

European TSOs' Coordination on System Security

Status of Play and Anticipated Evolutions



TSO/TSO Coordination

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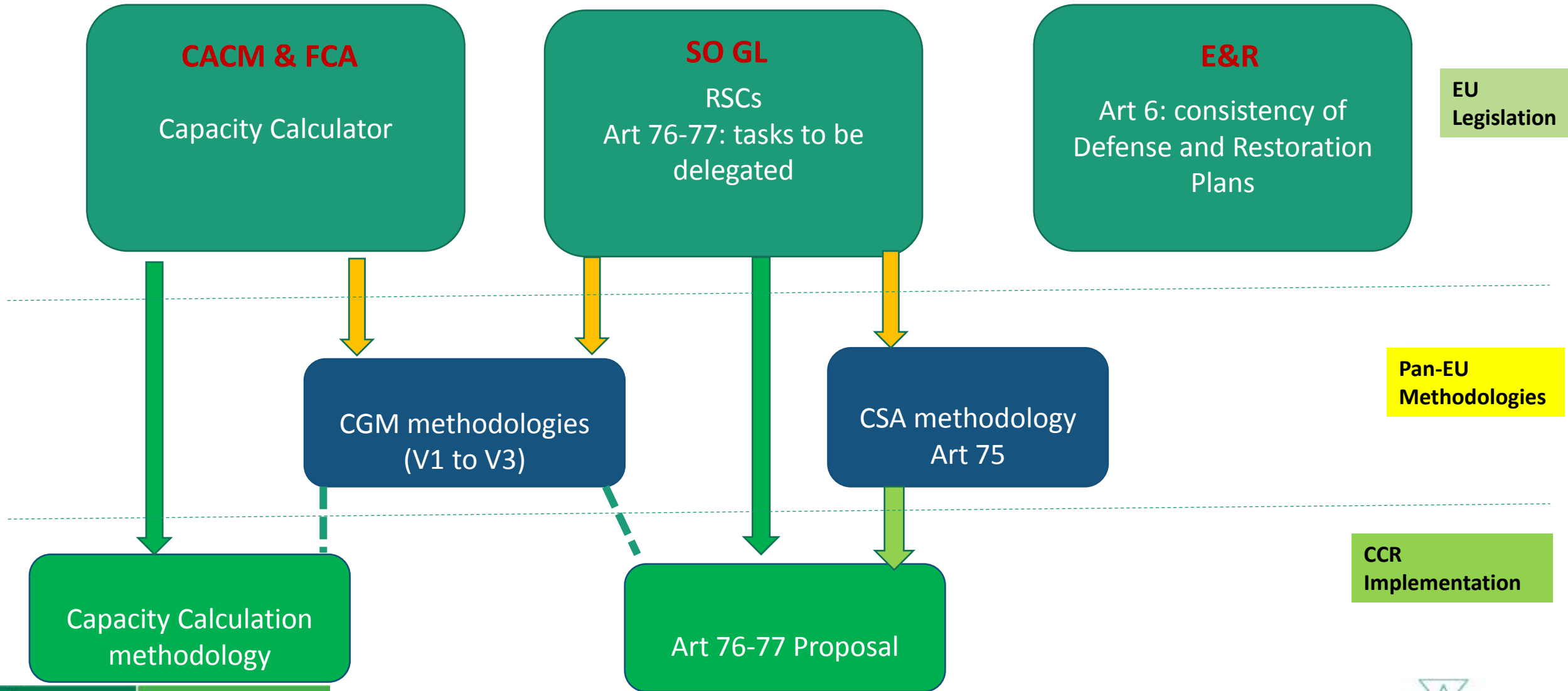
**South East European
Regional Council**



Towards the Integration of Electricity Sector in EU

- Environmental targets, RES exploitation and Integration of an Internal Electricity Market consist the Main and stable policy lines for Europe last decades
- Harmonization of legislation through energy policy “Packages” (Regulations adopted by the European Parliament)
- Specific targets for Emissions, Renewables, Energy conservation and Interconnectors have been set
- Common market structure (Target Model) to allow for Market coupling – the crucial role of interconnectors
- High degree of harmonization already (Grid Codes, Market rules, common capacity auctions etc.)
- Increased risks due to high RES, market behavior, bulk power transfers etc. Coordinated security procedures/rules/actions should be developed. Several Steps are foreseen towards “coordinated security” Actions in the framework of a Common European Market. Creation of RSCs is the first step.
- The crucial role of TSOs and entso-e; entso-e is the crucial facilitator of the implementations
- Pan-European Legislation on Security and transmission capacities
- Clean Energy Package (CEP) is the next important implementation

Relevant Regulations and secondary Legislation



Internal Electricity Market sequence

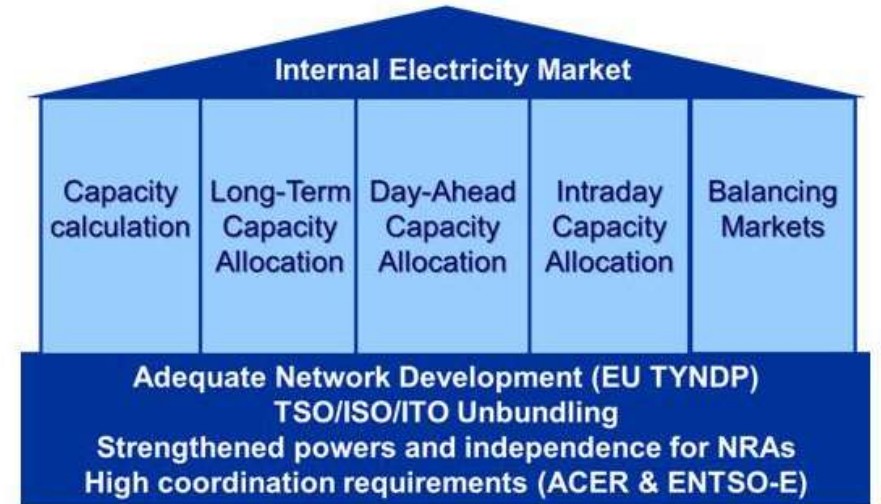
Capacity Calculation – TSO/RSC

Forward Capacity Allocation - TSO

Day Ahead Market - NEMO

Intra Day Market - NEMO

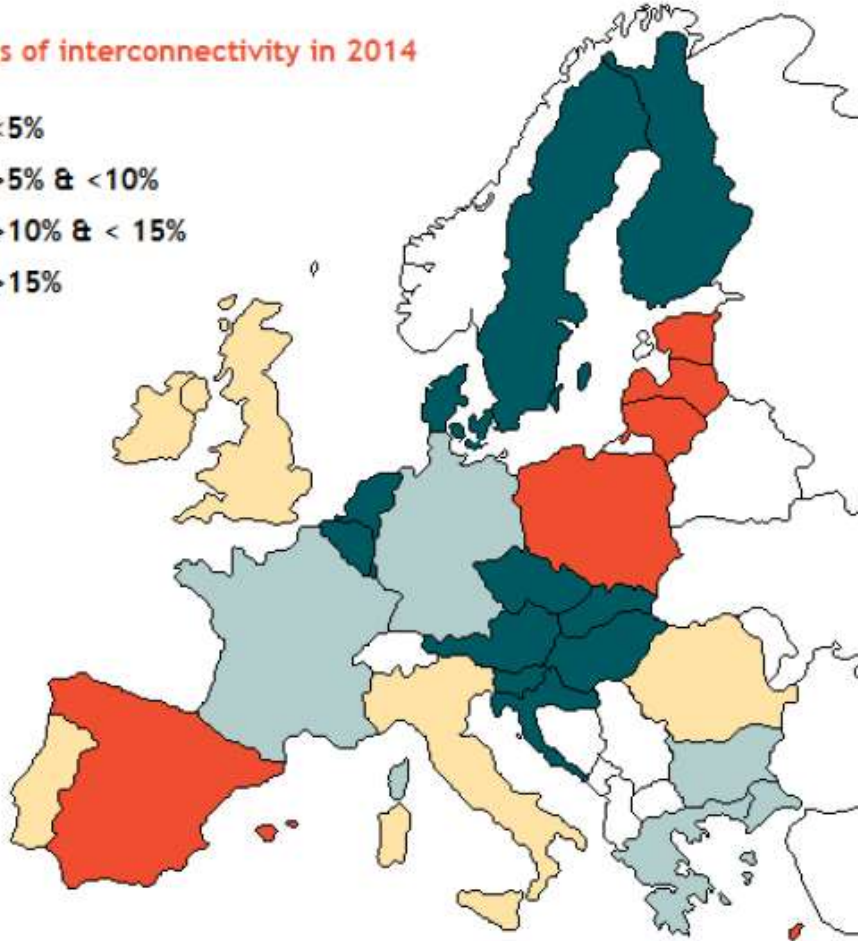
Balancing Market - TSO



Interconnectivity – EU 2014 and 2020

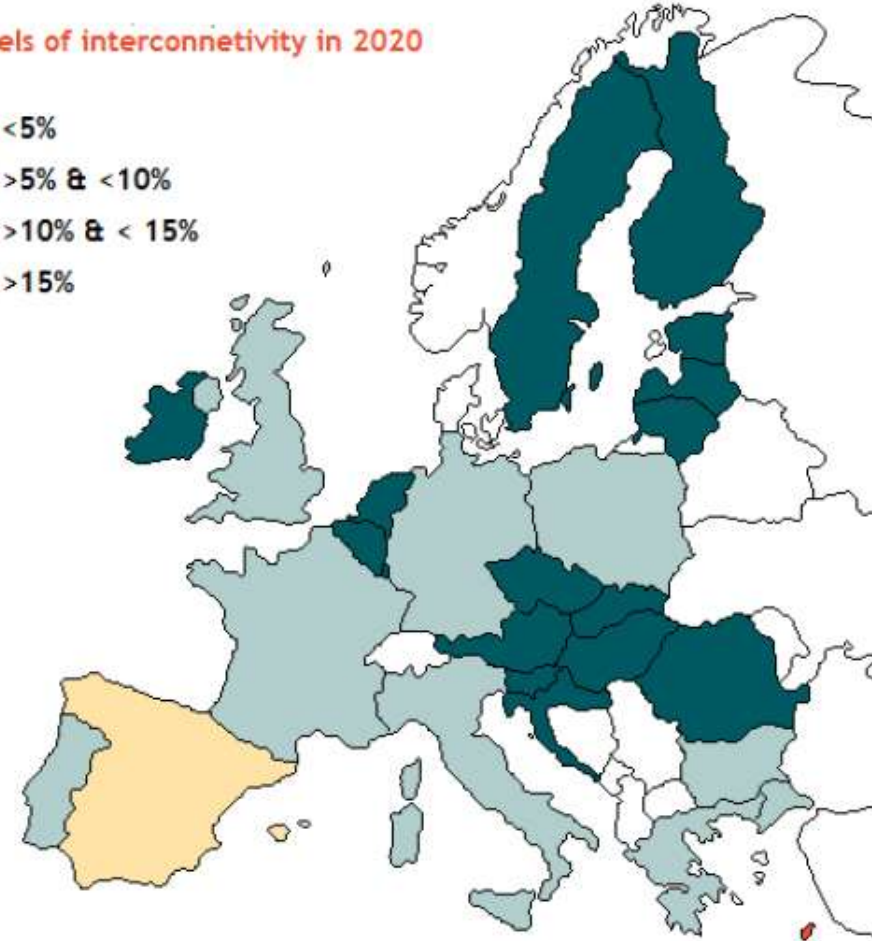
Levels of interconnectivity in 2014

- <5%
- >5% & <10%
- >10% & <15%
- >15%



Levels of interconnectivity in 2020

- <5%
- >5% & <10%
- >10% & <15%
- >15%



RSCs: A Major Step towards Coordinated Security in Europe

- Several Steps are foreseen towards “coordinated security” actions in the framework of a Common European Market. Creation of RSCs is the first step.

- **What are RSCs?**

Regional Security Coordinators or RSCs are entities created and owned by Transmission System Operators (TSOs).

- **Their role**

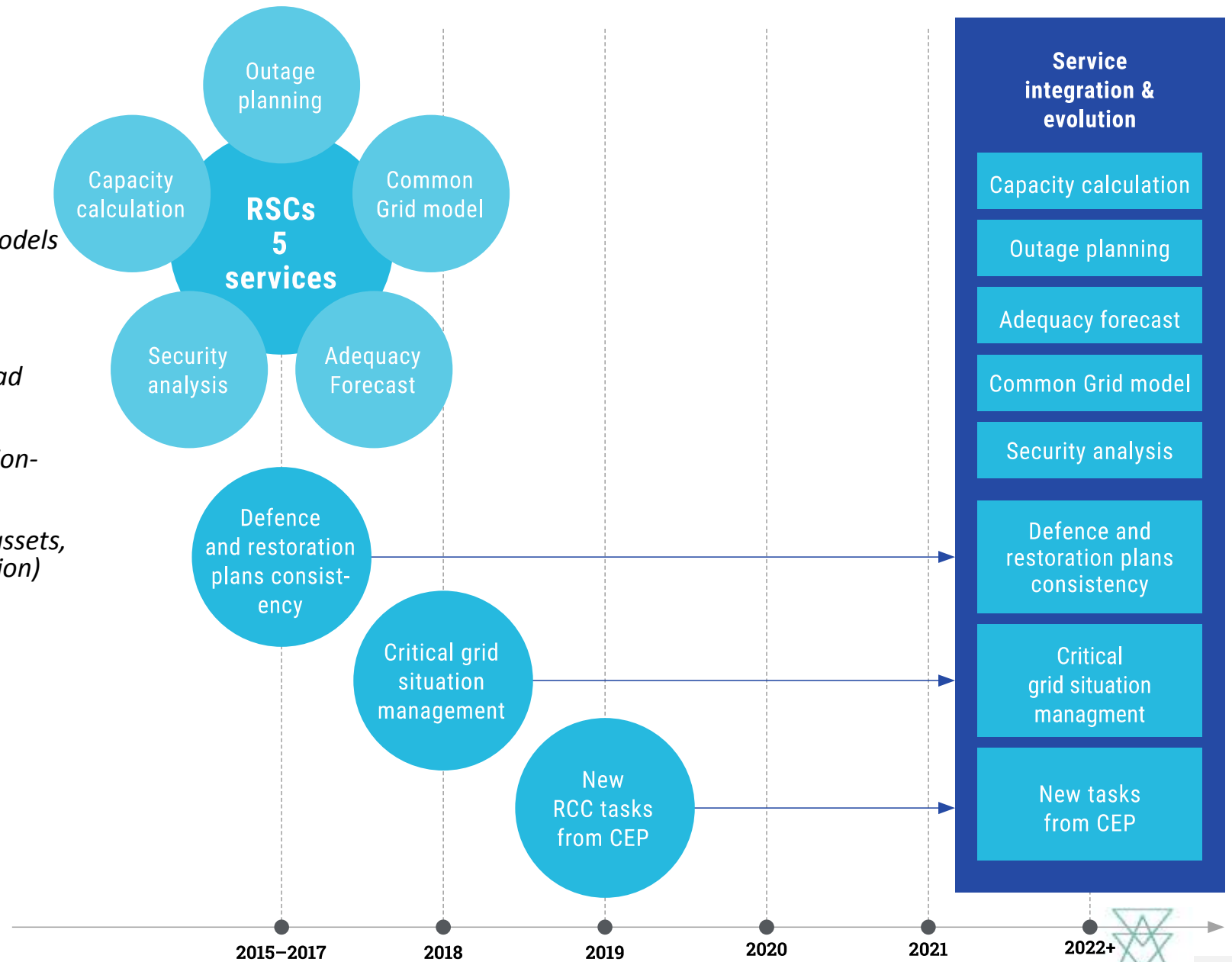
The role of an RSC is to assist the TSOs in their task of maintaining the operational security of the electricity system. They perform services for the TSOs, such as providing a regional model of the grid or advanced calculations to tell TSOs which remedial actions are the most cost-efficient, without being constrained to national borders. RSCs issue recommendations to TSOs

- Moreover, according to the SOGL 77(2):
 - ✓ Each TSO must be covered by one RSC, which will be established by EU TSOs (Clean Energy Package)
 - ✓ No more than 6 RSCs in Europe

Evolution of regional coordinated services

1. **European data model delivery** (Individual Grid Models from TSOs → Common Grid Model)
2. **Security Analysis** (focus: flows)
3. **Regional Capacity Calculation** (input for day ahead markets),
4. **Short-term Adequacy** (short term match generation-load; availability of MW's; link with balancing)
5. **Outage planning coordination** (optimized use of assets, incl PST (Phase Shifter Transfo) and HVDC coordination)

Timeline refers to entry into force and implementation of relevant network codes, all TSO decisions, and CEP regulation.

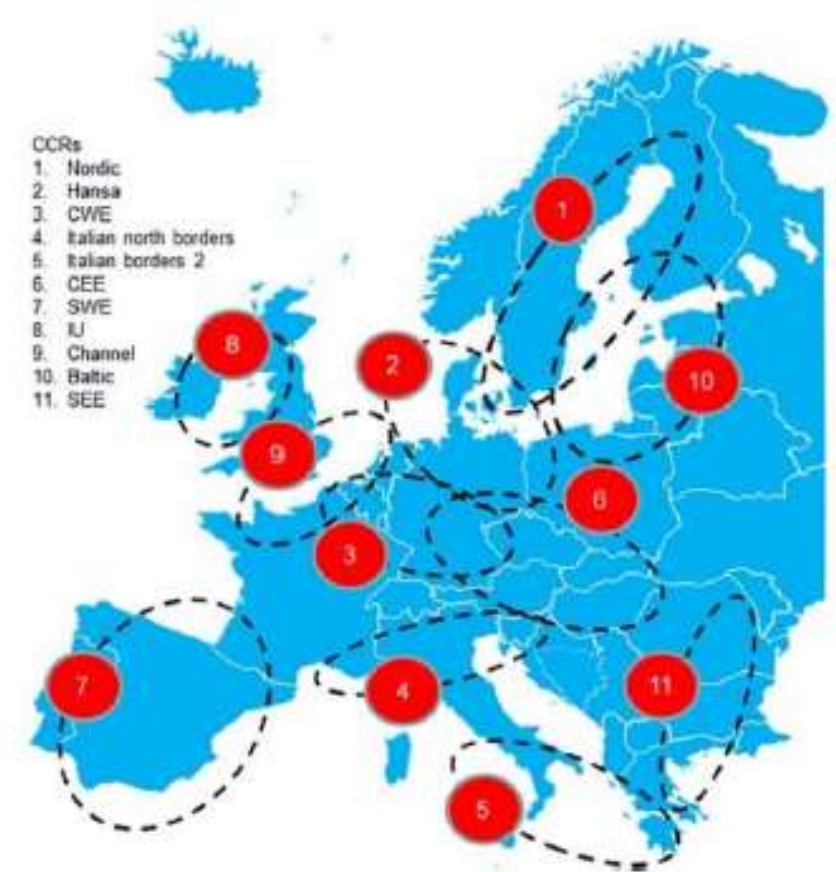


Capacity Calculation Regions

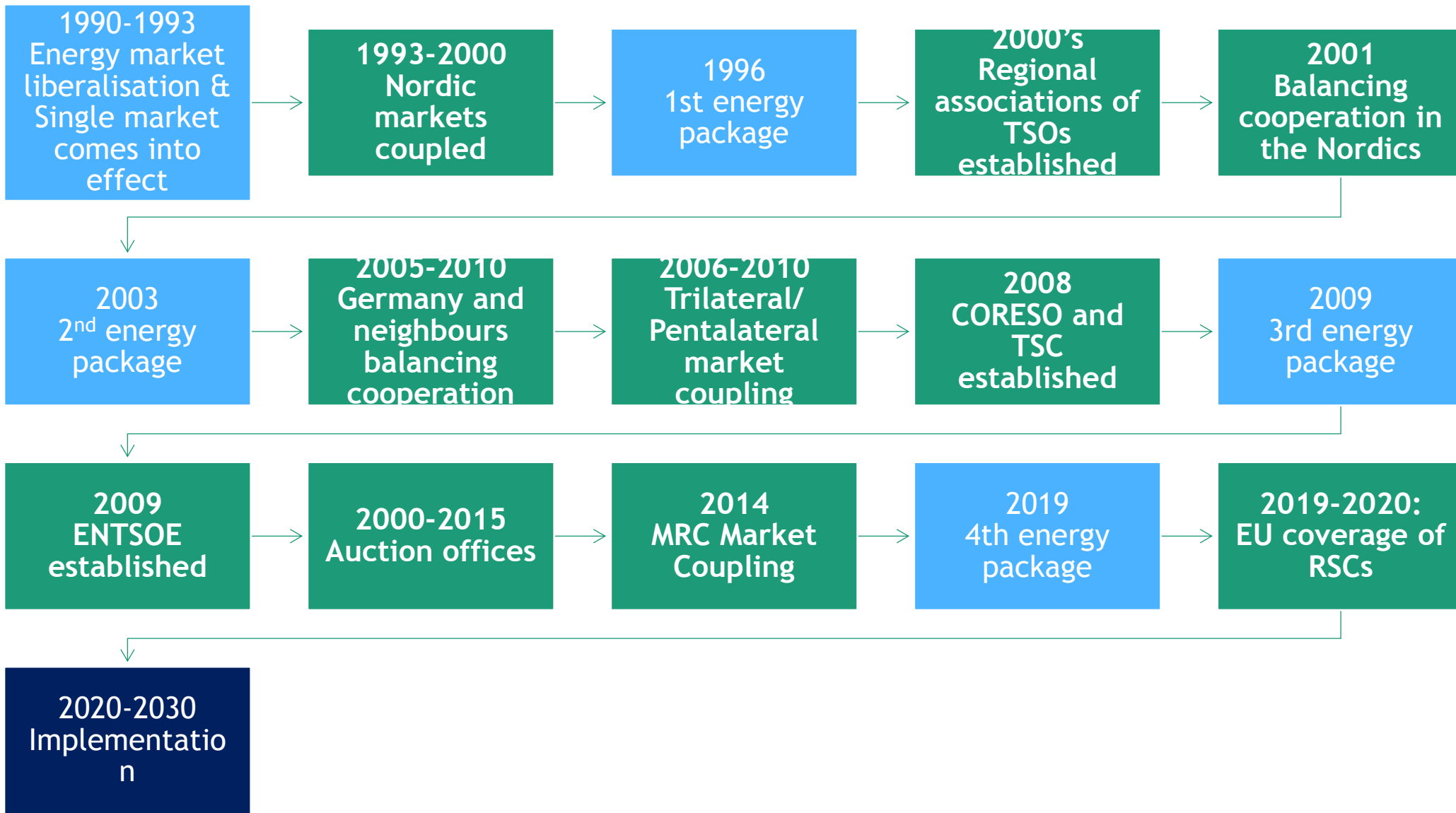
- Responsible: Transmission System Operator (TSO)
- Participation: Regional Security Coordinator (RSC)
- Methodologies for the calculation of the transfer capacities among different bidding zones (within each country) and regions (Available Transfer Capacity, Flow Based)
- Calculation of total volume of annual and monthly transmission rights

Transfer capacity: The capacity (MW) that can be commercially exploited by the electricity market

All technical constraints and security criteria are taken into consideration



Evolution of TSO regional coordination

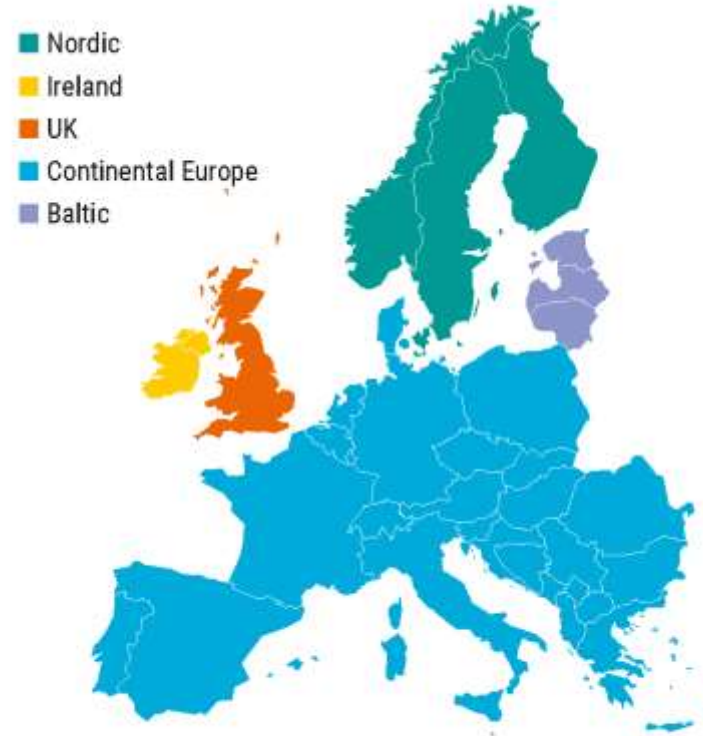


TSO regional coordination: State of play

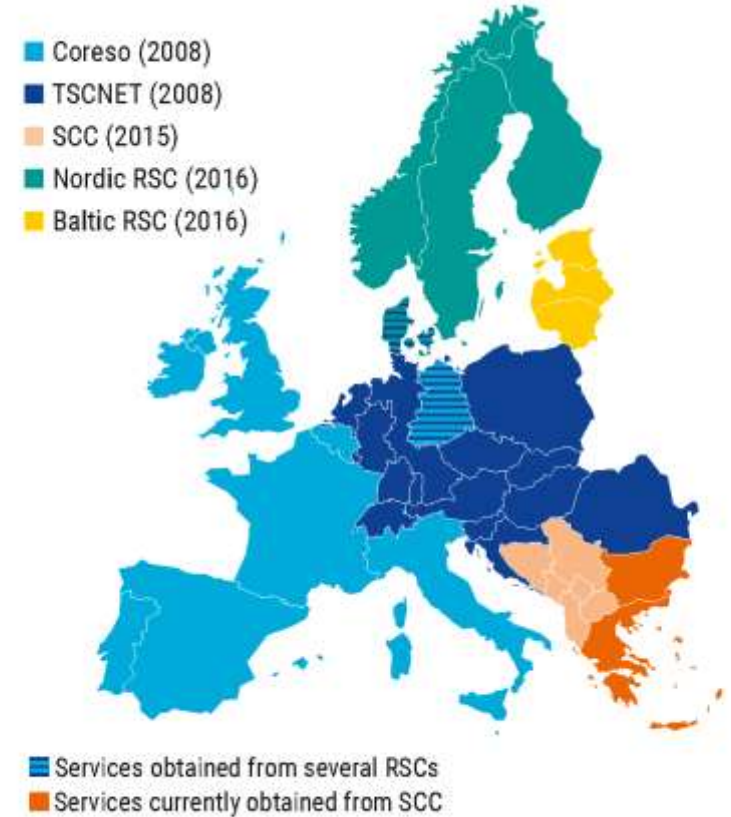
11 CCRs



5 Synchronous Areas



5 RSCs



State of play of TSOs' regional coordination in markets and system operations.

Recent developments towards an RSC/RCC in SEE region



MoU signed on 12/7/2019

Location: Thessaloniki

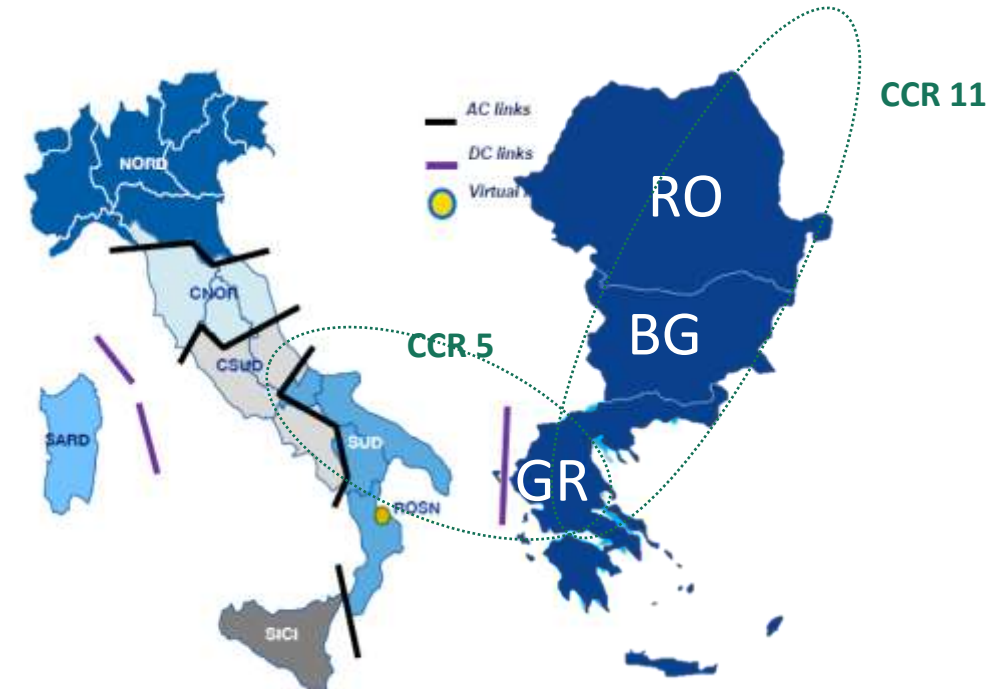
Until RSC establishment:

- ESO will provide CCC
- IPTO will provide CSA

On December 2019, TERN (IT) was welcomed as the 4th member of the SE-RSC

Integrating two Capacity Calculation Regions:

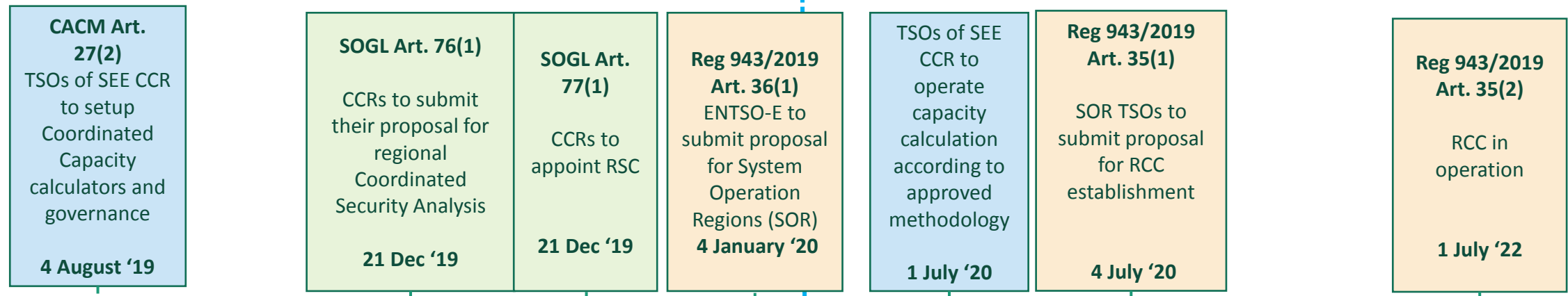
- GR-IT (South Italy-Greece) and
- Southeast Europe (Greece-Bulgaria-Romania)



Key Milestones

TODAY, 23 January 2020

DEADLINES



Events / Decisions

ESO nominated as Capacity Calculator

Agree to allocate tasks to RSC

Agree on SEE SOR and establishment of RCC

Plan to perform Coordinated Capacity Calculation

Main Tools/Services and Properties

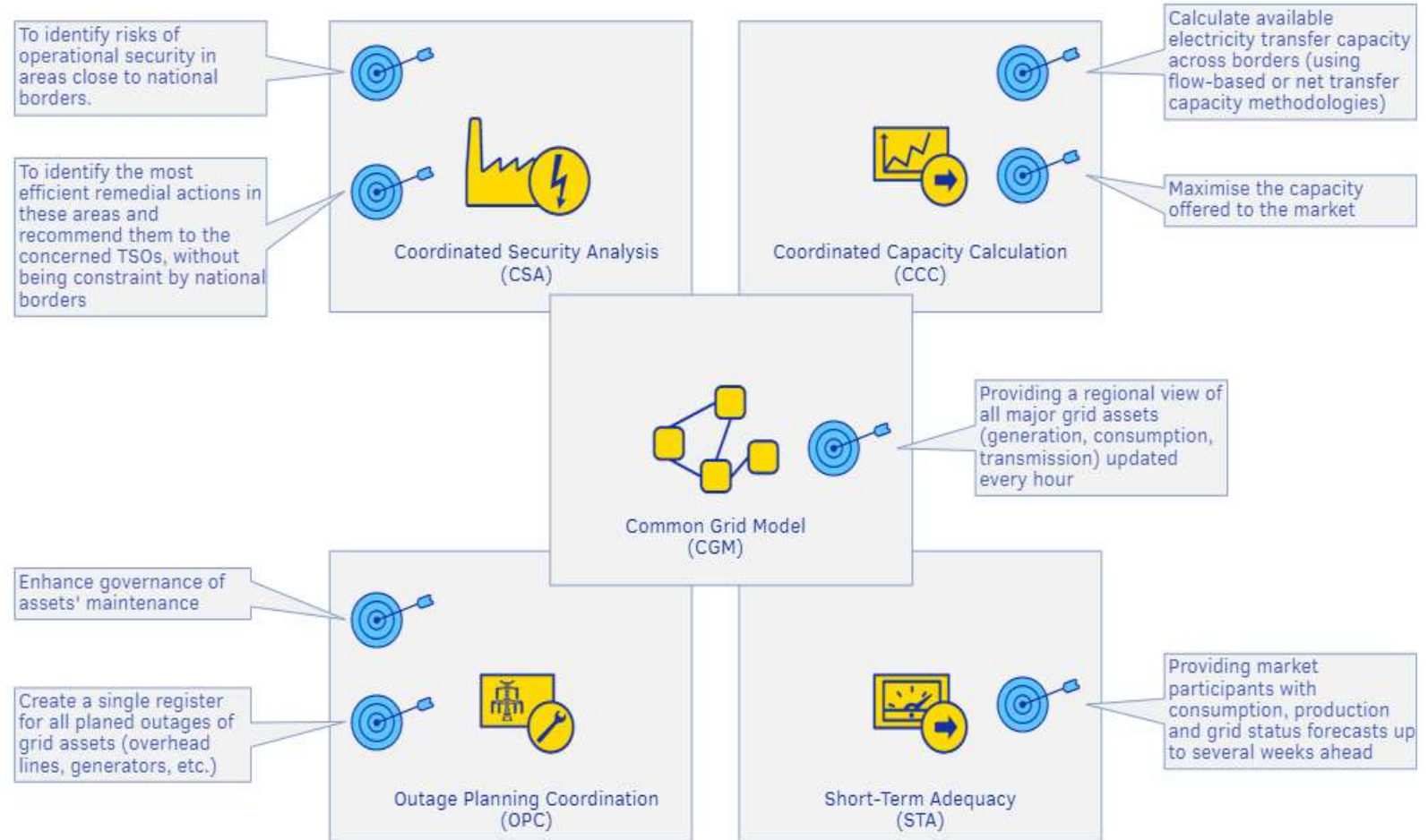
The 5 services will be available Day 1

Architecture enables:

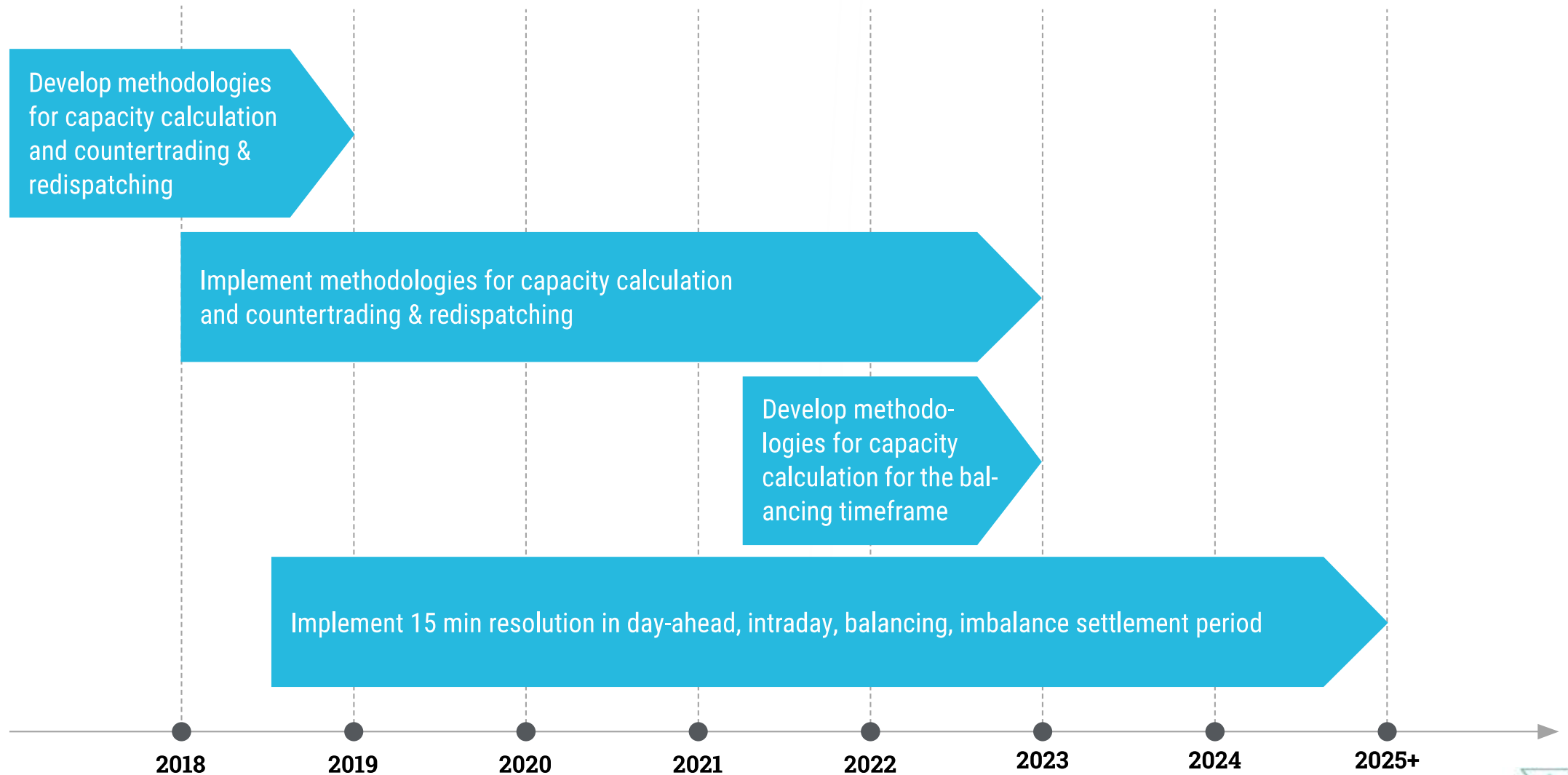
- best use of solution by both RSC and TSO personnel
- implementation of future RCC services in the same platform

Full compliance with authorized methodologies and rules

Starting commercial operation on June 2020



Timeline for major evolution of the CCRs





New tasks of regional coordination centers

(According to the CEP)

1. Support for transmission system operators' defense and restoration plans with regard to the consistency assessment
2. Support the coordination and optimization of regional restoration
3. Post-operation and post-disturbances analysis and reporting
4. Regional sizing of reserve capacity
5. Facilitation of the regional procurement of balancing capacity
6. Week-ahead to at least day-ahead regional system adequacy assessments and preparation of risk reducing actions (new+existing)
7. Optimization of inter-transmission system operator compensation mechanisms
8. Training and certification of staff working for Regional Coordination Centers
9. Identification of regional electricity crisis scenarios
10. Identification of needs for new transmission capacity, for upgrade of existing transmission capacity or their alternatives
11. Calculation of the maximum entry capacity available for the participation of foreign capacity in capacity mechanisms
12. Preparation of seasonal adequacy assessments



Thank You

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Ρυθμιστικό πλαίσιο αγοράς

ENTSO-E Network Codes

Βάσει της Οδηγίας (ΕΕ) 714/2009, το 2017 θεσπίστηκαν οι ακόλουθοι οκτώ Κώδικες και Οδηγίες:

Market: *CACM, FCA, EBGL*

- Capacity Allocation and Congestion Management GL,
- Forward Capacity Allocation GL
- Electricity Balancing GL

Operation: *SOGL, ER*

- System Operation GL
- Emergency and Restoration NC

Connection: *RfG, DC, HVDC*

- Requirements for Generators NC
- Demand Connection NC
- High Voltage Direct Current Systems NC