

Trends in electricity market design: ENERGY ONLY vs. CRM

Regulator perspective

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SUMMARY

- Energy-only markets
 - Definition
 - Theory
- Why Capacity Remuneration Mechanisms (CRM)?
- How CRMs work in practice?
 - Strategic Reserves
 - Price mechanisms
 - Quantity mechanisms
- The Italian capacity market
 - Reliability option contracts

ENERGY-ONLY MARKETS

Definition:

Markets where demand and supply forces, rather than engineering standards, determine the efficient level of installed capacity, and ultimately the level of reliability.

Is a pure energy-only market approach feasible given the current technology?

ENERGY-ONLY MARKETS: THEORY

Efficient level of reliability cannot be achieved through a pure energy-only market for the following reasons:

- consumers cannot be disconnected individually in real time on the basis of their willingness to pay for reliability (reliability=public good);
- low demand elasticity and non storability (when demand+reserves are greater than supply, price needs to be set administratively);

Competent bodies (e.g. NRA, TSO) have to intervene to solve the “reliability problem” by setting at least two parameters that play a crucial role in determining the level of installed capacity:

- the VOLL (the value that makes consumers indifferent between consuming and not consuming);
- the level of operating reserves required (using engineering standards).

“At this time, there is no other choice.” (Crampton and Stoft 2005)

RATIONALE FOR CRMs

The definition of VOLL and reserve requirements are unavoidable, administrative interventions and can be seen as the simplest form of capacity remuneration mechanism.

Is that enough?

Theory (academic papers) and practice suggest not, given the following market failures:

- missing money problem (elements of the market design that prevent prices to reflect scarcity conditions in an efficient manner);
- coordination failure (incomplete information, imperfect interaction between generation and transmission capacity, lack of efficient long term signal -> boom and bust cycle of investment typical of the electricity sector);

HOW CRMs WORK

Strategic reserves: part of the installed generation capacity is reserved for the use only in scarcity situations (reserve of last resort);

Price mechanisms: administratively set payments per MW available capacity regardless of whether they are dispatched to run;

Quantity mechanisms (decentralized): TSO defines capacity requirement based on security standards (peak demand + operating reserve). Obligation on retail suppliers to buy capacity certificates on the basis of their peak load + reserve margin either through self supply or by contracting available capacity from generators.

Quantity mechanisms (centralized): TSO purchases capacity from generators in a centralized market. The corresponding cost is passed on to load serving entities.

IT CAPACITY MARKET: AIMS AND TOOLS

AIMS

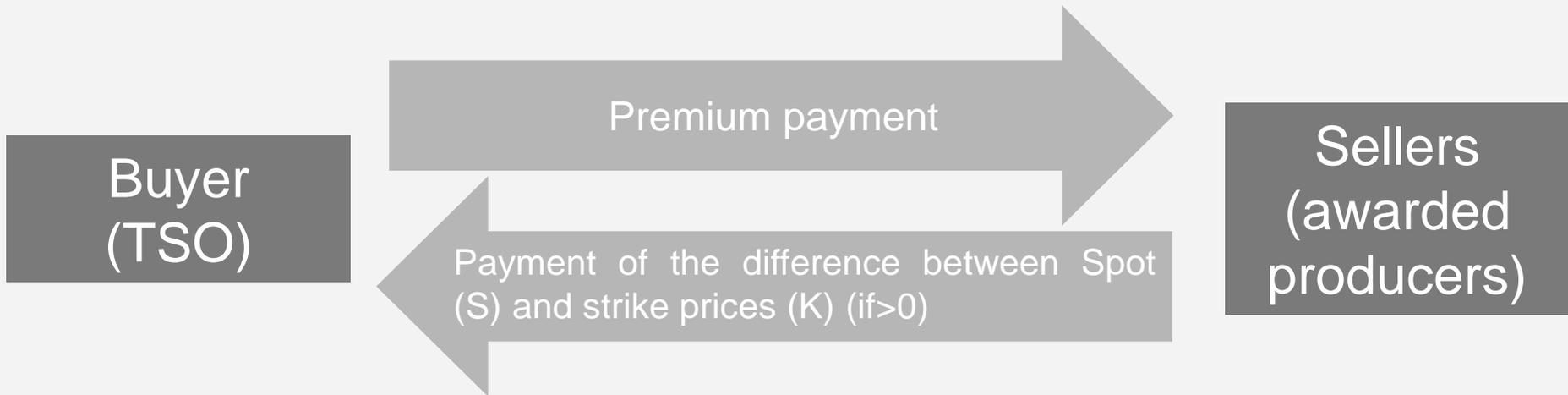
to ensure system adequacy at the minimum cost by:

- fostering the coordinated development of generation and transmission network
- promoting competition on a long term perspective → efficient long term price signals

TOOLS

- the auctioned product is a “reliability option contract” (Colombia and New England)

IT CAPACITY MARKET: STRUCTURE OF CONTRACTS



- Contract structure: reliability call option (1-way CfD)
- Real option - Sellers are obliged to submit offers in Day Ahead, Ancillary Services and Balancing Markets

IT CAPACITY MARKET: CONTRACT PARAMETERS

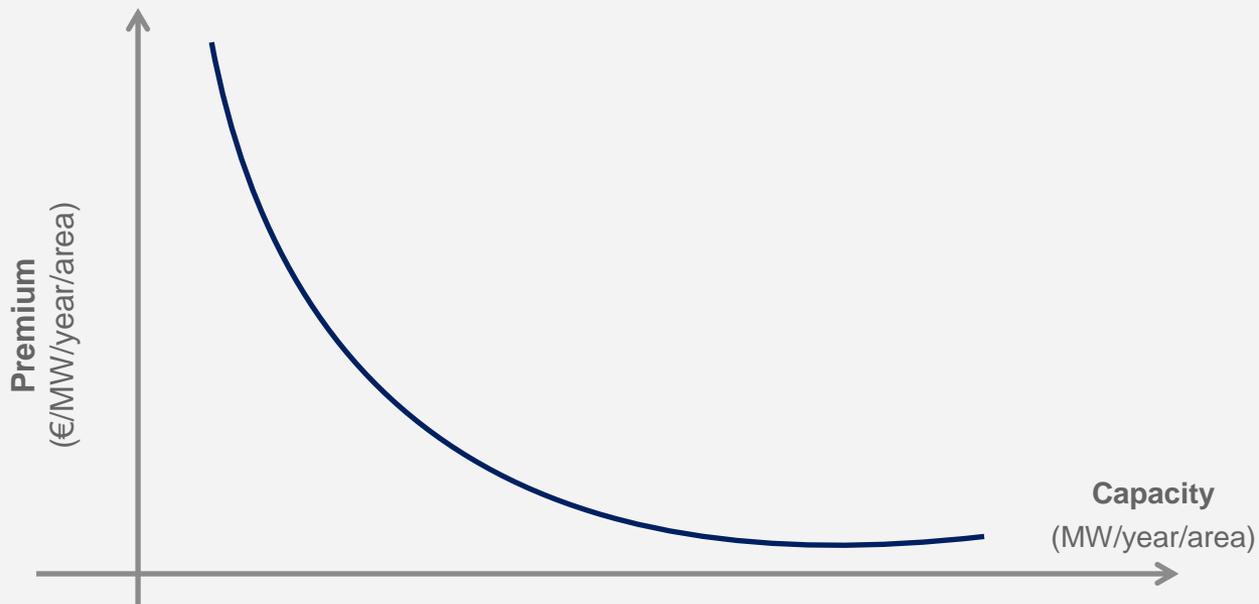
Planning period	4 years	To promote competition between existing and new capacity
Delivery period	3 years	To mitigate sellers investment risks
Location	Grid area where the resource is located	To give proper locational signals
Strike price	Standard variable cost of an efficient peak plant	To be efficient and non distortive with respect to the generation mix

IT CAPACITY MARKET: YEARLY AUCTIONS

- Organized by Terna (TSO)
- Participation is voluntary
- Both new (planned or under construction) and existing resources are admitted to the CRM as long as they are:
 - programmable [for instance: thermal (fossil, biomass, solar), pumping storage, conventional hydro etc.];
 - not subject to any type of investment incentive scheme;
 - not subject to any dismantling measures approved by competent authorities.
- Sellers submit their portfolio offers during a descending clock auction

IT CAPACITY MARKET: ADEQUACY TARGET

- Terna (TSO) defines, on annual basis, the adequacy target as a function of VOLL (3.000 €/MWh), LOLP.
- An elastic yearly demand curve to be defined for any relevant area (areas to be identified according to transmission limits).





THANK YOU!

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