

Market Reforms for Stressed Conditions: The Case of Europe

Anthony Papavasiliou, UCLouvain

95th plenary session of the Harvard Electricity Policy Group

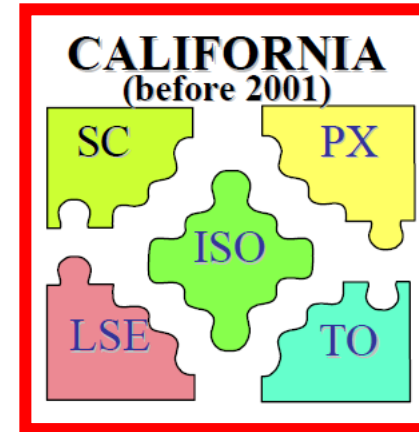
June 14, 2019



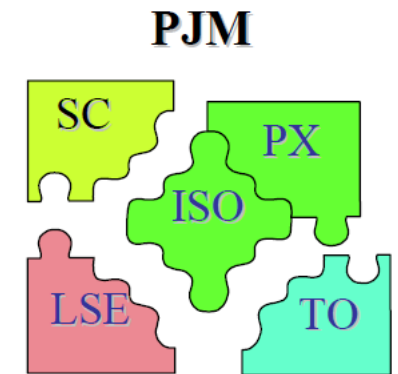
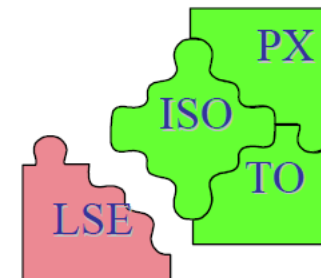
An Overview of European Market Design

Major Differences Between US and Europe

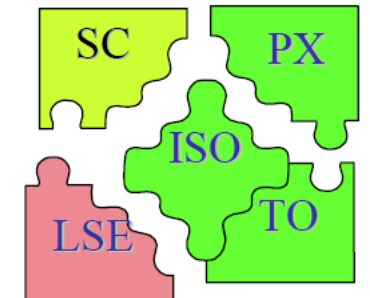
- European market design resembles, most closely, the pre-2001 California design
- Separation of *power exchange* (PX) and *transmission system operator* (TSO)
- Simplified representation of transmission network via *zonal pricing*
- Diminished role of real-time market:
 - *Balancing responsible parties* (BRPs) encouraged to maintain balance in real time
 - *Balancing service providers* (BSPs) balance the system by activating reserve
- No real-time market for reserve capacity



U. K. (before 2001)



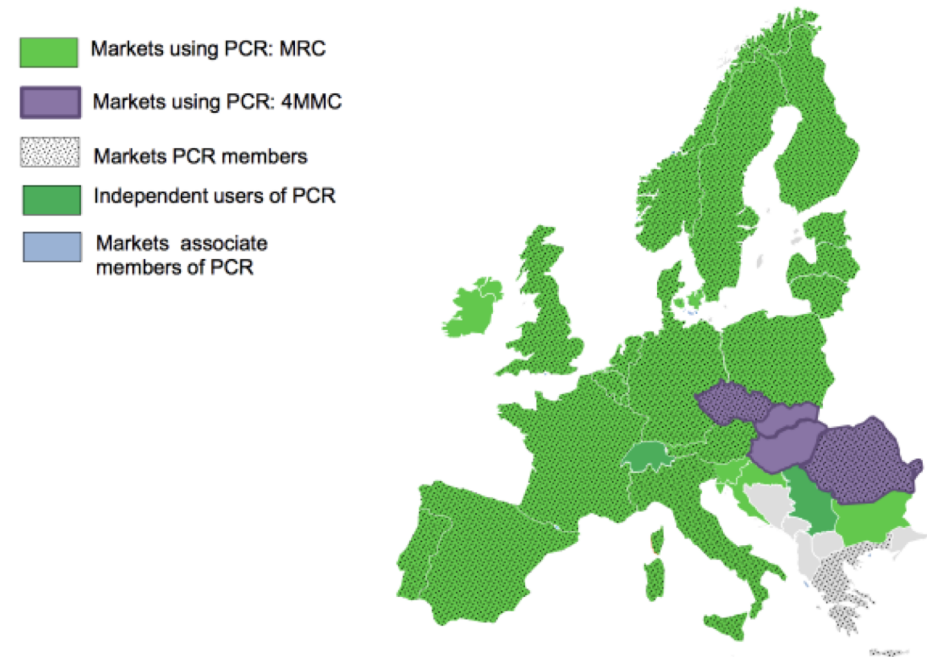
NORD POOL



The Day-Ahead Market

- **Price Coupling of Regions (PCR)**: project of European power exchanges to create a single day-ahead price coupling solution
- **EUPHEMIA**: the algorithm developed by *N-SIDE* (*UCLouvain* spin-off) for computing day-ahead price
- Zonal pricing results in various challenges
 - Operational efficiency (congestion management cost)
 - Discretionary provision of available capacity by TSOs
 - Surprisingly, investment signals and gaming are discussed less currently among stakeholders
- Nodal pricing no longer tabu in European market design discussions (for example, Polish TSO is investigating a nodal design)

PCR users and members



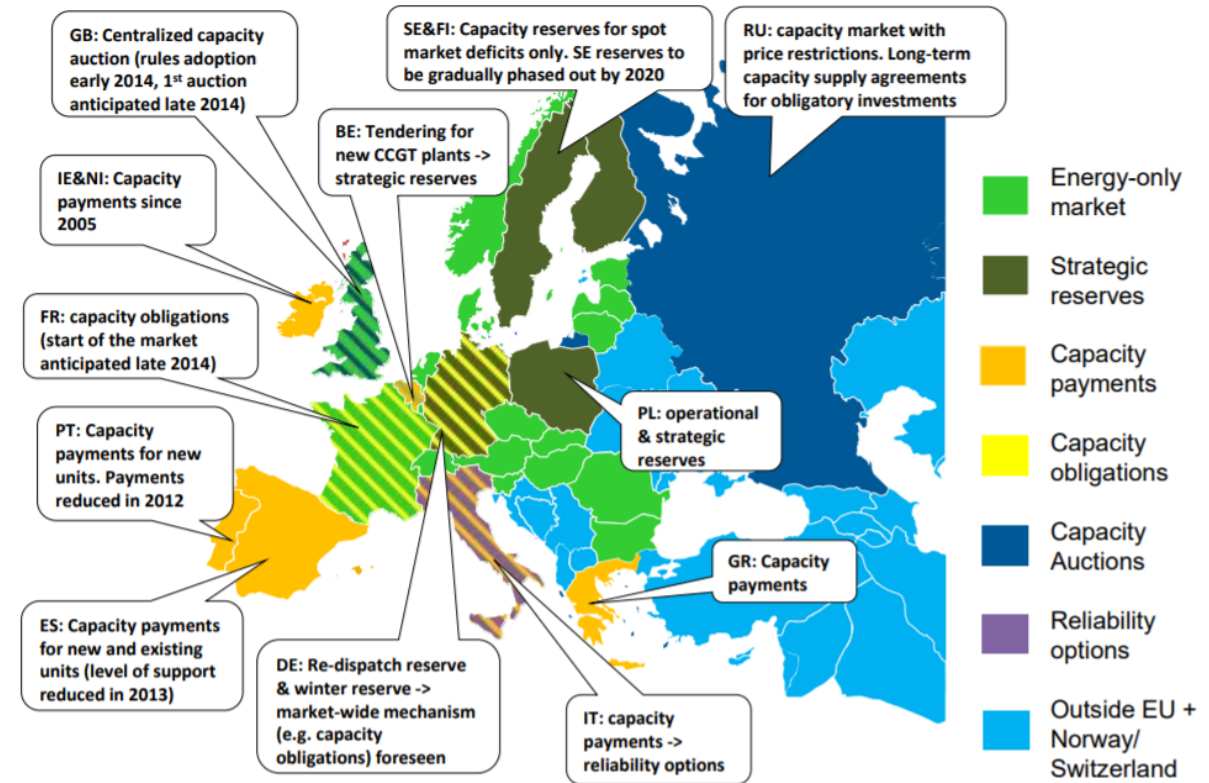
Real-Time Operations

- Transmission system operators (TSOs) manage real-time operations
- TSOs procure reserve capacity from individual generators in month/day-ahead auctions from balancing service providers (BSP)
- *Nominations*: day-ahead production schedules submitted to TSOs for individual generators, according to
 - day-ahead cleared trades
 - reserve commitments
- In real time, the TSO uses (i) stand-by units (called *free bids*), (ii) BSP capacity, and (iii) topological corrections in order to de-congest and balance the system
- Activated reserves are only paid for activated energy in real time, not real-time reserve capacity
- There are two major ongoing projects attempting to coordinate activation of reserves across Europe: **PICASSO** (secondary reserve) and **MARI** (tertiary reserve)

ORDC Developments in Europe

Balkanization of European Electricity Market

- Diverse approaches towards remuneration of (flexible) capacity in Europe
- Some of these measures draw scrutiny as possibly constituting anti-competitive *state aid*
- European Commission not in favor of balkanization of member-state market rules
- Two *legal documents* of the European Commission indicate favorable view towards ORDC:
 - Electricity balancing guideline
 - Clean energy package



Source: Eurelectric

European Commission Electricity Balancing Guideline, Article 44(3)

Each TSO may develop a proposal for an additional settlement mechanism separate from the imbalance settlement, to settle the procurement costs of balancing capacity pursuant to Chapter 5 of this Title, administrative costs and other costs related to balancing. The additional settlement mechanism shall apply to balance responsible parties. This should be preferably achieved with the introduction of a **shortage pricing function**. If TSOs choose another mechanism, they should justify this in the proposal. Such a proposal shall be subject to approval by the relevant regulatory authority.

Official Journal of the European Union

COMMISSION REGULATION (EU) 2017/2195
of 23 November 2017
establishing a guideline on electricity balancing

Clean Energy Package, Article 20(3)

Member States *with identified resource adequacy concerns* shall develop and publish *an implementation plan with* a timeline for adopting measures to eliminate any identified regulatory distortions *or market failures as a part of the State aid process*. When addressing resource adequacy concerns, *the* Member States shall in particular *take into account the principles set out in Article 3 and shall consider:*

...

(c) introducing a **shortage pricing function** for balancing energy as referred to in Article 44(3) of Regulation 2017/2195;

...

European Parliament

2014-2019



TEXTS ADOPTED

Provisional edition

P8_TA-PROV(2019)0227

Internal market for electricity ***I

European Parliament legislative resolution of 26 March 2019 on the proposal for a regulation of the European Parliament and of the Council on the internal market for electricity (recast) (COM(2016)0861 – C8-0492/2016 – 2016/0379(COD))

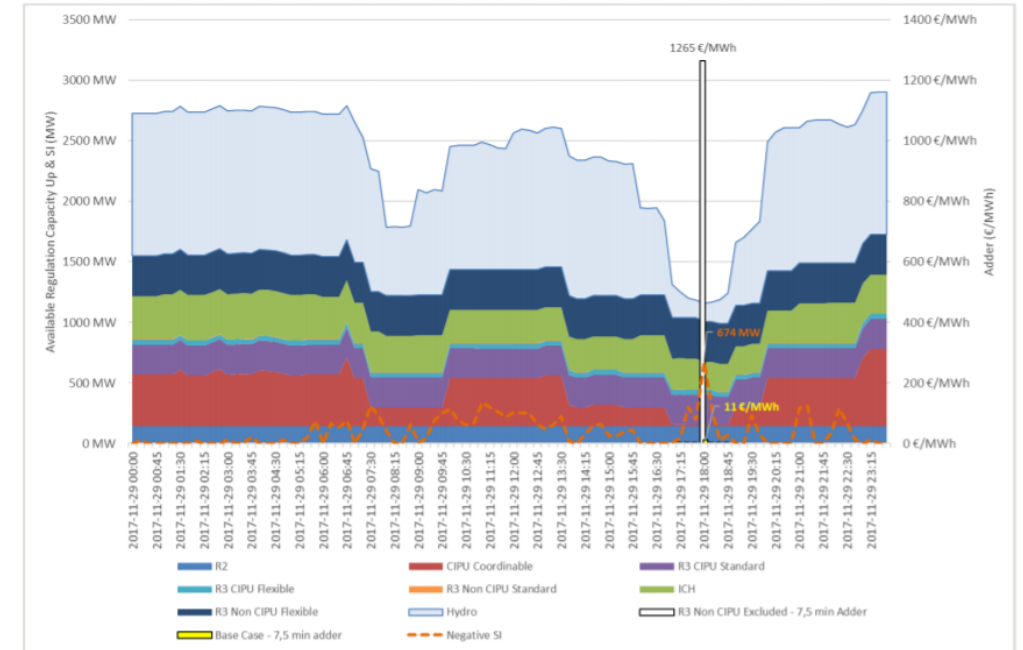
(Ordinary legislative procedure – recast)

The Belgian ORDC Studies

- **First study (2015)** [1]: How would electricity prices change if we introduce ORDC in the Belgian market?
 - **Finding:** it could enable the majority of combined cycle gas turbines, which are currently operating at a loss, to *recover their investment costs*
- **Second study (2016)** [2]: How does scarcity pricing depend on
 - strategic reserve
 - value of lost load
 - restoration of nuclear capacity
 - day-ahead (instead of month-ahead) clearing of reserves
- **Third study (2017)** [3]: can we take a US-inspired design and plug it into the existing European market?
 - **Finding:** the energy adder in itself will not suffice, the first step is to put in place a *real-time market for reserve capacity*

ORDC Developments in Belgium

- **ELIA ex-post simulation (2018)** [4]: ELIA (Belgian TSO) releases report on the simulation of scarcity prices in the Belgian market for 2017
 - **Finding:** comfortable year, infrequent occurrence of adders
- **ELIA parallel run (2019):** By October 2019, ELIA will be posting adders publicly
- **New question(s):** could Belgium implement ORDC unilaterally? How do the adders interact with the MARI and PICASSO platforms?



ORDC adder on November 29, 2017
Source: ELIA [4]

Thank You

For more information

anthony.papavasiliou@uclouvain.be

http://perso.uclouvain.be/anthony.papavasiliou/public_html/home.html

References

- [1] A. Papavasiliou, Y. Smeers. “Remuneration of Flexibility under Conditions of Scarcity: A Case Study of Belgium”, the *Energy Journal*, vol. 38, no. 6, pp. 105-135, 2017.
- [2] A. Papavasiliou, Y. Smeers, G. Bertrand. “An Extended Analysis on the Remuneration of Capacity under Scarcity Conditions”, *Economics of Energy and Environmental Policy*, vol. 7, no. 2, 2018.
- [3] A. Papavasiliou, Y. Smeers, G. de Maere d'Aertrycke, “Study on the general design of a mechanism for the remuneration of reserves in scarcity situations”, June 6, 2019.
- [4] ELIA, “Study report on Scarcity Pricing in the context of the 2018 discretionary incentives”, December 20, 2018.