

Reliable & secure network

Merging function
Data Exchange & Services Conceptual Picture

**Data Environment**

**COMMUNICATION NETWORK - ATOM**

- **ATOM Network**
  - Pan-European private network based on TSO owned backbone network for non-real-time operational and market-operations related data

**COMMON APPLICATIONS**

- Data Publishing
- Data Subscription

**TSO**

- Data Publishing
- Data Subscription
- Individual Grid Model (IGM)

**RSC**

- Data Publishing
- Data Subscription

1. Subscription to all IGMs
2. Merging process
3. Publishing of CGM
CGM-OPDE Program Phases: current planned milestones

**Development Phase**
- 13 January 2017
- Develop software, services and the ATOM network
- All TSO’s/RSC’s implement CGMES data format
- Set up of the ATOM/OPDE design and contract

**Transition Phase**
- 11 December 2017
- TSOs/RSCs connect to OPDE/ATOM
- Test processes, optimize (individual) connections/process

**Stability Phase**
- 11 June 2018
- Grid models in CGMES format exchanged in OPDE for operational purposes
- Users get used to the new data format in operational processes

**Operational Phase**
- Common Grid Model used for pan-European operational services, data exchange through OPDE
THANK YOU FOR YOUR ATTENTION

Jean-Philippe Paul
PG Coordinated Security Analysis Convenor
RTE
System Operation Framework
Implementation Activities

Tahir Kapetanovic

System Operation European Stakeholder Committee
14 March 2017

*System Operation Guideline and Network Code Emergency & Restoration
### KEY IMPLEMENTATION ACTIVITIES

- **Data exchange, § 40(6)**
- **Min. inertia study per synchronous area, § 39(3)(a)**
- **Year ahead outage planning scenarios, § 65**
- **YA/DA/ID CGM from IGM, §§ 67(1), 70(1)**
- **Operational security analysis method., § 75**
- **Short/medium term adequacy, § 81**
- **Outage coordination methodology, § 84**
- **Synchronous area agreements, § 118**
- **Determination of LFC blocks, § 141(2)**
- **Min. FCR activation in CE & Nordic, § 156(10-11)**

### IMPLEMENTATION*

*SO Guideline only, because ER is Network Code hence no „implementation“ after its entering into force*

### RSCs*

* A large part of SO GL implementation – subject to NRAs approval – is prepared through rollout of 5 standard services by the Regional Security Coordinators

### REPORTING

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<th>NC ER</th>
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<td>ICS Report, § 15</td>
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"RSC „WHATABOUTS“"

#1: "trigger" in the past

- "Dry summer" 2005 with supply interruptions and disturbances in GB, FR, DE
- Italy blackout 25.09.2003
- Summer 2002 in Scandinavia (peak load in Norway covered by demand side response since 1996)

#2: contract

- All TSOs' MLA 12/2015

#3: legal framework

- UCTE System Split 04.11.2006
- Growing volatility of market and renewables since 2006
- Effective measures and coordination needed
  - Operational practice: Regional Security Coordination Initiatives since 2008
  - Framework: System Operation Codes / Guidelines expected in 2017

#4: five stand. services by RSCs

- CORESO
- TSC
- NORDIC RSC
- BALTIC RSC
- SCC
- SEE-T RSC

#5: Possible future enhancements of:
- operational planning, balancing, long-term adequacy, network planning

"Options for the future of power systems regional coordination“, FTI-CR Study, [www.entsoe.eu](http://www.entsoe.eu)
## Preliminary Timeline

### 2017
- **Data exchange, § 40(6)**
- **Min. inertia study per SA, § 39(3)(a)**
- **Y-1 outage planning scenarios, § 65**
- **YA/DA/ID CGM, §§ 67(1), 70(1)**
- **Oper. security analysis method., § 75**
- **Short/medium term adequacy, § 81**
- **Outage coordination methodology, § 84**
- **Synchronous area agreements, § 118**
- **Determ. of LFC blocks, §141(2)**
- **Min. FCR activation in CE & Nordic, §156(10-11)**

### 2018
- *1st published, for 2019*
- **SO GL EIF**
- **Public consultation / WS**
- **Stakeholder workshop**
- **Delivery by TSOs/ENTSO-E**
- **Approval by NRAs**

### 2019
- **RSC on TSOs defence & restoration plans, § 6(3)** → 09/2019
- **ENTSO-E on market suspension consistency, § 36** → 09/2020

### Timeline Including NRA Approval

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<td>CBA methodology</td>
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<td>Proposal of min. activation period</td>
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### LEGEND
- ![SO GL EIF](image)
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- ![Delivery by TSOs/ENTSO-E](image)
- ![Approval by NRAs](image)
THANK YOU FOR YOUR ATTENTION

Tahir Kapetanovic
SO Framework Convenor
ENTSO-E RSC Project Manager
Austrian Power Grid AG
Abbreviations – in order of appearance

SOGL – guideline on electricity transmission system operation
CACM – guideline on capacity allocation and congestion management
TSO – transmission system operator
RSC – regional security coordinator
CGM – common grid model
OPDE – Operational Planning Data Environment
CGMES – common grid model exchange standard
IGM – individual grid model
ATOM – All TSO Operational, Market and Planning Data Network

YA/DA/ID – year ahead/day ahead/intraday
LFC – load-frequency control
FCR – frequency containment reserve
ICS – Incident Classification Scale
NC ER – network code on electricity emergency and restoration
NRA – national regulatory authority
MLA – multilateral agreement
SA – synchronous area