FLORENCE SCHOOL OF REGULATION

ROBERT SCHUMAN CENTRE

Security of electricity supply through markets and regulation

Alberto Pototschnig
Part-time Professor and Deputy Director (World of Practice)
Florence School of Regulation, European University Institute

Security of Supply Webinar
European Climate Diplomacy Week
8-9 November 2021

www.eui.eu

Security of electricity supply

- New Zealand Electricity Authority

  Security of supply refers to the electricity industry providing appropriate electricity system capabilities (such as generation and transmission capacity) and storable fuel supplies (such as water, gas and coal) to maintain normal supply to consumers

- Directive 2005/89/EC (measures to safeguard security of electricity supply and infrastructure investment)

  Security of electricity supply means the ability of an electricity system to supply final customers with electricity

Co-funded by the Erasmus+ Programme of the European Union

The 5 dimension of the EU Energy Union

Security, Solidarity and Trust

Diversifying Europe's sources of energy and ensuring energy security through solidarity and cooperation between EU countries

A fully-integrated Internal Energy Market

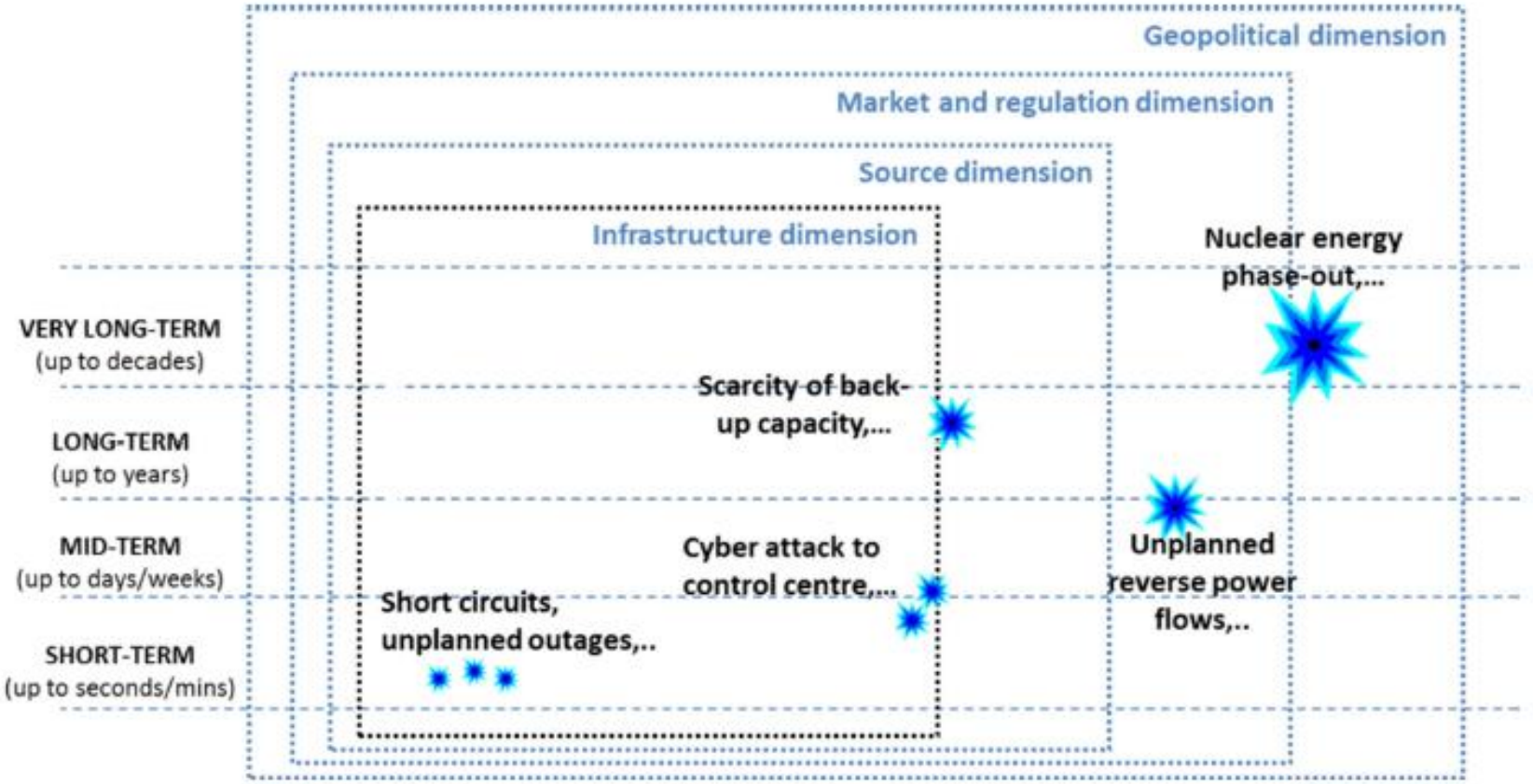
Research, innovation and competitiveness

Energy efficiency

Climate action, decarbonising the economy

Co-funded by the Erasmus+ Programme of the European Union

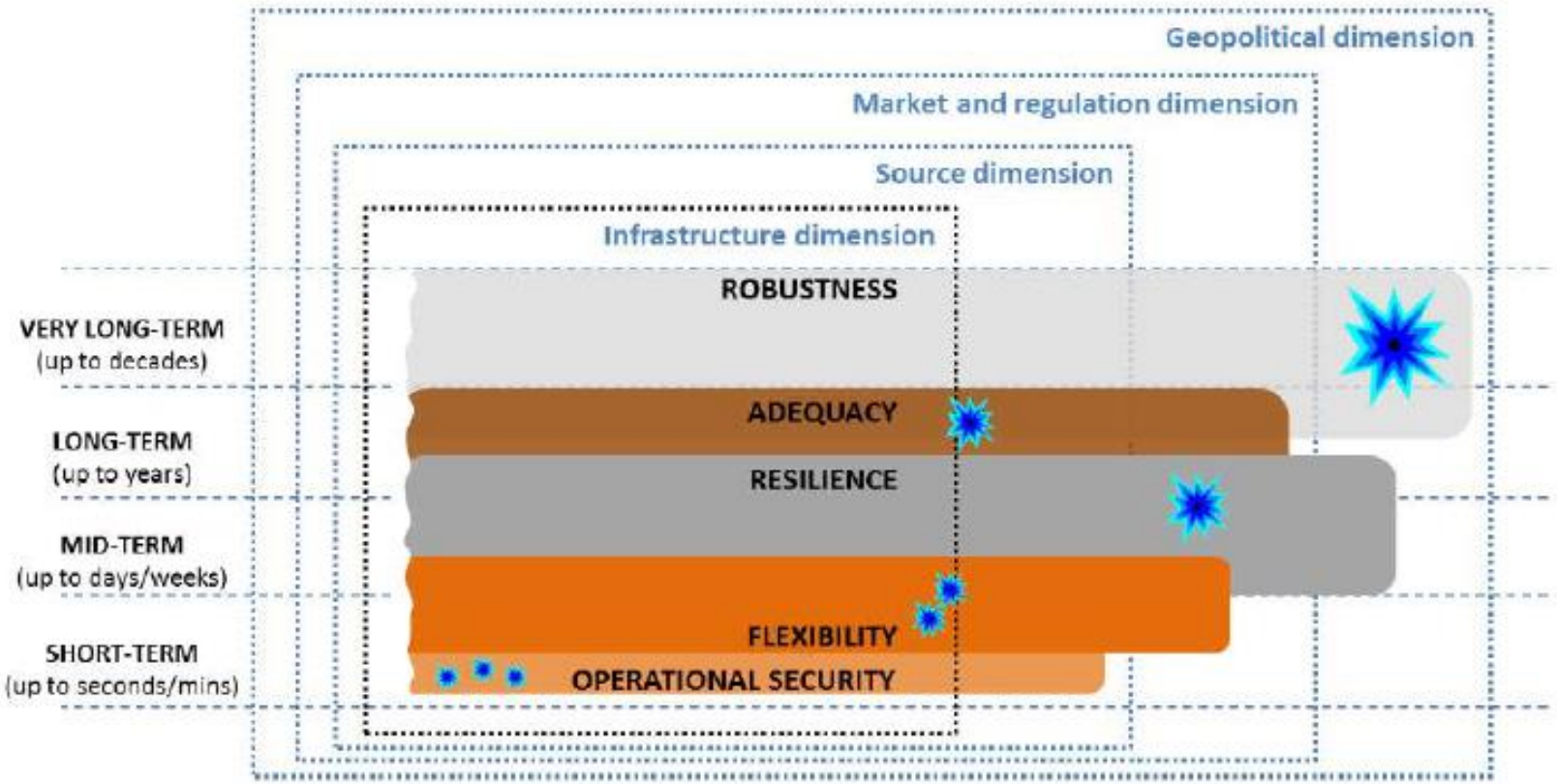
Dimensions of electricity supply security



Source: Joint Research Centre, 2021

Co-funded by the Erasmus+ Programme of the European Union

Dimensions of electricity supply security



Source: Joint Research Centre, 2021

Co-funded by the Erasmus+ Programme of the European Union

Dimensions of electricity supply security

- **Operational security:** the ability of the power system to maintain or to regain an acceptable state of operational condition after disturbances
- **Flexibility**: the capability of the power system to cope with the short/mid-term variability of generation and demand so that the system is kept in balance
- **Resilience**: the mid-term capability of the power system to absorb the effects of a disruption and recover a certain performance level
- **Adequacy**: the ability of the power system to supply the aggregate electrical demand at all times under normal operating conditions
- **Robustness**: the long-term capability of the power system to cope with constraints/stresses originating outside the infrastructure dimension

With the liberalisation of the power system and the introduction of competition, new mechanisms should be put in place to ensure security of electricity supply (previously taken care of by the vertically integrated monopolist)

Co-funded by the Erasmus+ Programme of the European Union

The EU approach to Security of Electricity Supply

The chosen approach *"builds on [the]* ***energy-only market*** *scenario but does not discard the possibility for Member States of using* ***capacity [remuneration] mechanisms****, provided however these are* ***based on a shared resource adequacy assessment*** *methodology carried out in full transparency through ENTSO-E and ACER and comply with* ***common design features*** *for better compatibility between national capacity mechanisms and harmonised cross-border cooperation"*

Co-funded by the Erasmus+ Programme of the European Union

The EU approach to security of electricity supply

- A ***fully functioning internal energy market***, providing efficient investment signals, is the best means to ensure resource adequacy and security of electricity supply
- ***Capacity remuneration mechanisms (CRMs)*** should only be developed for ***security of supply*** purposes:
  - as ***a last resort***
  - if a ***regional system adequacy assessment,*** taking into account the potential for energy efficiency and demand-side response, highlights ***adequacy concerns***
  - to the extent and until such concerns are not addressed by ***measures to eliminate any identified regulatory distortions***

Co-funded by the Erasmus+ Programme of the European Union

Security of electricity supply and electricity markets

Capacity Remuneration Mechanisms to address residual adequacy concerns while regulatory distortions are being removed

Renewables support mechanisms to ensure the achievement of the renewable penetration target until renewables achieve market parity

Promote long-term (financial) contracting to hedge price volatility risk

Expressing short-term prices to signal scarcity and attract demand-side response

Expressing real-time prices to attract flexibility resources

From several-year ahead to week-ahead

Main reference market, run the day before delivery

"Adjustment" market run after the day-ahead market and until "gate closure"

Co-funded by the Erasmus+ Programme of the European Union

Promoting security of electricity supply by removing regulatory distortions

Before introducing capacity remuneration mechanisms, Member States shall seek and plan to address ***regulatory distortions*** by:

- Removing ***regulatory distortions***
- Removing ***price caps and regulated end-user prices***
- Introducing ***a shortage pricing function*** for balancing energy
- Increasing ***interconnection and internal grid capacity***
- Enabling ***self-generation, energy storage, demand side measures and energy efficiency*** by eliminating any identified ***regulatory distortions***
- Ensuring cost-efficient and market-based procurement of ***balancing and ancillary services***

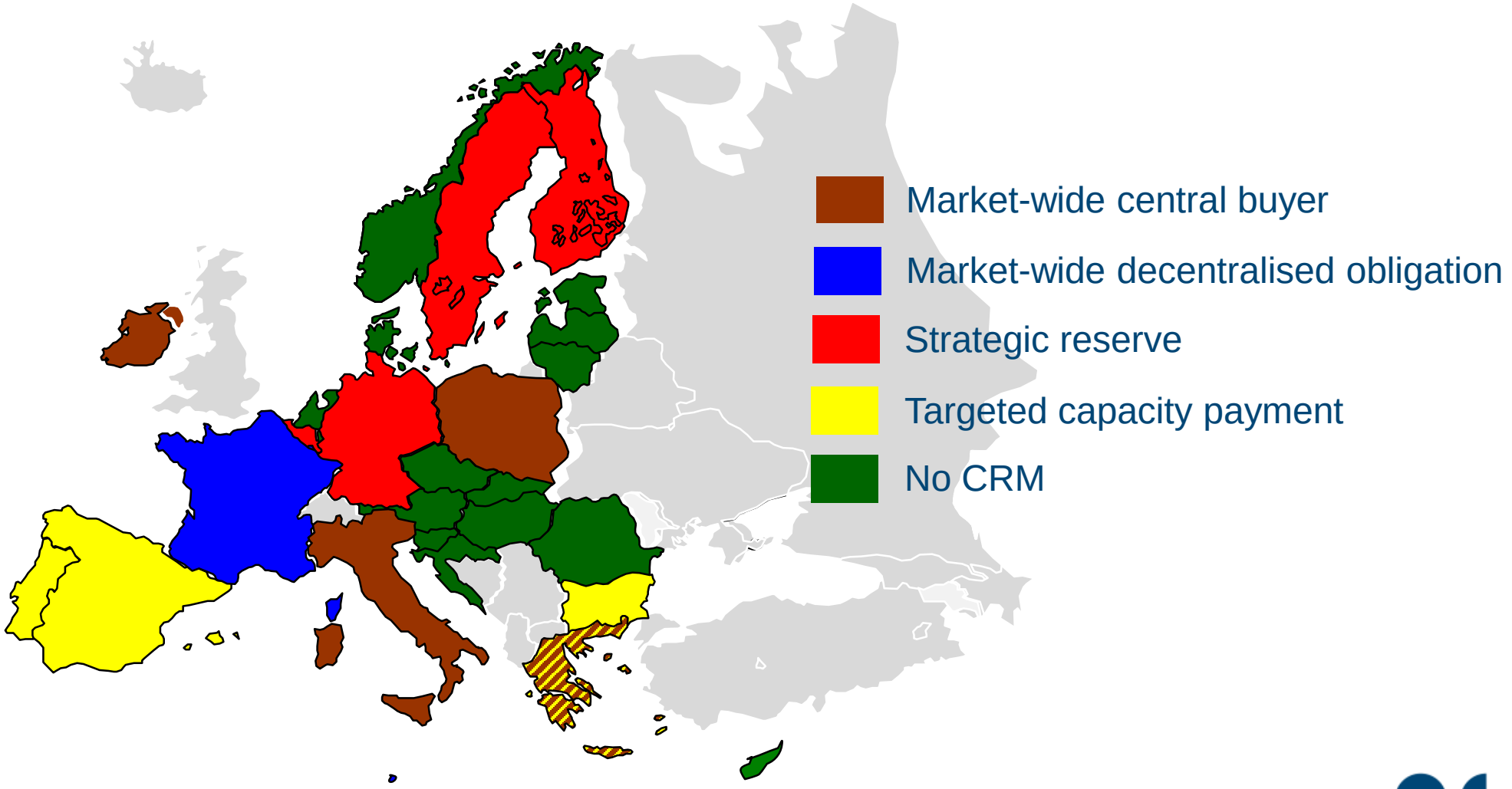
Co-funded by the Erasmus+ Programme of the European Union

Capacity Mechanisms

- ***Capacity mechanisms*** shall:
  - be ***temporary***
  - not create ***undue market distortions*** and not limit cross-zonal trade
  - not go beyond what is ***necessary*** to address the adequacy concern
  - ***select*** capacity providers through a ***transparent, non-discriminatory and competitive*** process
  - provide ***incentives*** for capacity providers to be available at times of expected system stress
  - ensure that the ***remuneration*** is determined through a ***competitive process***
  - be open to ***direct participation*** of capacity providers located in ***another connected Member State*** (except for Strategic Reserve)
  - apply appropriate ***penalties*** to capacity providers that are not available in times of system stress

Co-funded by the Erasmus+ Programme of the European Union

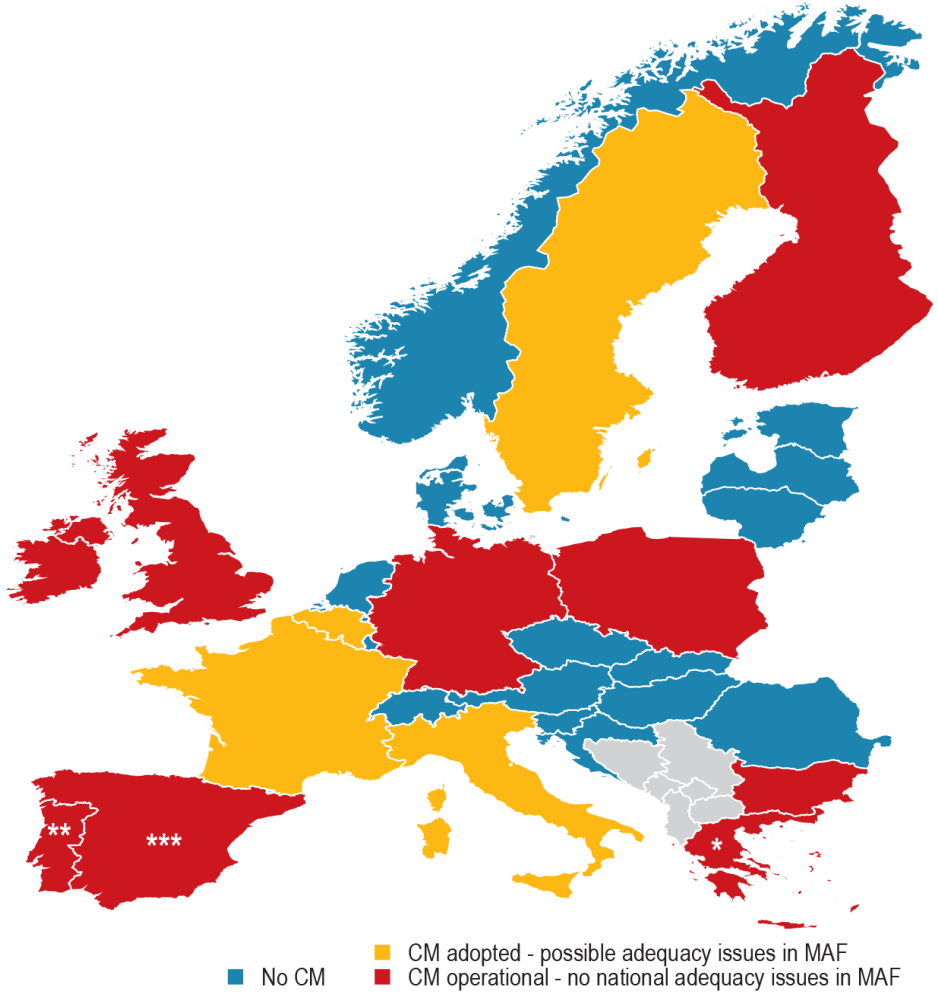
Capacity Mechanisms in Europe



Source: ACER, 2021

Co-funded by the Erasmus+ Programme of the European Union

Capacity Mechanisms and Adequacy Concerns



Source: ACER, 2020

Co-funded by the Erasmus+ Programme of the European Union

Thank you for your attention!

Co-funded by the Erasmus+ Programme of the European Union