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

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System Operation European Stakeholder Committee
14 March 2017

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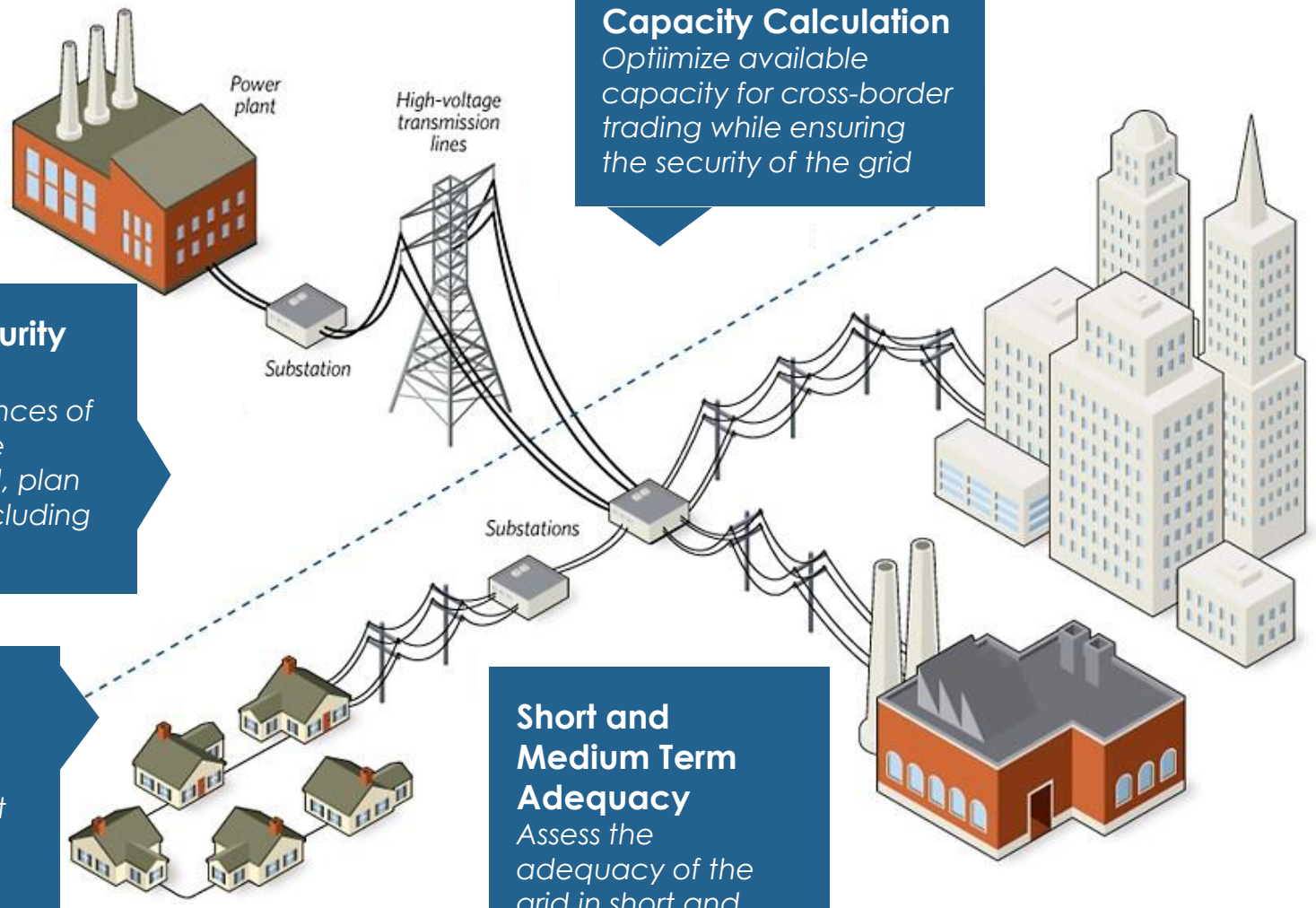
TSO Regional Cooperation

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

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

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



At the basis of all services lies a

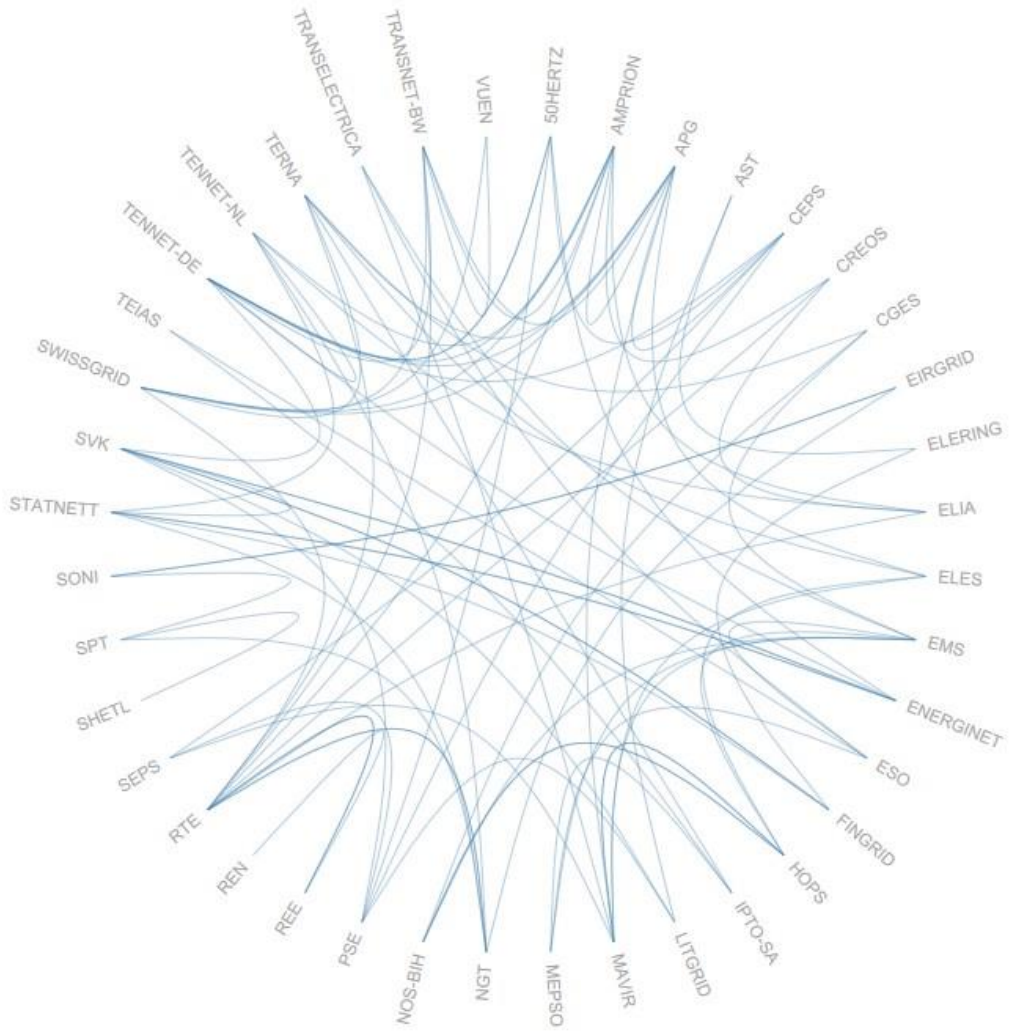
Mathematical Power Flow Model → the Common Grid Model

which allows to simulate the future behaviour of the grid

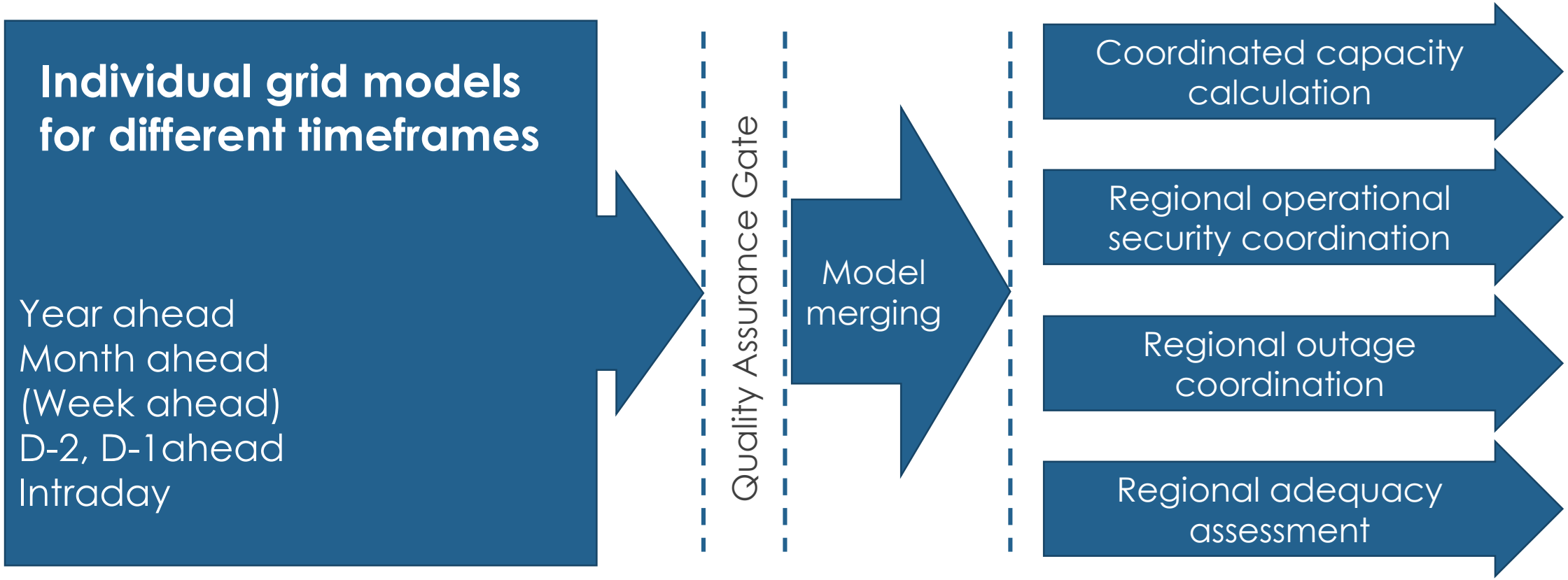
Improved Individual and Common Grid Model Delivery
For agreed future time horizons, TSOs create forecasts of their individual grid, share them with each other and merge them to a pan-European Common Grid Model

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-1ahead
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)

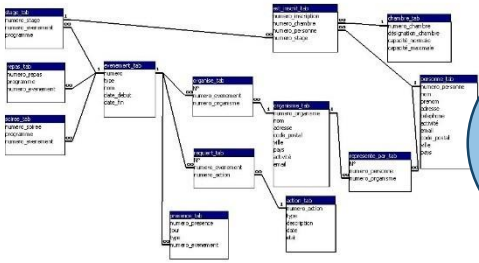
- Operational planning activities to be coordinated
- RSCs to provide 5 services based on CGM
- All data shared in a common Data Environment (OPDE)
- Common format definition

CGM Methodology

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

Applications & general services

Merging function

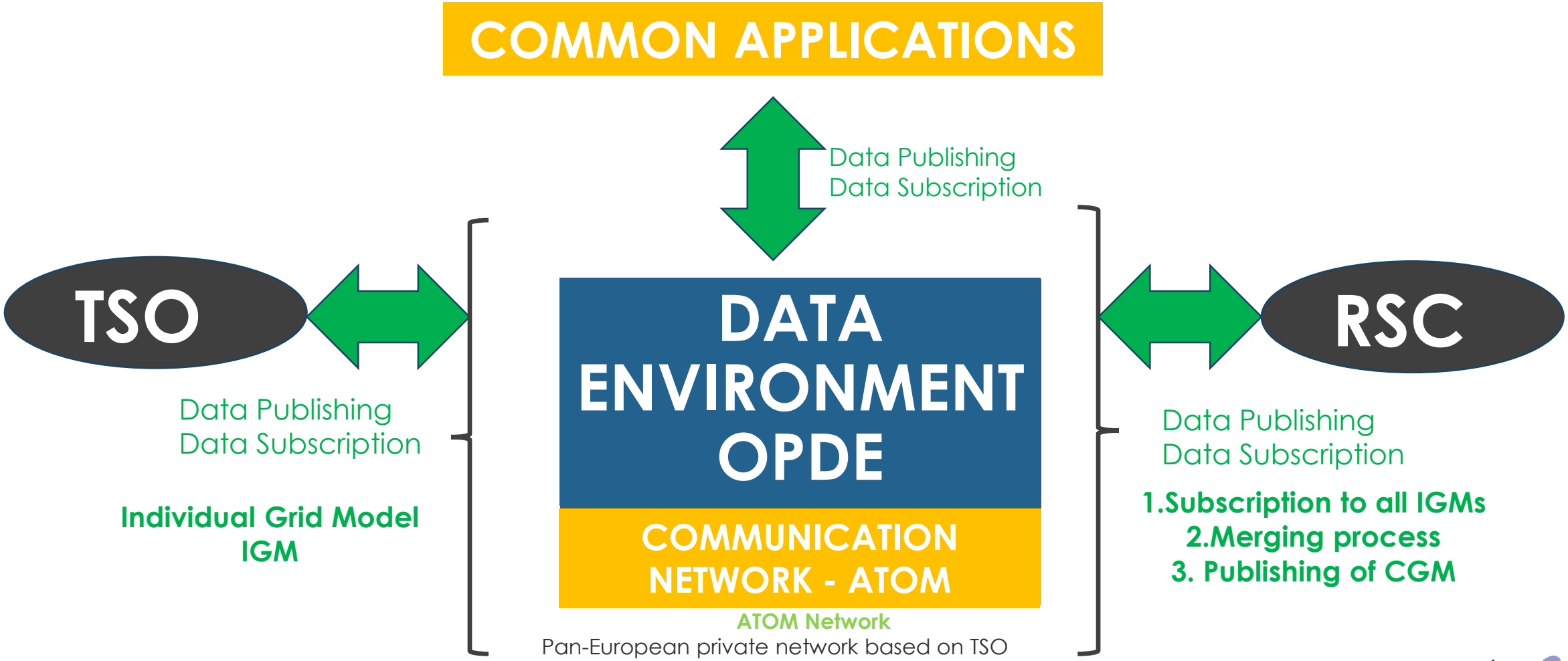


CGMES 2.4

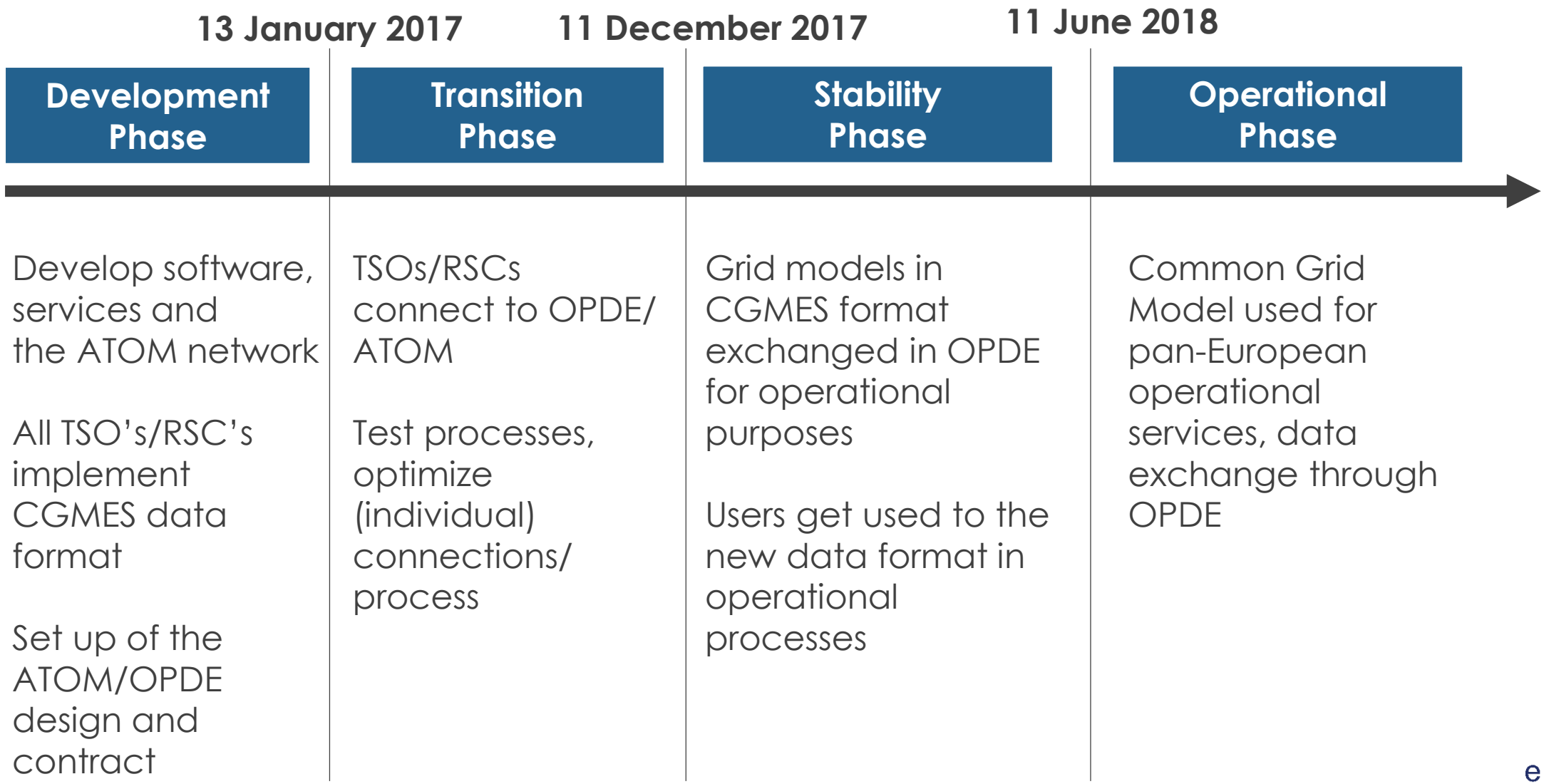
Define and Implement !!

Reliable & secure network

Data Exchange & Services Conceptual Picture



CGM-OPDE Program Phases: current planned milestones



THANK YOU FOR YOUR ATTENTION

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System Operation Framework* Implementation Activities

Tahir Kapetanovic

System Operation European Stakeholder Committee
14 March 2017

* *System Operation Guideline and Network Code Emergency & Restoration*

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KEY IMPLEMENTATION ACTIVTIES … RSCs& REPORTING

IMPLEMENTATION*

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

- 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)

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

SO GL

- ICS Report, § 15
- LFC Report § 16
- RSC Report § 17

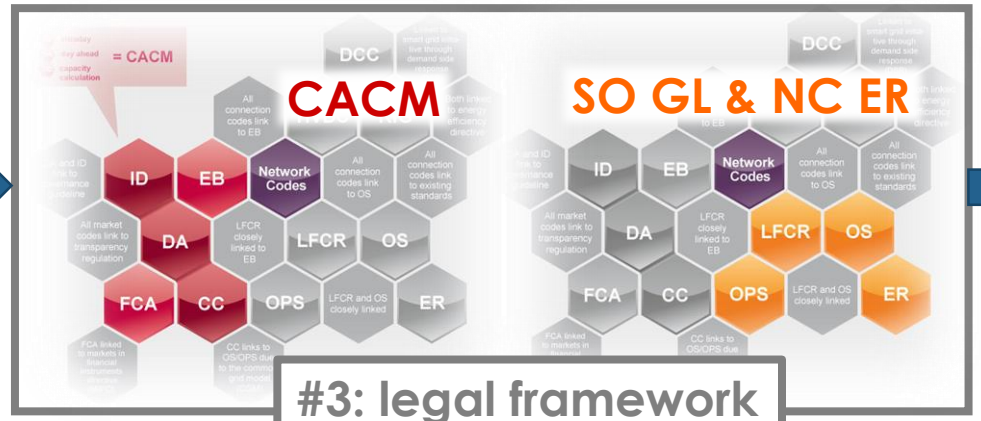
NC ER

- RSC on TSOs defence & restoration plans, § 6(3)
- ENTSO-E on market suspension consistency, § 36

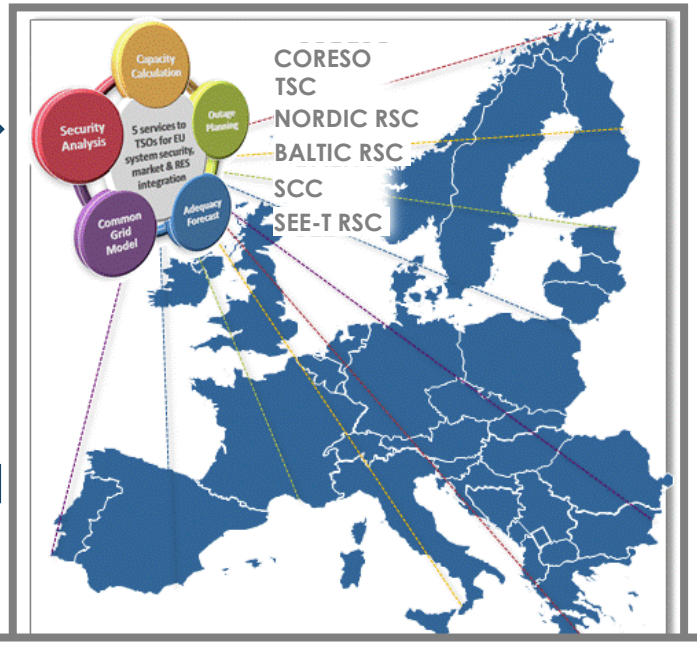
RSC „WHATABOUTS“

#2: contract

All TSOs‘ MLA 12/2015

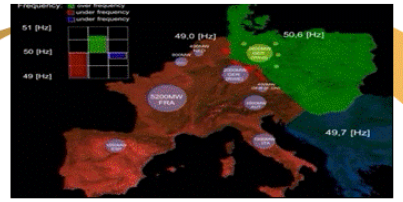


#3: legal framework



#4: five stand. services by RSCs

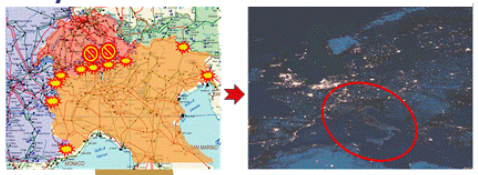
UCTE System-Split 04.11.2006



„Dry summer“ 2005 with supply interruptions and disturbances in GB, FR, DE

Growing volatility of market and renewables since 2006

Italy blackout 28.09.2003



Summer 2002 in Scandinavia (peak load in Norway covered by demand side response since 1996)

Effective measures and coordination needed

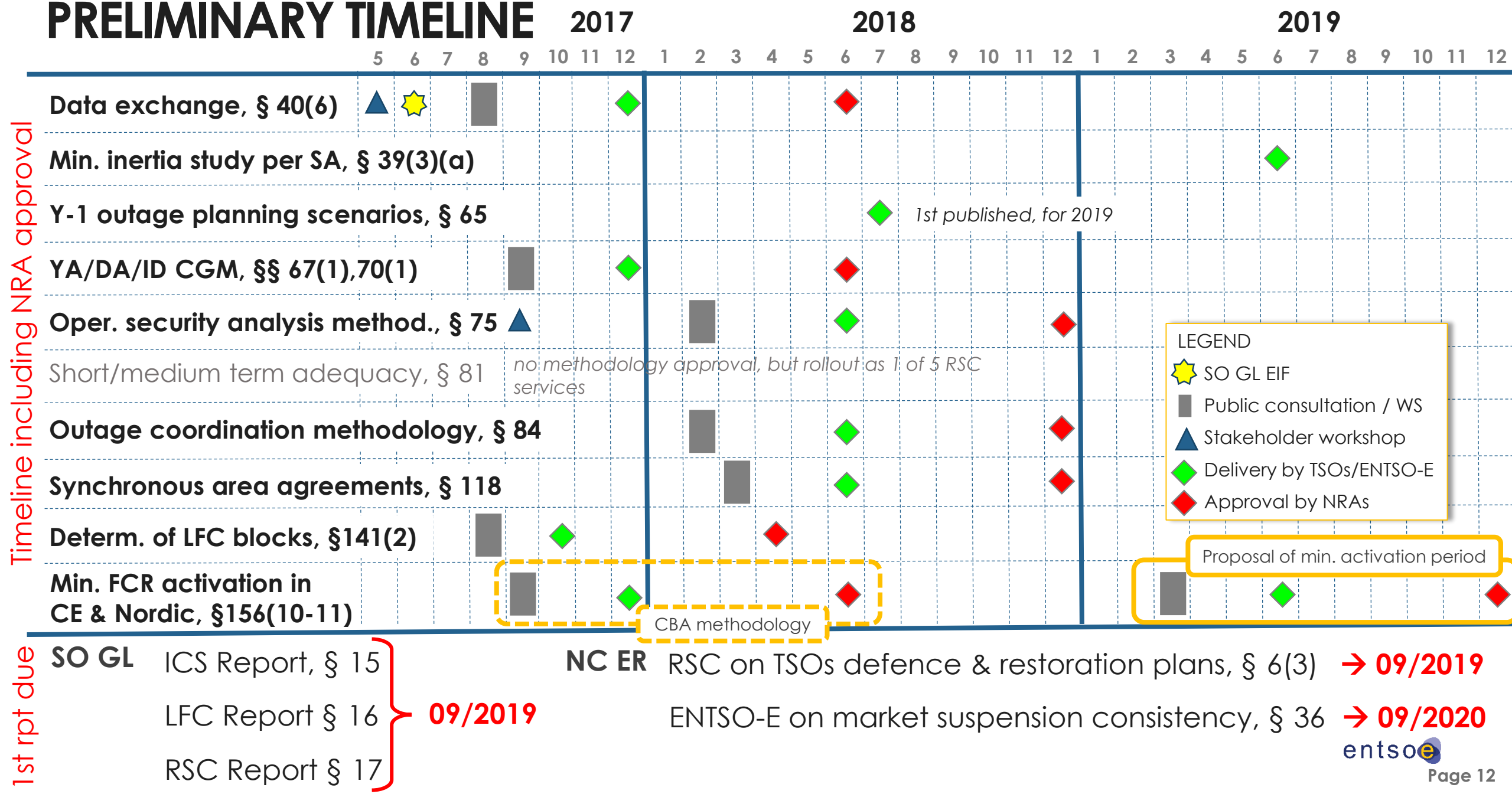
- Operational practice: Regional Security Coordination Initiatives since 2008
- Framework: System Operation Codes / Guidelines expected in 2017

#1: „trigger“ in the past

#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

PRELIMINARY TIMELINE



1st rpt due

SO GL

- ICS Report, § 15
- LFC Report § 16
- RSC Report § 17

09/2019

NC ER

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

THANK YOU FOR YOUR ATTENTION

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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