Zurich University
of Applied Sciences

School of
Management and Law

Workshop on Electricity Market Design: Capacity Remuneration Mechanism

Building Competence. Crossing Borders.

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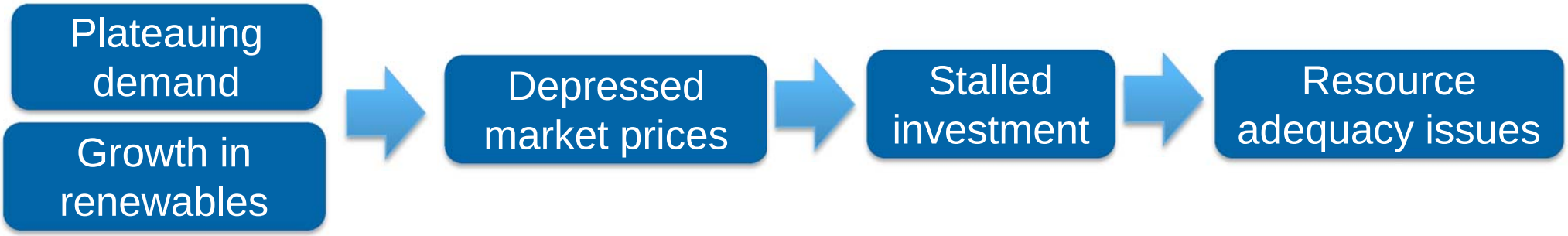
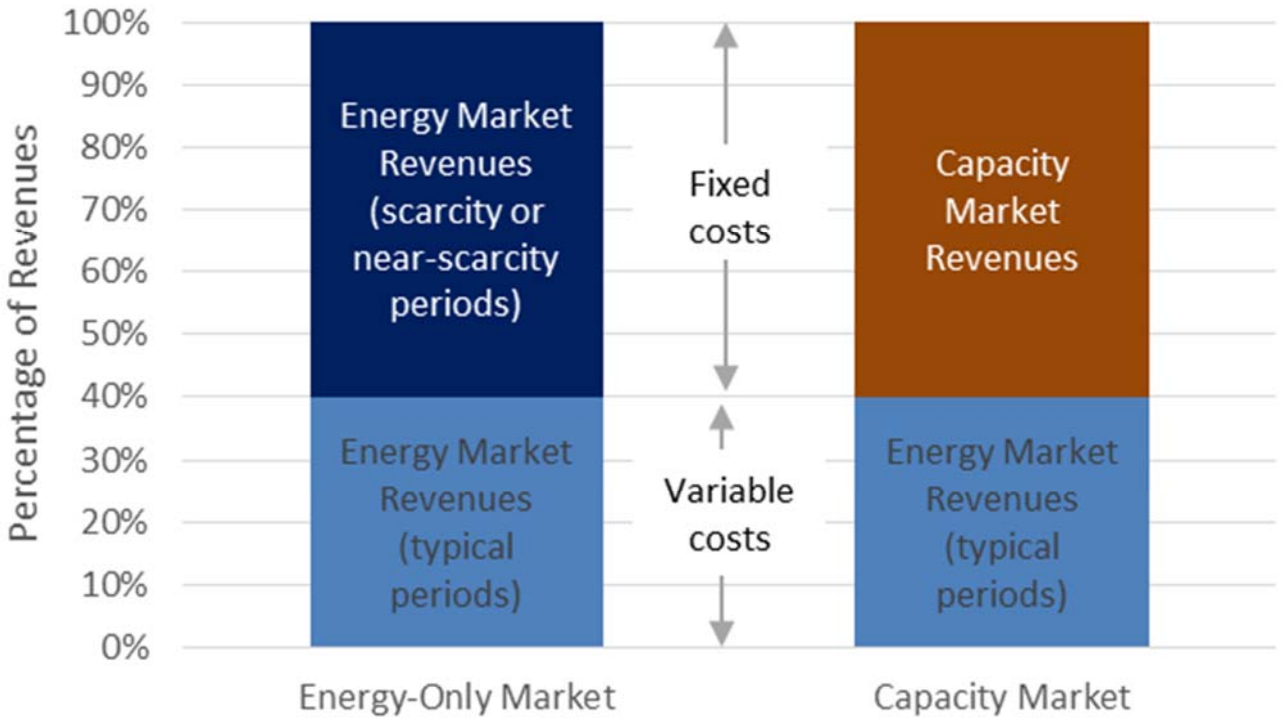
Introduction

- Resource Adequacy:
  - Mechanisms to manage capacity of installed generation, and adequacy to meet demand
- Becoming more challenging



Many jurisdictions moving towards explicit capacity remuneration mechanisms

Capacity markets vs Energy-only Markets

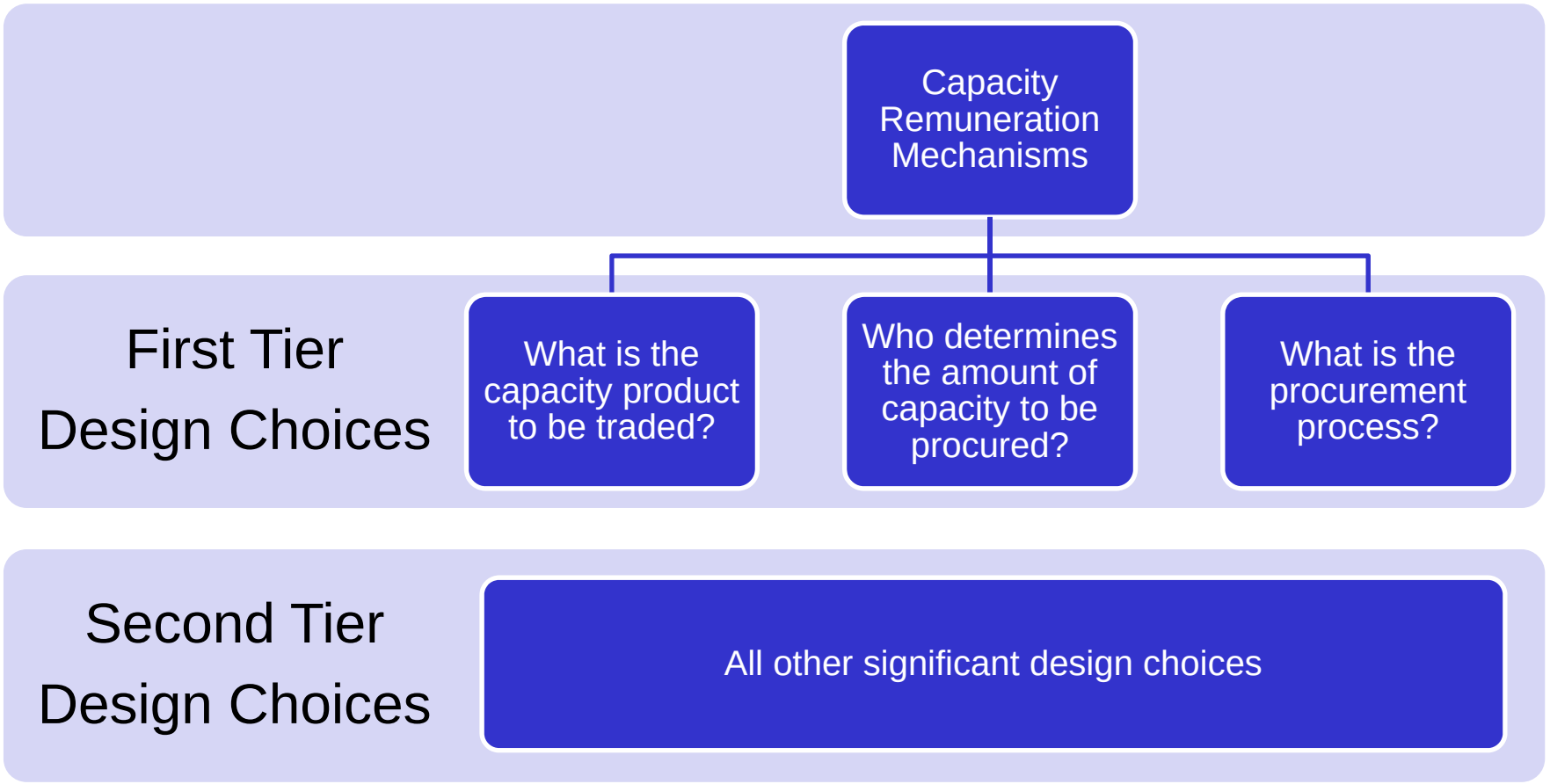


Capacity markets may be necessary where it is politically (or otherwise) not possible to allow sufficiently high scarcity prices

Many different kinds of capacity mechanisms

- A plethora of different capacity mechanism designs have been explored and implemented
- Can be challenging to compare between jurisdictions
  - Terminology differences
  - Lack of common framework
- Developed a 2-tier framework for categorising capacity mechanism designs
  - Useful framework for comparing and considering designs

2 Tier Design Framework for capacity market design



1. What is the capacity product to be traded?

- Most common types of capacity markets trade "**capacity credits**" or similar
  - a physical megawatt (MW) of generating (or demand-side) capacity made available to the market in a particular year (or defined timeframe).
  - May be complex provisions that define the consequences if that capacity is ultimately not available at times when it is required
- More recent innovation: trade a **financial instrument**, eg. "Reliability Options"
  - a call option similar to a cap contract traded in energy-only electricity markets.
  - Generators sell reliability options, and must then pay that central authority the difference between the spot price and the strike price, whenever the spot price exceeds the strike price [1].
  - Creates a severe penalty for failing to be available during scarcity periods
  - Currently under consideration in Italy.

2. Who determines the amount of capacity required?

- Option A: **Central authority** directly determines the volume of capacity that is required
  - Possibly based upon a forecast of peak demand several years in advance.
- Option B: **Load Serving Entities** self-determine the amount of capacity to be procured
  - Based upon their own forecast of their anticipated customers' demand, and the risk associated with the penalties defined by a central authority if they fail to forecast accurately.
  - "Decentralised Capacity Market" model
- Option C: **Customers** determine the amount of capacity that they want to contract for directly with providers
  - "Capacity Subscription" model

3. What is the procurement process for capacity?

- Option A: central authority directly procures capacity through a central process
  - such as an **auction** or **tender**
- Option B: LSEs are responsible for procuring capacity, potentially through a **bilateral trading** process.

Common Terminology

	Product Description	Who determines how much is procured?	Procurement process
Centralised capacity market	Physical Capacity	Central Authority	Central Procurement
Capacity Obligation (France)	Physical Capacity	Central Authority	Bilateral
Decentralised capacity market	Physical Capacity	LSEs	Bilateral
Capacity Subscription	Physical Capacity	Customers	Bilateral
Reliability Options (Italy)	Financial Instrument	Central Authority (usually)	Central Procurement (usually)

Current developments in Europe

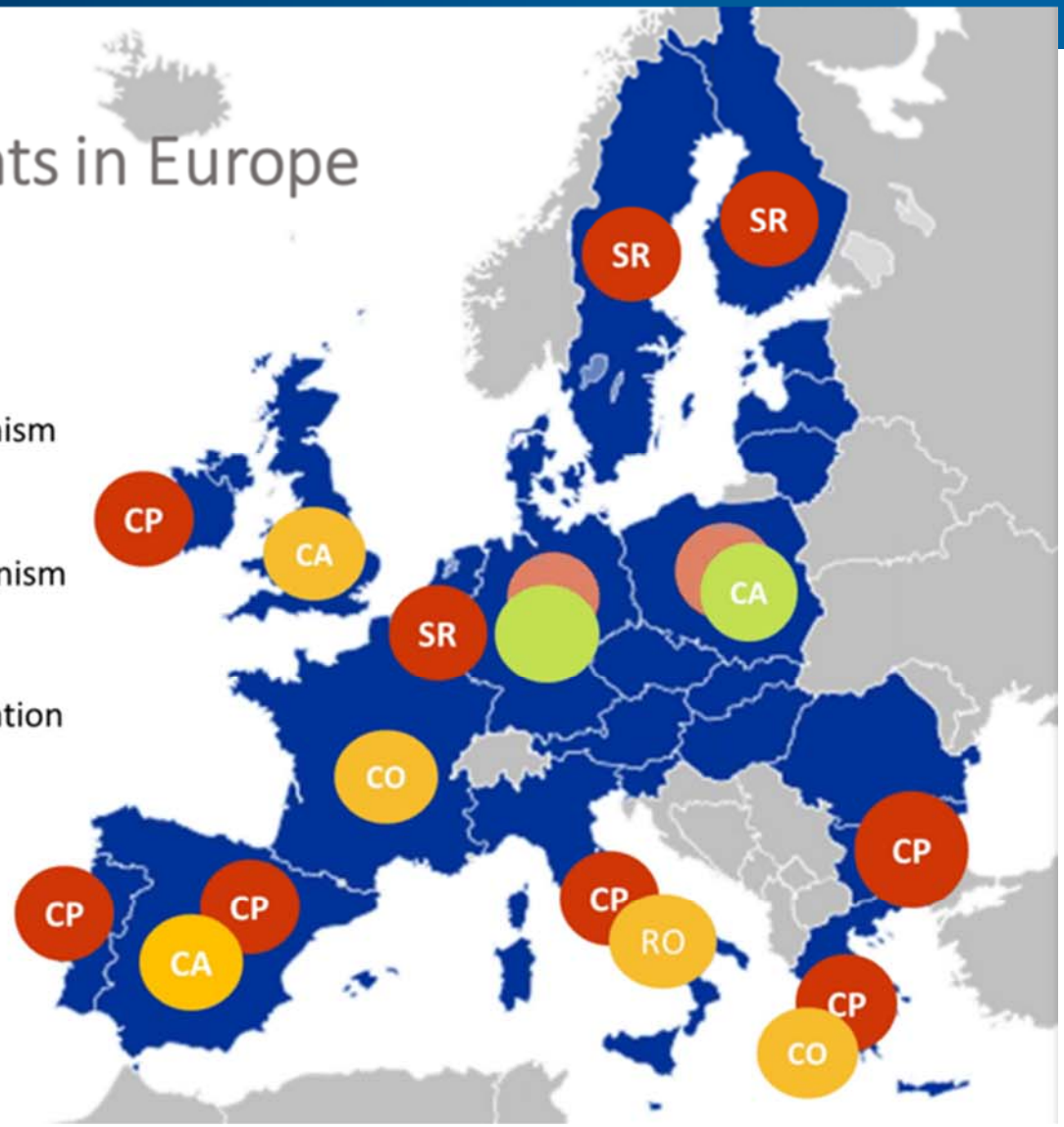
existing capacity mechanisms

some elements of a capacity mechanism in place (types of strategic reserves)

implementation of a capacity mechanism or its revision in progress

capacity mechanism under consideration

CP – capacity payments
CO – capacity obligations
CA – capacity auctions
SR – strategic reserve
RO – reliability options



Source: EUI webinar "Capacity mechanisms: legal issues" by Malgorzata Sadowska (http://fsr.eui.eu/Publications/WEBINAR/2014/141217-WR-Sadowska.aspx)

The French capacity mechanism: Type, Status, Aim

Type:

- Capacity Obligation
- Physical Capacity is set by central authority and traded bilateral

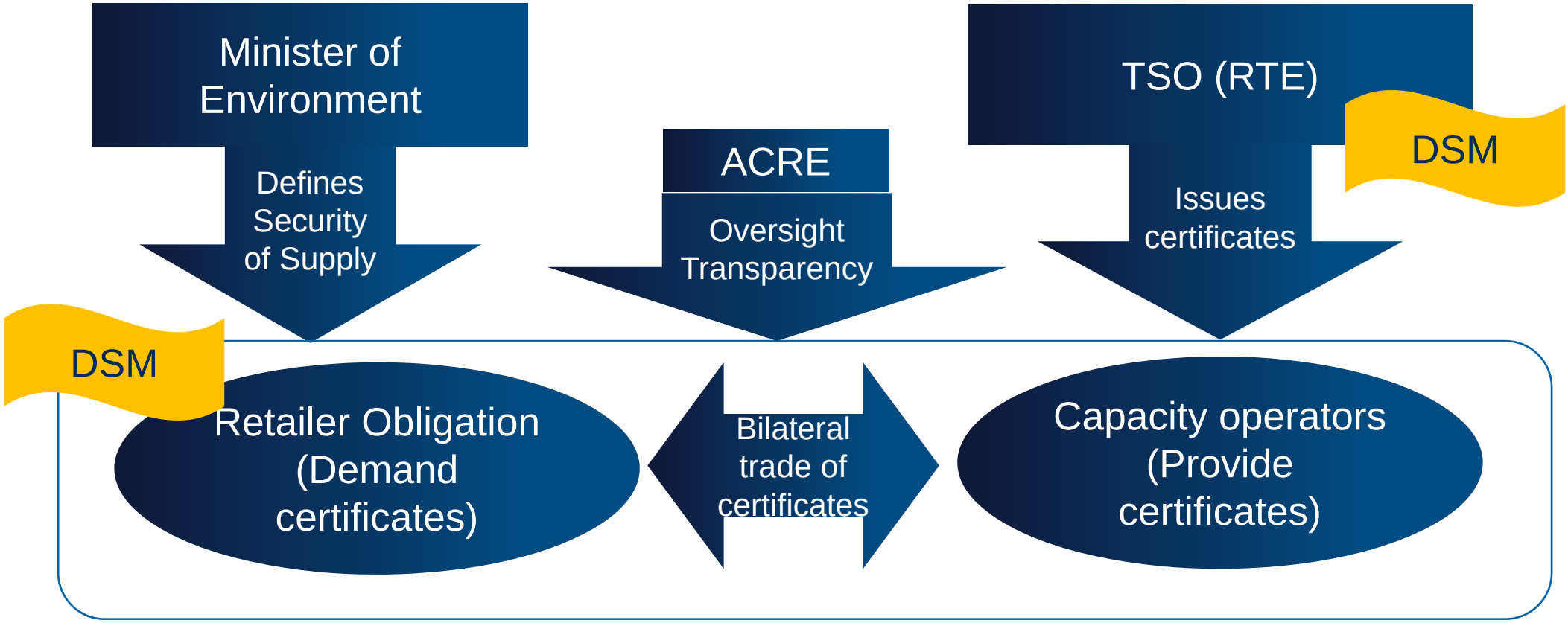
Status:

- Decree in 2012 contained the main principles
- ACER report April 2014 explained market rules
- Decree signed January 2015
- First delivery year: January 2017 to end of December 2017

Aim: Security of Supply

- Tackle the peak load issue (especially in Winter)
- Boost Demand Side Management (DSM)

The French capacity mechanism: Design



Price of certificates reveals value of Security of Supply
Price is zero if there is no risk on Security of Supply

The French capacity mechanism: Cross-border participation

Status:

- No explicit participation in first phase, only implicit through obligation setting
- Target: explicit participation in second phase
- Stakeholder consultations on explicit participation (2014)
- Options of hybrid model e.g. participating in French balancing market

Defined principles by RTE:

- Without harmonising security of supply criteria across Member States, but rather upholding the division of competences defined in the Treaty of Lisbon;
- Without reserving interconnector capacity;
- Within volume limits reflecting the physical limitations of import capacity during peak periods;
- Subject to the creation of a mechanism for cross-border certification or control in order to avoid double counting;
- Subject to the signature of agreements to govern operational management in crisis situations.

The Italian capacity mechanism: Type, Status, Aim

Type:

- Reliability Option
- Adequacy target is set by TSO (Terna) and reliability option contract is the product which is bought through a central auction in each region

Status:

- Law has been approved by Ministry of Economic Development in 2014
- First auctions in 2015
- First delivery period: 2018-2019

Aim: System Adequacy

- No capacity problem , aim to ensure that not too much of the overcapacity (mainly gas) is retired
- Long-term price signals to support coordinated development

The Italian capacity mechanism: Design

- Regional auction, on grid area where the resources are located
- Adequacy target is a yearly elastic function of volume, loss of load probability and variable costs of marginal technologies

TERNA

organises

- New and existing programmable generation (e.g. fossil, solar thermal, biomass, pump storage..) not subject to other incentive schemes or dismanteling measures
- 4 years planning period
- 3 years

Descending clock auction

Premium payment

If P(strike) <P(spot), option executed (difference paid)

Buyer
TSO (Terna)

Seller
awarded producers

- Reliability option contract
- Strike price is set at variable costs of an efficient peak plant
- →Penalty if no delivery in peak periods

Considerations in Germany

Status quo

– Network reserve
– Discussion: EOM vs. capacity mechanism (Green Paper)
– Strategic Reserve as interim mechanism

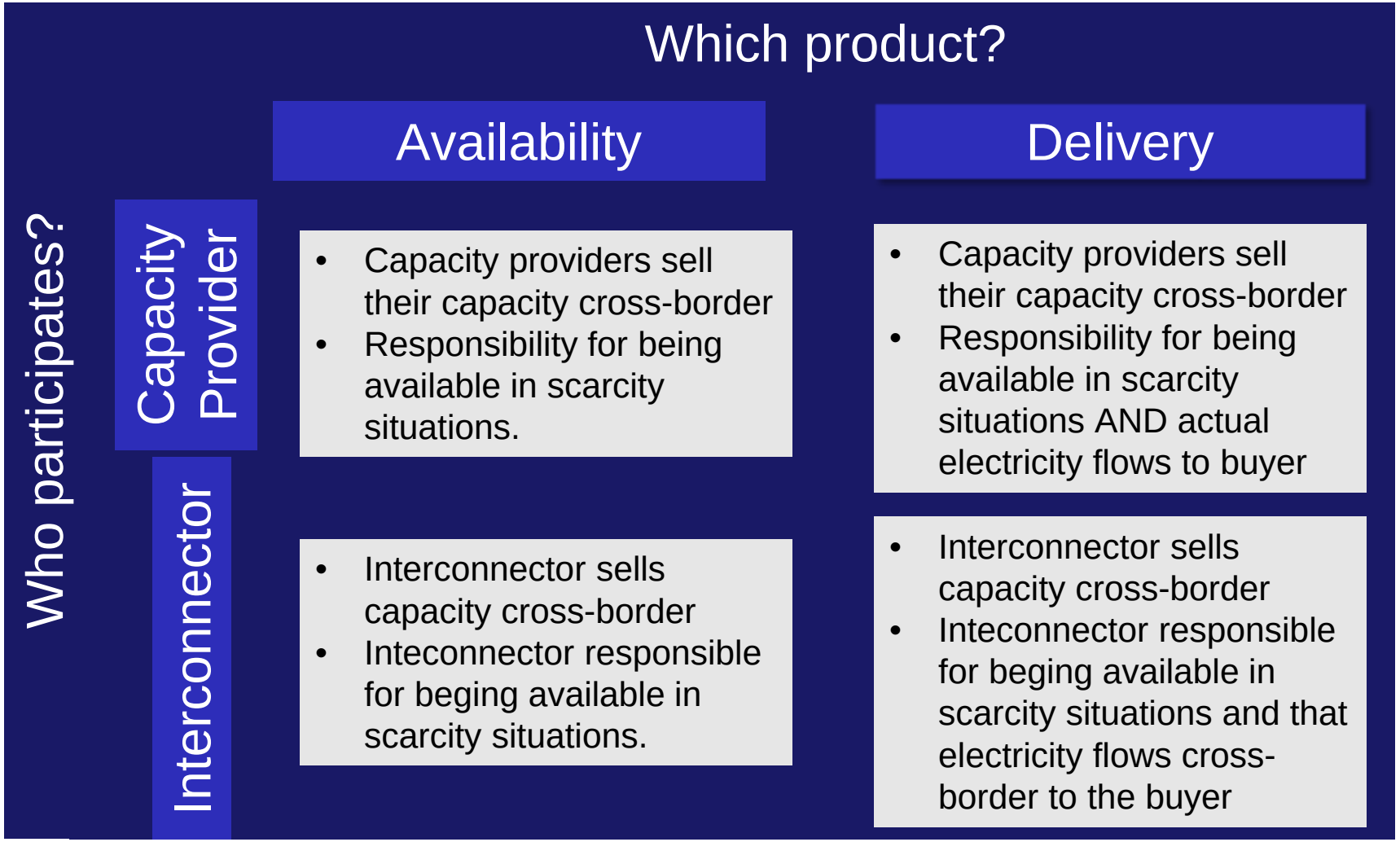
Capacity mechanisms proposed

– Comprehensive capacity market
– Focussed capacity market
– Decentralised capacity market

Legislative process

– Consultations on Green Paper
– White Paper as legislative proposal
– 19/01/2015: Gabriel states no intention to introduce CRM in Germany

Cross-border participation



Source: Eurelectric 2015

Cross-border participation and penalties

	French capacity market	Italian capacity market	Comprehensive capacity market	Focussed capacity market	Decentralised capacity market
Cross-border participation	Envisaged, consultations ongoing	Envisaged	Advantages discussed, no specific mechanism	Only if in single price zone, (i.e. AU, LU) and if no participation in national CRM	Yes, if physical delivery (PTR) is ensured and if no participation in national CRM
Penalties		Difference between trigger and strike price	Yes, but not specified further Plus reliability options	Yes, with requirement: at least 90% availability at peak demand Plus reliability options	"Multiple of the certificate price"

Potential questions for discussion

1. Block (14:00 – 15:00)

A. Teilnahme Schweizer Kraftwerke an Kapazitätsmechanismen anderer Länder (technische, rechtliche, institutionelle Fragen)

B. Verteilungseffekte

C. Effizienz (Miteinbeziehung des Auslands? Wer kann teilnehmen: Interconnectors vs. Erzeuger? Wer trägt die Strafe?)

2. Block (15:30 – 16:30)

A. Bottom-up: Kapazitätsmechanismen in der Schweiz? Kosten / Nutzen; Was wäre das Ziel?

B. Top-down: Europa / ENTSO-E

C. Integration bestehender Marktmechanismen (offizielles „Linking“? Chancen und Grenzen? z.B. penalty design)

THANK YOU VERY MUCH FOR YOUR ATTENTION !