RSC Role in Coordinated Capacity Calculation

Training on Coordinated Capacity Calculation in Electricity
13 February 2019, Vienna

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Why Regional Security Coordinators – have been created in Europe...
One of the reasons...
One of the reasons – Continental system split 04.11.2006

15 million European households affected by frequency drop!
Increase of electricity exchanges and their volatility by

- Evolution of Internal Electricity Market
- Regional market integration
- Renewables integration
- Nuclear phase-out & decarbonization
Electricity trading in Europe

Physical Import / Export flows (TWh/a) 2017

Trading Volumes on European Day Ahead Market
Source: Energy Exchanges, TenneT

Trading Volumes on European Intraday Market
Source: Energy Exchanges, TenneT

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### Past Developments on Regional Coordination

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>04.11.2006</td>
<td>European System Split</td>
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<tr>
<td>2007</td>
<td>UCTE decision to improve TSO coordination</td>
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<td>2008</td>
<td>Launch of the TSO Security Cooperation (TSC)</td>
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<td>2013</td>
<td>Start of TSC Joint Office activities</td>
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<td>2014</td>
<td>Foundation of TSCNET Service GmbH</td>
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<tr>
<td>2014</td>
<td>ENTSO-E: Future TSO Coordination for Europe</td>
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<td>2016</td>
<td>ENTSO-E: MLA on the participation in RSC(I)</td>
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<tr>
<td>2015 - 17</td>
<td>Network Guidelines &amp; Regional Security Coordinators</td>
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</table>
TSCNET Services - Facts & Figures

- Started as a TSO project in 2008
- Legal entity founded 2014, Munich
- Role of Regional Security Coordinator (RSC) and Coordinated Capacity Calculator
- 24/7 operation
- > 50 employees
- 15 TSO shareholders
- 12 countries & bidding zones
- > 120 GW connected renewables
What the RSCs are doing today

Foundation of RSCs
3rd EU Energy Package 2009

4 Network Codes - obligations on security coordination assigned to TSCNET

Clean Energy Package to set forth achievements on the level of Regional Coordination Centers

Coordinated Security Analysis (CSA)
Capacity Calculation (CC)
Short & Medium Term Adequacy (SMTA)
Outage Planning Coordination (OPC)
Common Grid Model (CGM)
Critical Grid Situation (CGS) & Emergency Restoration Coordination service (ER)
RSCs exclusively act in the non-realtime operational planning time frame. All RSC services address the same electrical system and are not independent.
Significant deviations from forecast can lead to a Critical Grid Situation (CGS). RSCs provide TSO support in escalation and solution management using results of all services.
RSCs are cooperating with each other
TSCNET Activity Areas

Service is live

Services under development

CCR HANSA

CCR CORE

CCR ITALY North

CCR CHANNEL

CWE Flow-based Capacity Calc.

TSO Security Cooperation

CCR (formally no CCR)
Actual Security Coordination between TSCNET & TSC TSOs

Common tool for data exchange and security assessment (AMICA)

27 TSOs’ networks
24 Continental European countries
31,000 elements, 16,900 monitored
7250 contingency scenarios per timestamp
Full integration in TSO control rooms
Hourly rolling forecast
Connected day and night - 24/7
Core competences of TSCNET

Implementation of methodologies defined by TSOs

Development of software tools

Design of RSC-RSC and RSC-TSO processes

Design & operation of IT solutions & software tools

Analytical support, quality management

Optimization & forecasting concepts

24/7 service operations, service level support
Capacity Calculation Implementation in Continental CCRs

**APPROACH**

- Legally governed by CACM & FCA GL
- Input data delivered by TSOs
- Methodologies drafted by TSOs
- Processes aligned between TSOs and RSCs
- Solutions implemented by RSCs
- Consultation by NRAs
- Experimentations in regular mode
- Regulatory approval by NRAs
- Operations by RSCs

**Operation with 2 RSCs**

RSC cooperation level
All-TSO coverage

Data quality management via fixed TSO assignment to a single RSC

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TSCNET Solution for Capacity Calculation (1)

PERUN

Day-ahead Flow-based Capacity Calculation

Integrated solution for CGM merging, Remedial Action Optimization and Capacity Calculation, minRAM application, CNEC selection

Modular & highly adaptable approach
Integration with tools of other RSCs

Fully automatic

Multi-user site platform for RSCs and TSOs

Secure web interface encrypted (HTTPs/SSL)

100% ownership of source code by TSCNET

The solution is highly adaptable basis for the experimentation in CORE CCR.
The solution is accessible by TSOs and RSCs.
VESNA
Intraday coordinated NTC Capacity Calculation

Status: internal parallel run

Shares PERUN modules

Integration with tools of other RSCs

Fully automatic

The solution is basis for the experimentation in CCR Italy North (IBWT).
## VICTORIA

### Long-term Capacity Calculation

**Coordinated NTC calculation**

**Status:** robust experimentation

Based on modules and architecture of PERUN, module for TSO validation

Considers long-term scenarios according to FCA GL

**Fully automatic**

### The solution is applied for the experimentation in CORE CCR.

### Default scenarios (i.e. CGMs, according to CGMM Art. 3):

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Winter Peak</th>
<th>Spring Peak</th>
<th>Summer Peak</th>
<th>Autumn Peak</th>
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</thead>
<tbody>
<tr>
<td>Winter Valley</td>
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<tr>
<td>Spring Valley</td>
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<tr>
<td>Summer Valley</td>
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</table>

+ Add planned outages (from OPC) to the respective default scenario
EXPERIENCES

Only a central capacity calculation for one CCR including all bidding zone borders is acceptable as it provides for both, maximization and simultaneous feasibility of capacities.

Each CCR has different historical background of capacity allocation.

CCR
different needs due to structural and market situation.

Methodological approaches are actually different.

Flexibility of tool setting and tool chain is key for efficient experimentation support of TSOs.

Modularization of software tools is key but no industry standard is yet available.

New solutions are required for highly performant Remedial Action Optimization with complex optimization requirements.

The solution is applied for the experimentation in CORE CCR.
CHALLENGES

NEW regional structures
NEW methodologies & sophistication
Experimentation requirements
Role split RSC – TSO (advisory role)
Corporate Challenges from Activity Growth

Operations & Excellence
Methodologies
Legal Requirements
Corporate Functions
Service Implementation & Delivery
Cooperation with TSOs & RSCs
Organisational structure
Staffing & knowledge
Software & IT
External
Internal

Tranformation of young and small company into a professional service operator.
Governance Model

Customers

- TSO Security Cooperation
- Capacity Calculation Region

Service Level Agreements

Corporation & Shareholders

- Corporate Bodies

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