



COMMISSION  
DE RÉGULATION  
DE L'ÉNERGIE

## **FORUM OFATE**

24 OCTOBER 2019, BERLIN

### **Security of supply in the light of electricity network codes and guidelines' implementation: issues at stake**

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## QUICK DIVE INTO...

- Development of network codes through intense cooperation
- Lessons learned
- Emerging challenges for the market design
- CEP: a way forward?

# FROM EARLY (AND VOLUNTARY) IMPLEMENTATION...

- Several **voluntary cross-border initiatives** were already in place before the development of European network codes and guidelines (NCGL):

- Day-ahead market coupling through implicit auctions (FR-BE-NL in 2007 + DE in 2010 + UK-Nordics in 2013 + ES-PT in 2014...)
- Flow-based capacity calculation in Central Western Europe since 2015
- FCR cooperation since 2007 (German TSOs), extension to neighbouring TSOs from 2014 onwards...
- iGCC cooperation since 2010...

- Several success stories thanks to...

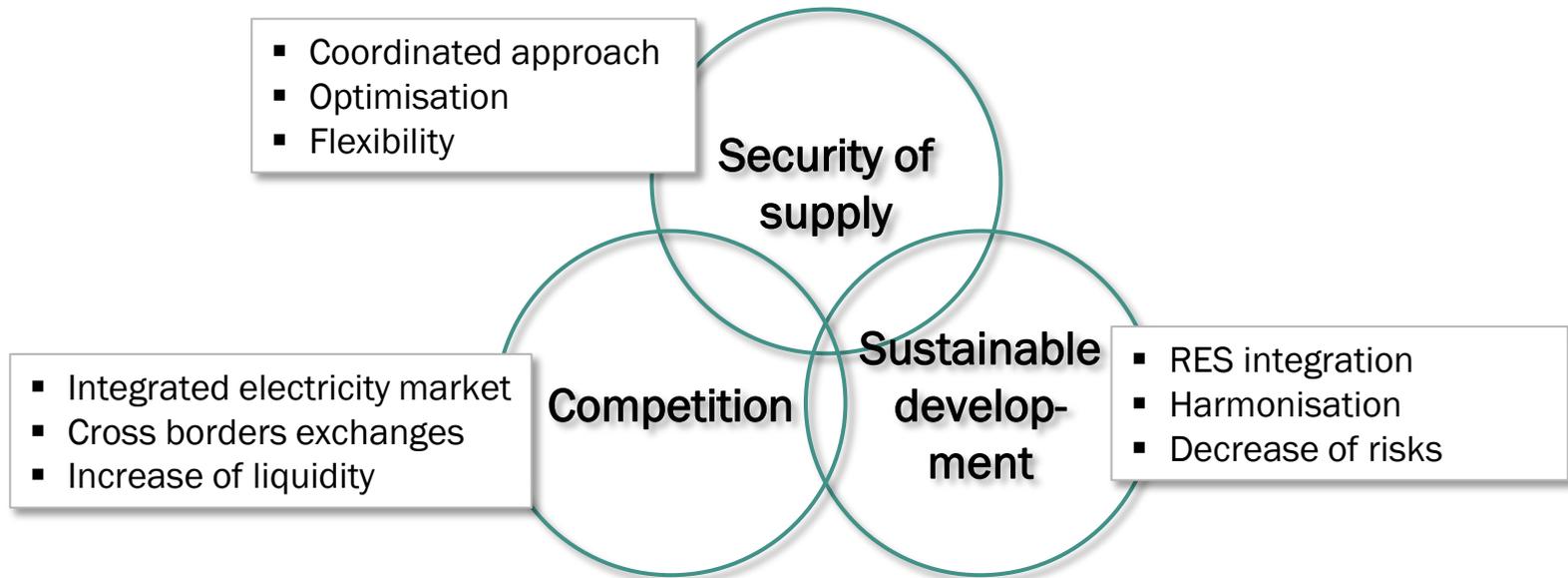
- the **cooperation** between TSOs and NRAs
- **inputs from stakeholders**

- ... which allowed to **build the UE target model for integrated electricity market**, which in turns was transcribed in the NGCL.

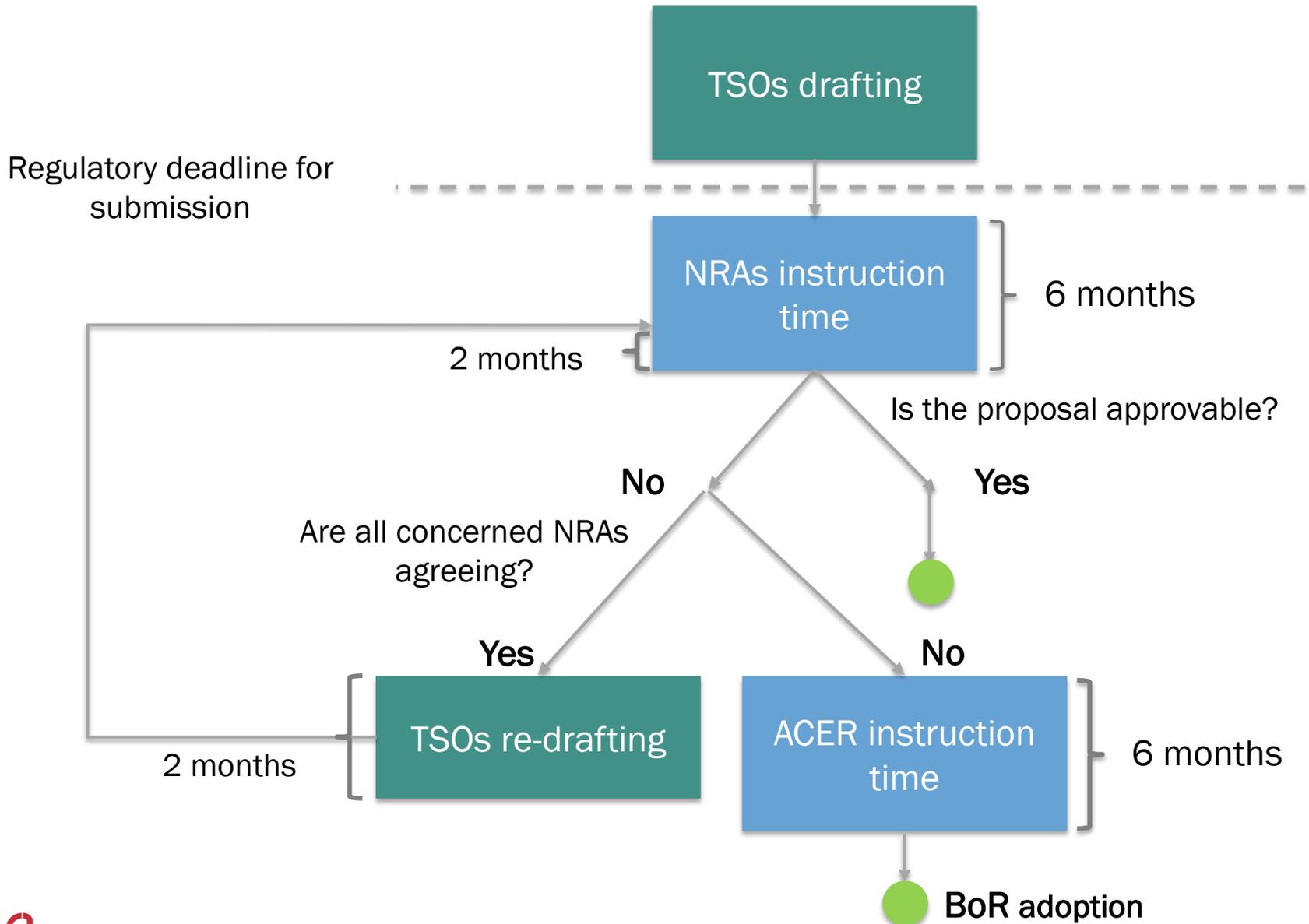
*Day-ahead market coupling in Europe*



# ... TO NETWORK CODES AND GUIDELINES...



# ... WHOSE IMPLEMENTATION REQUIRED SUBSTANTIAL COORDINATION AMONG TSOS AND NRAS



# ... AND FURTHER ENTRY INTO FORCE OF THE CLEAN ENERGY PACKAGE (CEP)

- 8 texts, representing more than 5,000 pages:
  - Electricity Directive (revision)
  - Electricity Regulation (revision)
  - ACER Regulation (revision)
  - Renewable Energy Directive (revision)
  - Regulation on risk preparedness in the electricity sector
  - Regulation on the governance of the Energy Union
  - Energy efficiency Directive
  - Energy performance of buildings Directive



Entry into force between  
mid 2018 and mi 2019



# HOW DO NETWORK CODES AND GUIDELINES SUPPORT SECURITY OF SUPPLY?

- NCGL allow for **improvement of regulatory framework**.
  - More ambition for electricity **market design**...
    - Definition of a target model
    - Binding implementation timeline
  - ... and for the **operational management** of network
    - Some **historical best practices promoted as state of the art**
    - Clarification of technical requirements for grid connection
  - Harmonisation of essential features
    - Facilitation of **cooperation and coordination** amongst TSOs
    - Enhancement of level playing field amongst market participants
- A few examples:
  - Common grid model and capacity calculation methodologies
  - Requirement for reserves dimensioning
  - Standard products for electricity balancing exchanges

# A CONCRETE ILLUSTRATION OF SECURITY OF SUPPLY: THE ROLE OF INTERCONNECTIONS

- Interconnections play a major role to ensure security of supply.

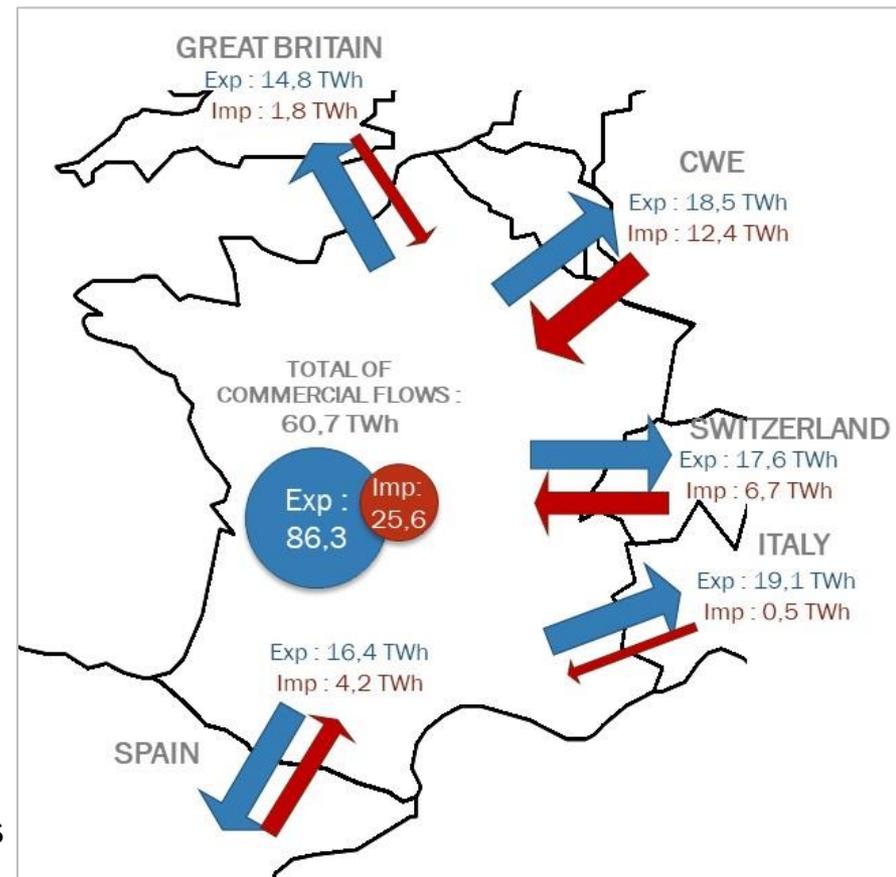
- Interconnections represent a **significant flexibility tool** in case of adequacy situations. France could rely on imports during several moments of tightness:

- Cold wave in January-February 2012
- Multiple Nuclear power plants shutdowns in November-December 2016

- Recent progress in operation of interconnections **enabled improving the efficiency of their use** at all timeframes:

- **Long term**: single allocation platform (JAO), harmonised rules allocation;
- **Day-ahead and intraday**: efficient allocation through implicit allocation;
- **Balancing**: exchanges of balancing energy as a prerequisite for exchanges and sharing of reserves.

*Electricity commercial flows at the French borders in 2018 (TWh)*

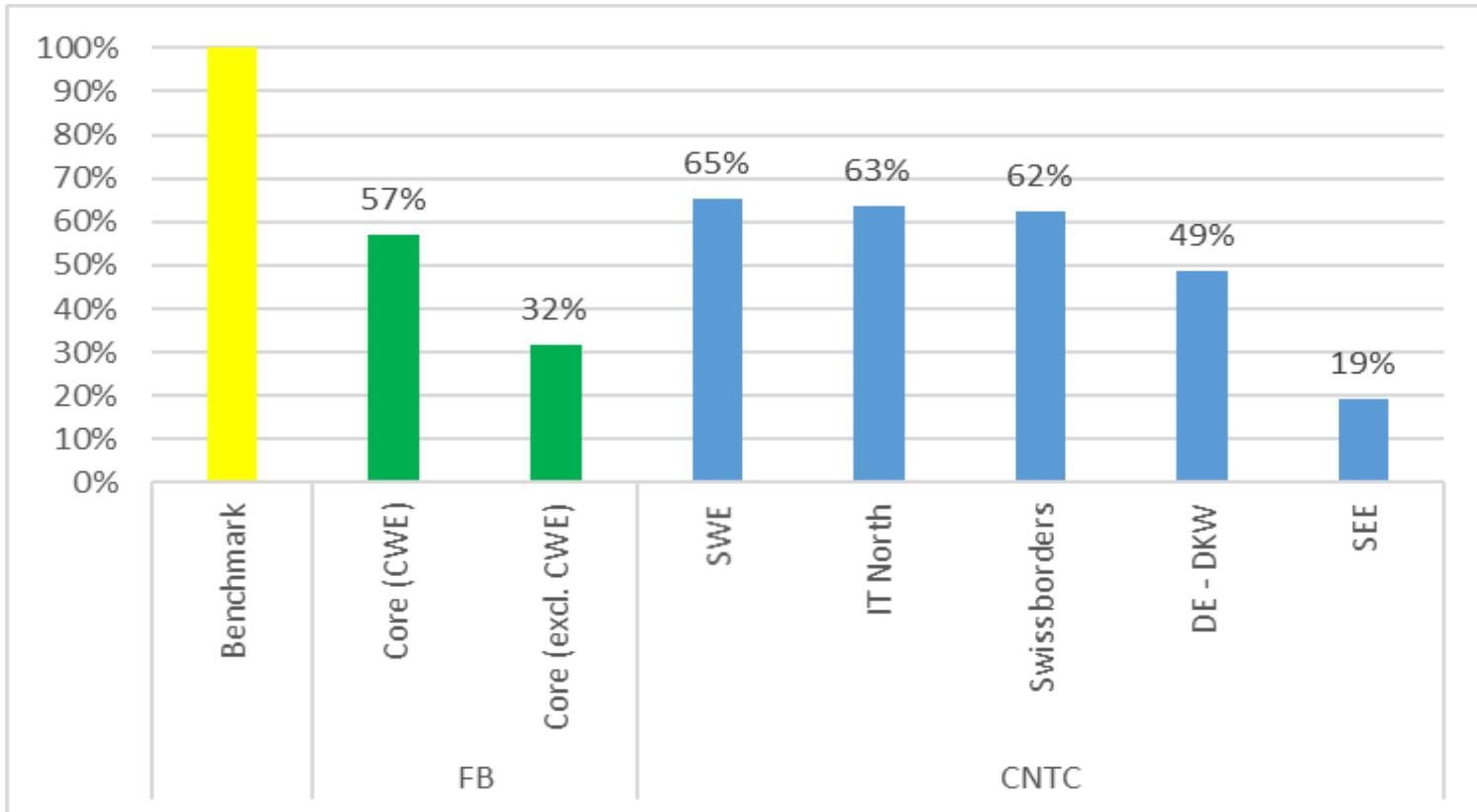


# HAVE NETWORK CODES AND GUIDELINES FULLY DELIVERED?

- Beside the positive results, some methodologies are still to be adopted and **many provisions remain to be actually implemented**. A few examples:
  - Actual implementation of capacity calculation methodologies
  - European platforms for the exchange of aFRR, mFRR, RR
- Furthermore, **several trends** in the electricity sector are experienced that challenge the zonal market design:
  - Increased renewable generation
  - Increased decentralised production
  - Decommissioning of centralised generation
  - New electricity usages
- Historical adequacy between zones, generation/load location and balance with networks are thus challenged. **Market design may not be as efficient as expected when the third package was adopted...**
  - **Some symptoms:** reduced cross-border capacities, high amount of loop flows, redispatching and countertrading costs

# COORDINATED NET TRANSMISSION CAPACITY REGIONS PERFORM WELL BUT IMPROVEMENTS ARE POSSIBLE

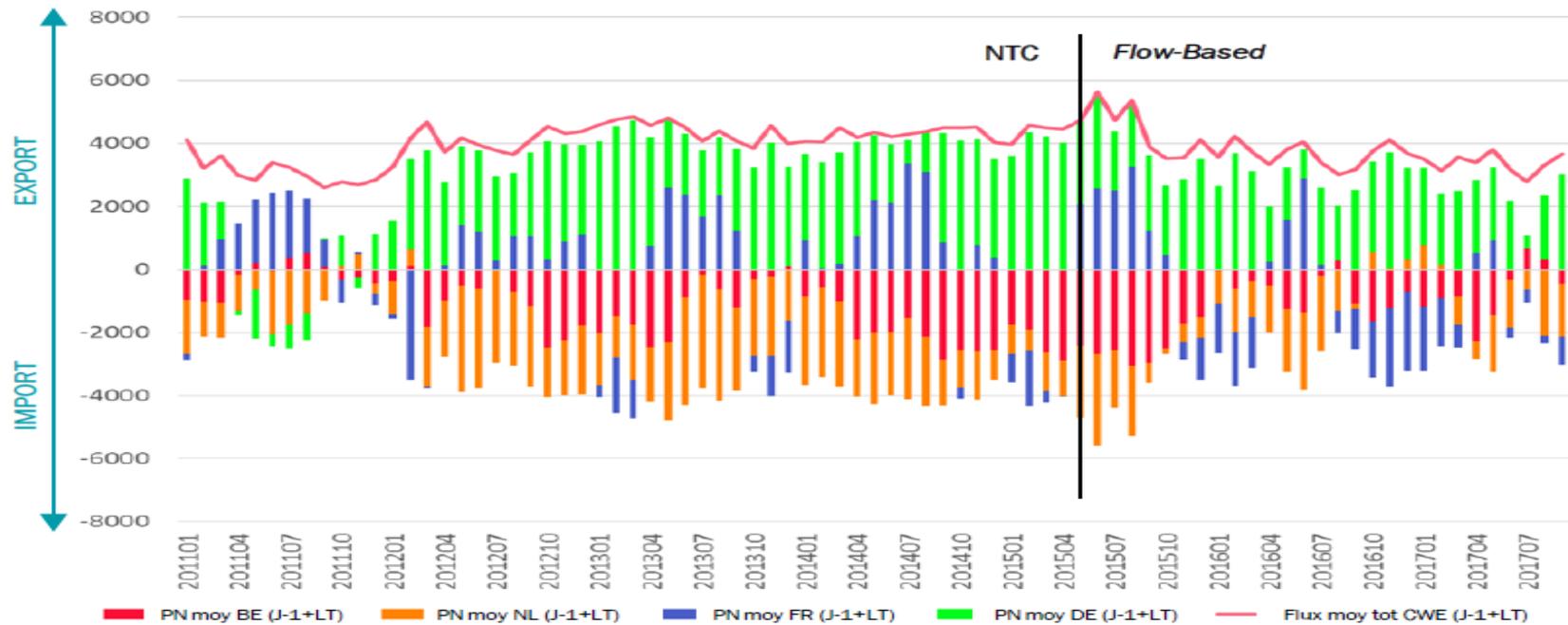
Available capacities in 2017 (in % of benchmark capacity)



Source: ACER calculations based on NRAs, Nord Pool Spot and ENTSO-E's data.

# TECHNICAL IMPROVEMENTS SUCH AS THE FLOW-BASED DID NOT DELIVER ALL EXPECTED BENEFITS

Net positions and total cross border flows in CWE (MW)

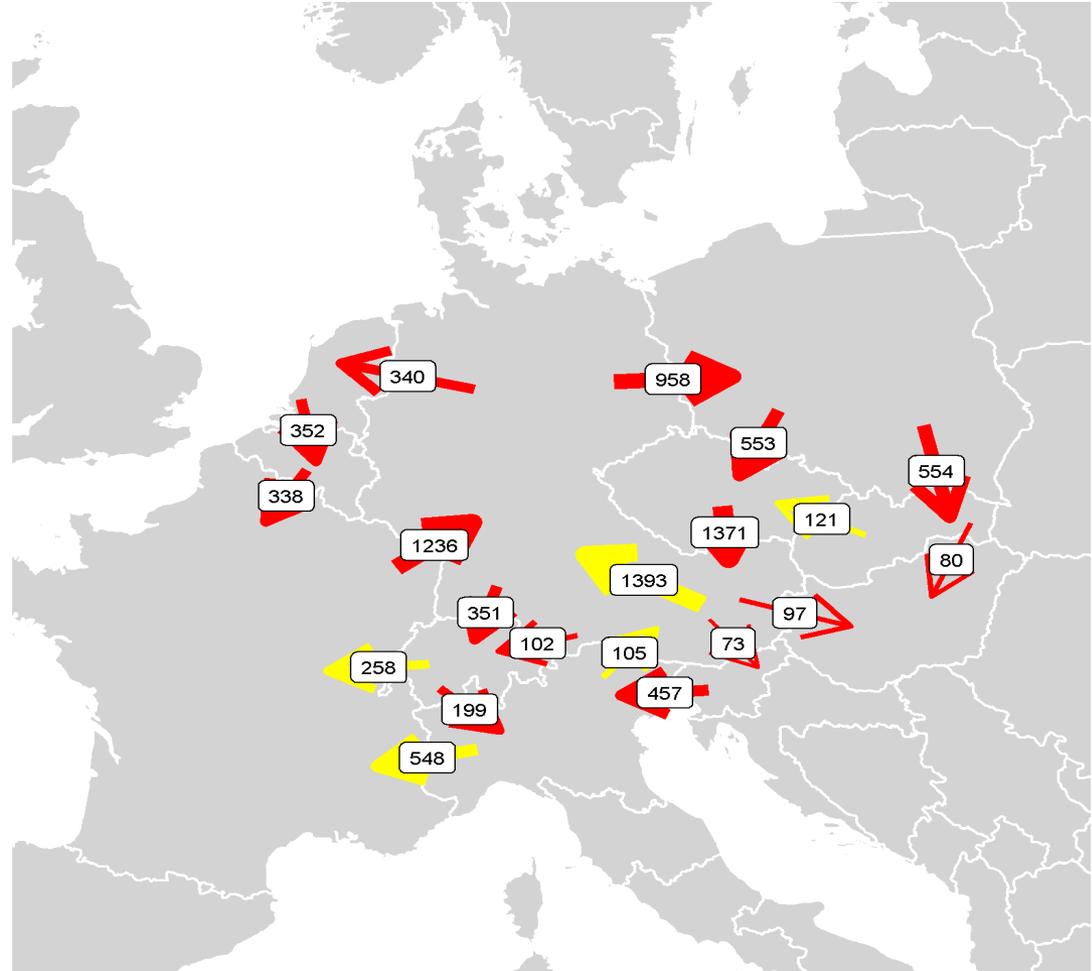


Source: CREG analysis

# SIGNIFICANT AMOUNTS OF LOOP FLOWS ARE OBSERVED IN EUROPE

*Average unscheduled flows in Continental Europe in 2017 (MW)*

- Small volumes of loop flows are a natural consequence of physics (Kirchhoff laws).
- However, **high volumes are the consequence of market design failures.**
- Such high volumes may have a strong impact on **operational security for TSOs.**

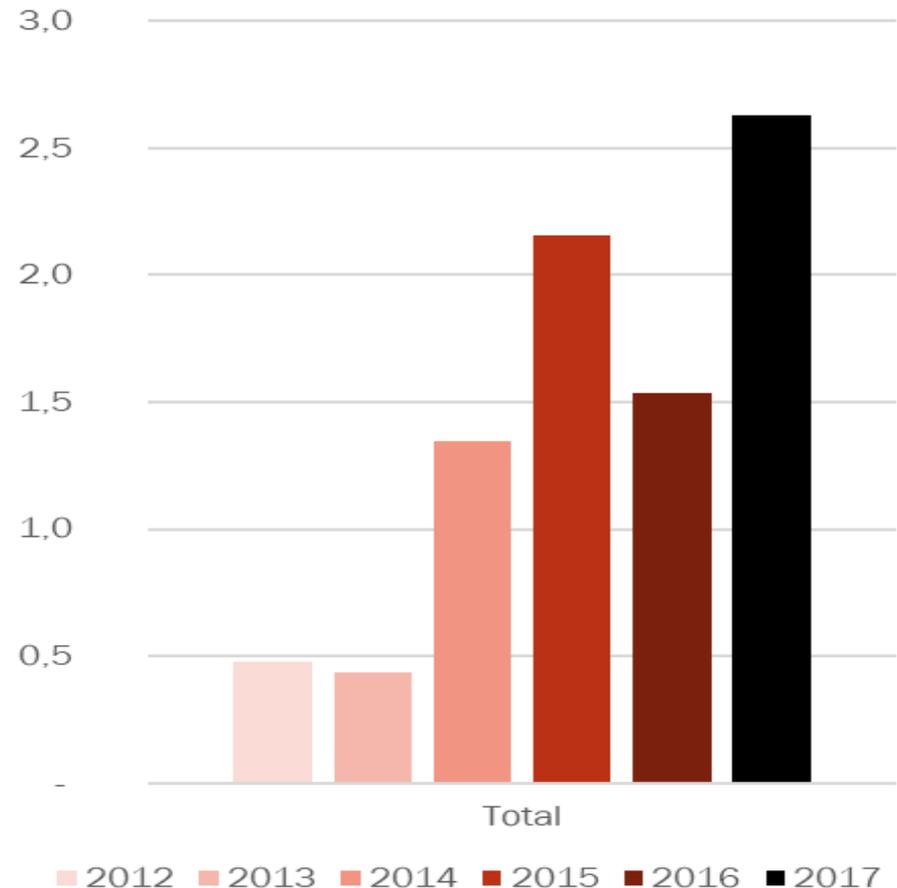


*Source: ACER calculations based on NRAs, Nord Pool Spot and ENTSO-E's data.*

# REDISPATCHING AND COUNTERTRADING COSTS ARE ALSO RISING SIGNIFICANTLY

- Redispatching and countertrading costs were **multiplied by more than 5.5 between 2012 and 2017**.
- This is **another (economic) illustration of the growing challenge** of adequacy between bidding zone configurations, generation/load location and networks.
- The increase is particularly important in DE and the UK where changes in generation mix are particularly swift and massive.

*Change in RDCT costs in 8 countries (bn €), 2012-2017*



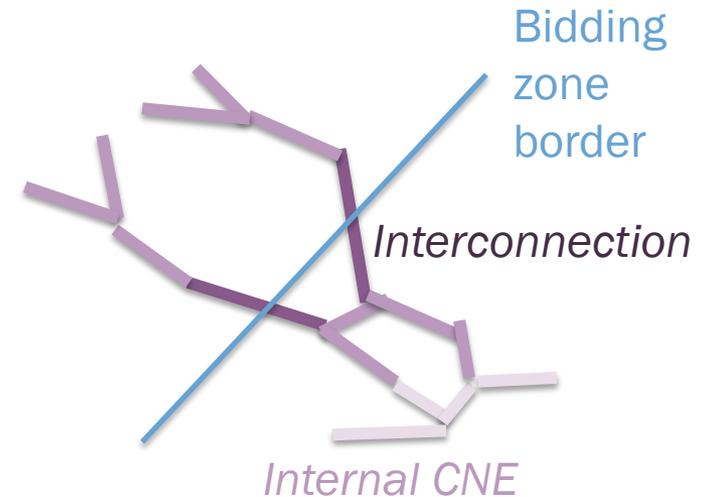
*Countries: DE, UK, SP, PL, AT, NL, NO, FR*

*Source: CRE*

# THE CEP ATTEMPTS TO TACKLE THESE ISSUES WITH THE 70% TARGET

- In its proposal for a recast electricity regulation, the European Commission proposed to address these issues.

- After trilateral negotiations a **70% target for the capacity that all critical network elements (CNEs) need to provide for cross-border exchanges** was eventually introduced.



- This target should force TSOs, NRAs and Member States to increase the available capacities for cross-border exchanges and better face the challenges raised by the evolutions of the electric systems:

- Through investments, bidding zones review...
- With a period for adaption until 2025: possibility for action plans or derogations

# WHICH CHALLENGES FOR THE IMPLEMENTATION OF THE 70% TARGET?

- A highly technical text for a highly technical issue!
- **Paradigm shift** for TSOs to perform capacity calculation:
  - Historically margin on CNEs was an output of the capacity calculation processes...
  - ... now becomes an input
- New tools need to be further developed to **meet this operational challenges** to:
  - Set up a minimum margin threshold on individual CNEs
  - Check that these thresholds do not endanger operational security
  - Implement remedial actions, if needed, to that effect
- The **70% will probably not be met as of 2020**.
  - Action plan already announced in Germany
  - Derogations very likely in other Member States

# ANNEXES

# SEVERAL TRENDS IN THE ELECTRICITY SECTOR

## CHALLENGE ZONAL MARKETS

- **Significant mix and localization changes are being experienced:**
  - Increased renewable generation: the energy produced from renewables **increased by 64.0 % between 2007 and 2017**.
  - Increased decentralized production: smaller wind and solar farms, demand side response, storage etc.
  - Decommissioning of centralized generation: German complete phase out by 2022 with nearly **half of the reactors closed in 2011** (8 out of 17). That's a shift of nearly 10GW of capacity.
  - New electricity usages: intensification of electricity consumption (new technologies, electric vehicles etc.).
- **Historical adequacy between zones, generation/load localization and networks is thus challenged.** This means that:
  - The definition of the zones need to be reviewed: political cost due to re-distributive effect.
  - The network has to cope with these changes: economic cost.
    - Some infrastructures become obsolete.
    - New investments are needed to ensure a continued adequacy between zones, generation/load localization and networks.

# REDUCED INTERCONNECTION CAPACITIES FOR A REDUCED EUROPEAN WELFARE

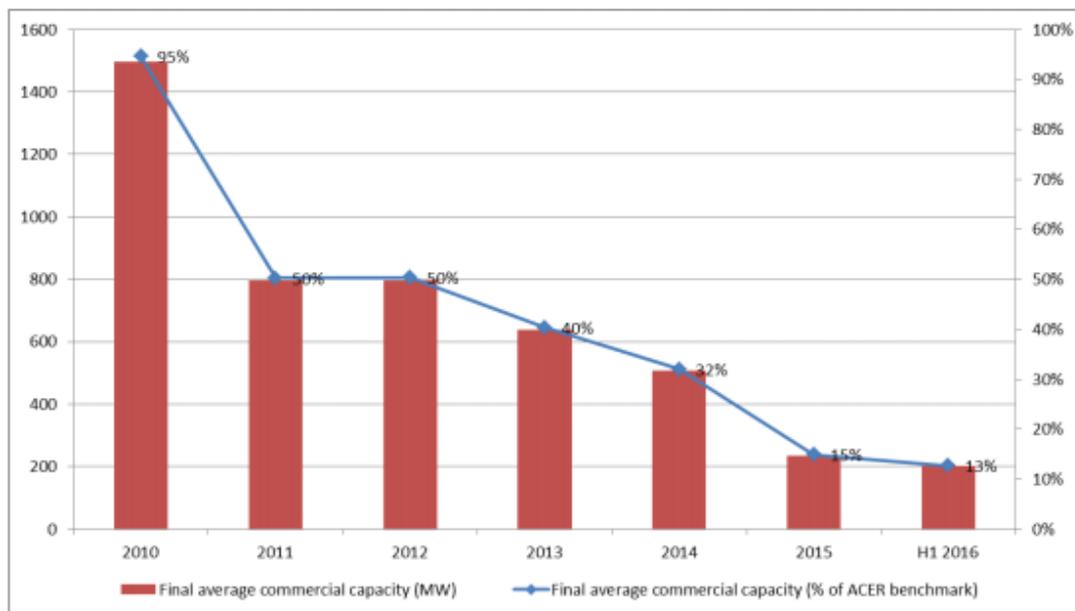
- The Commission opened an investigation in March 2018 to assess whether TenneT infringed EU antitrust rules by systematically limiting southward capacity toward Germany.

- From 2010 to 2016, capacity toward Germany **dropped to 13% of the benchmark capacity.**

- In response to the investigation, TenneT committed to providing 1,300MW of southward capacity.

- Since it was implemented, the capacity was provided but extensively countertraded after the market clearing.

*Evolution of the annual average commercial capacity on the DE-DK1 interconnector – Direction of imports from Germany*



Source: ACER calculations based on NRAs, Nord Pool Spot and ENTSO-E's data.

# THE CEP FORESEES THAT CRITICAL NETWORK ELEMENTS PROVIDE 70% OF THEIR CAPACITY FOR CROSS BORDER EXCHANGES

- 70% is implemented as of the 1<sup>st</sup> of January 2020 (article 71)
- Whereas 27 “Clear minimum levels of available capacity for cross-zonal trade need to be put in place [...]. Where the flow-based approach is used, that minimum capacity should determine the minimum share of the capacity of a [...] critical network element respecting operational security limits to be used as an input for coordinated capacity calculation under Regulation (EU) 2015/1222, **taking into account contingencies. The total remaining share of capacity may be used for reliability margins, loop flows and internal flows.**”
- Derogations (for 1 or 2 years) are possible subject to approval of the NRAs of the region.
- In case of structural congestions, **an action plan can be triggered nationally, reducing the requirement while actions are implemented to resolve the congestions.**

