

IEA Electricity Security Advisory Panel

Session 1 : Aligning reliability and market frameworks

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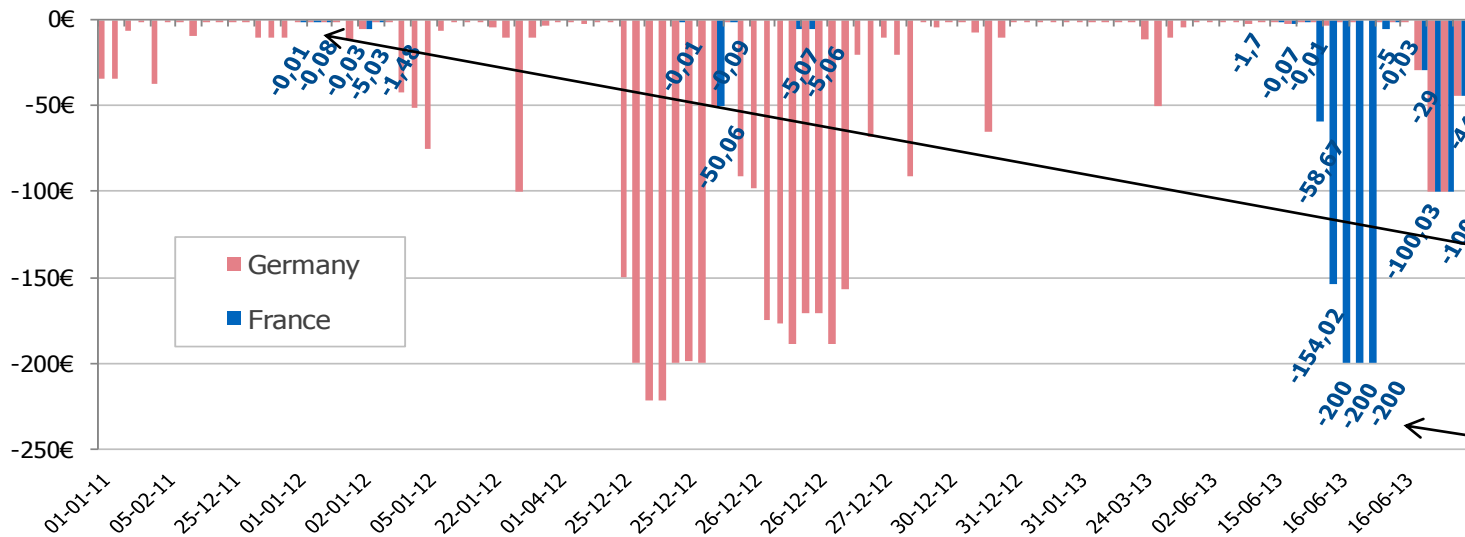
The electricity system is facing a rapid transition

- Long term vision and objectives of energy transition :
 - Reducing GHG emissions
 - In the EU : 40% by 2030
 - Adopt low carbon strategies
 - Increasing energy savings
- Electricity is only one part of these commitments
- But the structure of the electricity mix is being deeply remodeled...
 - Massive investments in capital intensive technologies with low operating costs → questioning the business model of old generation capacities
- ... Providing new challenges :
 - Ensuring security of supply, managing intermittency, developing network infrastructures and services (commandability, grid stability, reserve margins...)

→ Tools and stable signals have to be developed to guide this transition

But the electricity market no longer gives the proper signals for investments

- Baseload prices are about 40-45 €/MWh, < **levelized costs for new generation units**
- Baseload prices are even < **O&M costs** for conventional thermal units
 - CCGTs are no longer profitable resulting in massive capacity mothballing / closure ;
- **A decline in demand response capacity has been observed** : in France, demand response capacity fell from 6 GW in 2000 to 2,8 GW.
- **Electricity production from coal power plants is increasing** in Europe.
- **The occurrence of negative prices is more frequent**



First negative prices in France in 2012

-200 €/MWh in June 2013

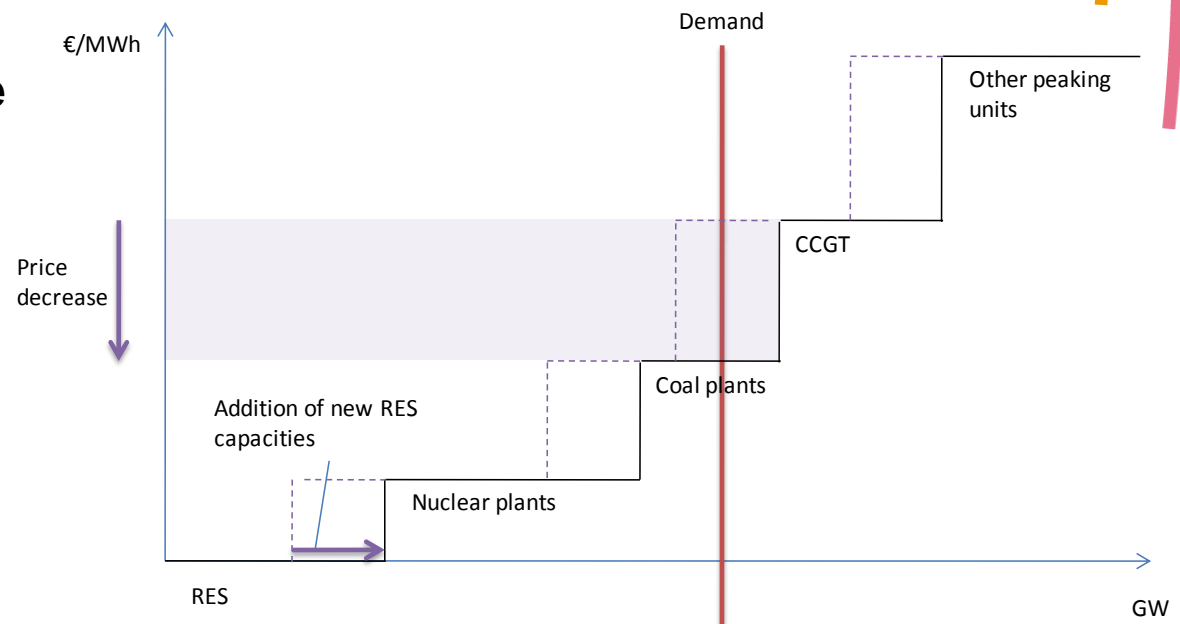
Occurrences and depth of negative prices in Germany and France since January 2011

Drivers of this crisis

- **The economic crisis has led to a decline in demand in Europe , especially industrial demand : -4% between 2008 and 2012 (-112 TWh)**
- **Massive investments in CCGT were made between 2005 and 2010 (+100 GW since 1990)**
- **Quick development of RES to meet the objective of 20% of RES in final energy consumption in Europe:**
 - +176 TWh of renewables between 2008 and 2012
 - PV/wind capacities reached 175 GW in EU 27 in 2012

→ **An overcapacity situation has led the wholesale prices to collapse**

- **Additionally, renewables are displacing the merit order (which was anticipated)**
- **Grid priority for RES sometimes “forces” negative prices**



Which regulations are needed ?

- **Long term CO2-signal**
 - Keystone to lead ambitious politics of GHG reduction
 - Otherwise, suboptimal investment choices are made
- **Revised support schemes for RES**
 - Medium-term programming of RES development is needed, at a country level, to reduce uncertainties for investors and industries
 - Evolution of support schemes to optimize public investments, minimize distortions and reshape the electricity markets
- **Capacity mechanisms** to guarantee security of supply
- **Adoption of network codes to tackle cross-border issues :**
 - Developing harmonized grid connection requirements and system operation rules to meet future challenges (increased penetration of intermittent generation) ;
 - Facilitating cross-border trade by ensuring optimal use of transmission network capacity ;
 - Integrating national balancing markets, which requires some standardization of balancing resources being available in different Member States

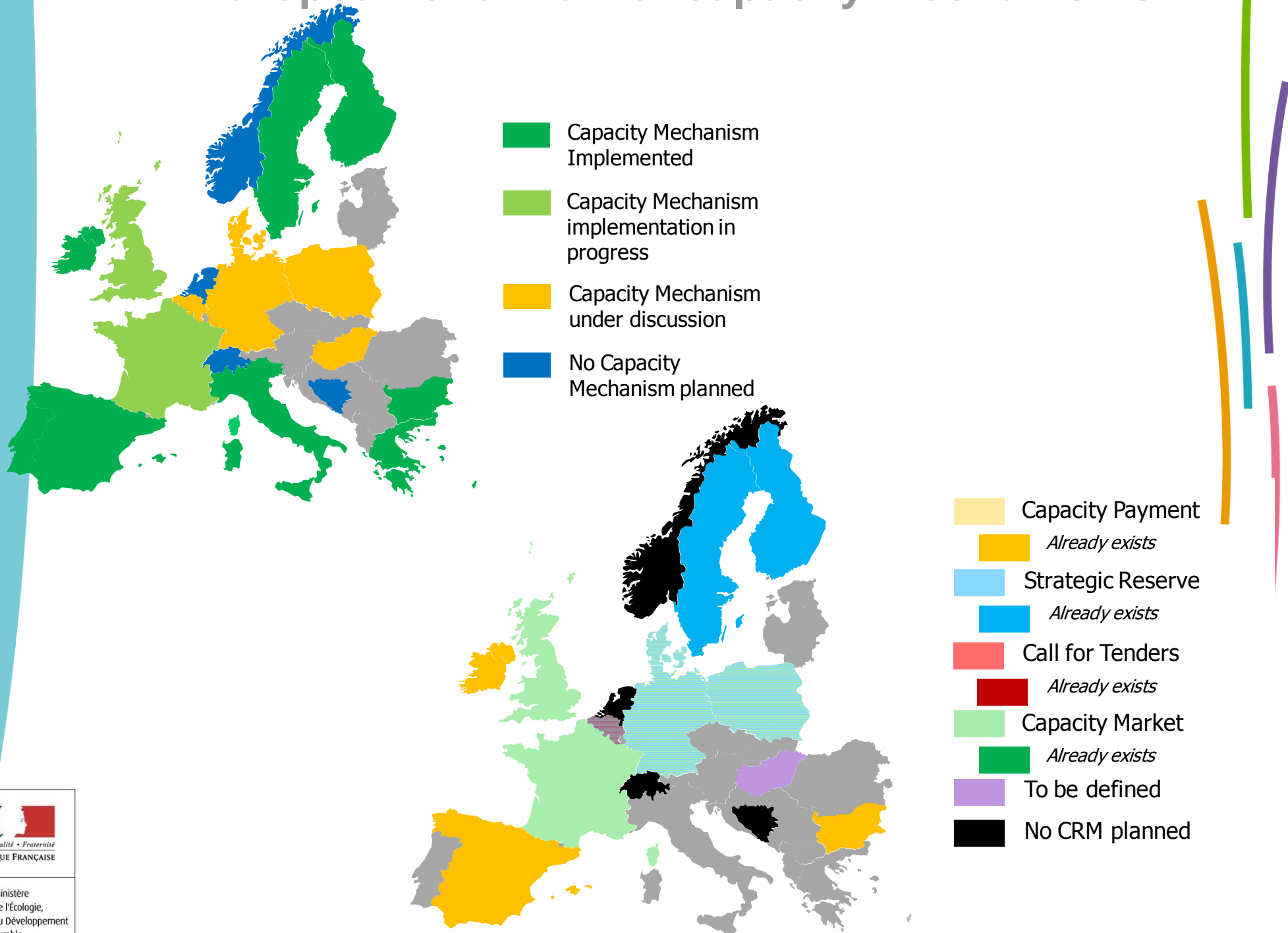
The functioning of electricity markets has to be improved

- The electricity market should **efficiently optimize daily generation**
- There is a **need for flexibility and commandability** in generation and demand
- Due to the increasing share of intermittent RES, an evolution of support schemes seems desirable :
 - for a better system and market integration :
 - exposing RES to short term signals : electricity sold on the market, no compensation when prices are negative, participation of relevant RES units in balancing markets
 - for a better contribution to the network needs :
 - Commandability ? predictability ? observability ?
 - Participation of RES in voltage and frequency control services
- Technological neutrality should be promoted
 - in the context of the increase of generation variability, demand-side management should be able to participate in the markets
 - **But energy-only markets fail to provide good investment signals in demand response, storage capacities or peak capacities**

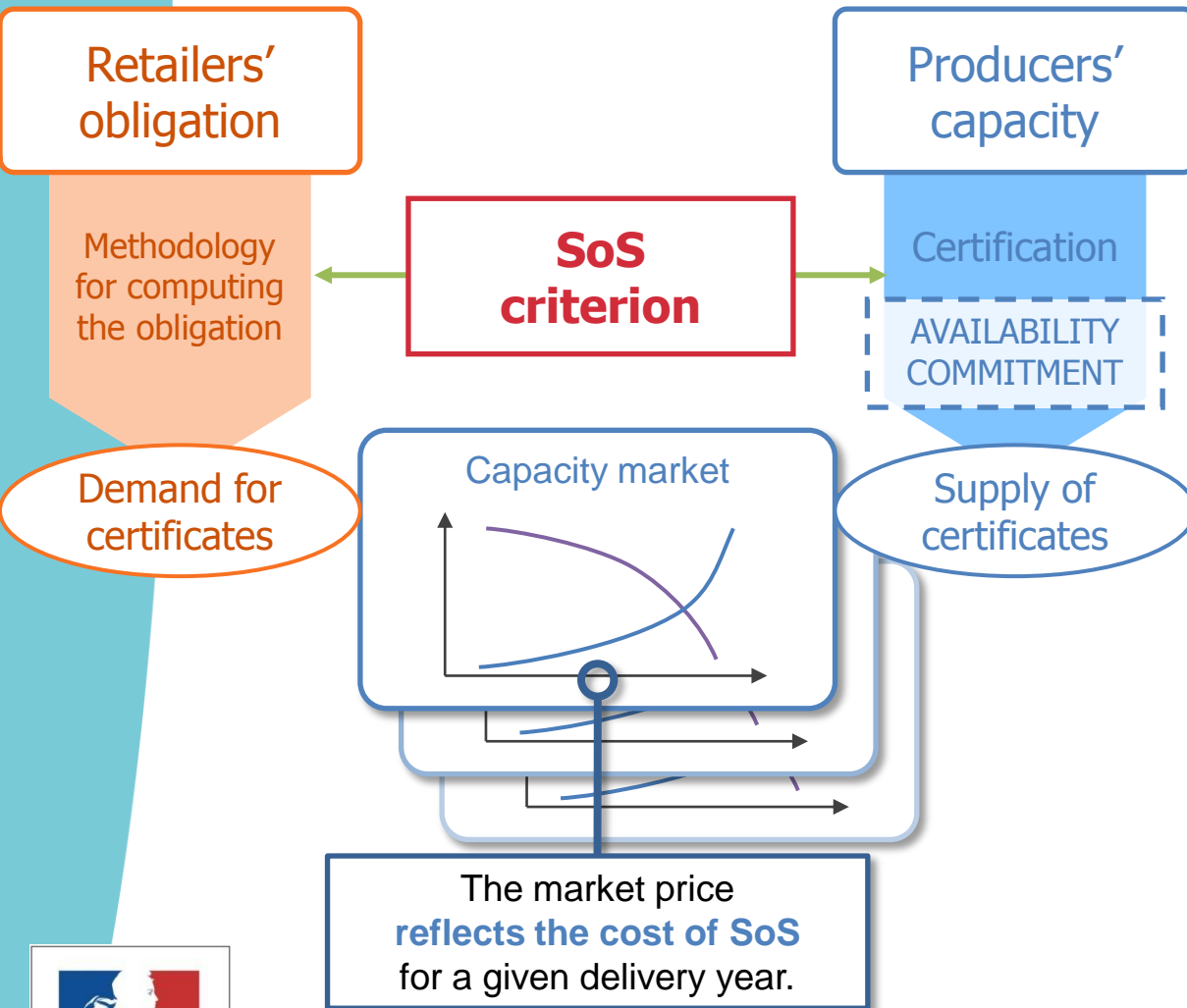
A power regulation is essential to ensure security of supply

- Need to ensure the level of security of supply in electricity which is decided by the government
 - “Energy-only” market has trouble in sending the right signals:
 - it causes “missing money” (difficulties in fixed costs recovery)
 - the profitability of demand response or storage capacities is not guaranteed, due to the low difference between peak and base prices
 - in a system with huge intermittent RES volumes or with fast increasing consumption peaks, scarcity will lie in capacity and not in energy
 - specific problems in certain countries : peakload in France, intermittency in Germany, ...
 - The fundamentals of security of supply are diverse in Europe, but the common need is based on a capacity signal
- ➔ **Many EU countries are currently implementing/developing a capacity mechanism**

A European overview of capacity mechanisms



Functioning of the forthcoming French capacity mechanism



Security of supply criterion

defined by the ministry
(loss of load expectation = 3h)

Obligation carried by suppliers

to acquire enough capacity certificates to meet the peak consumption of their clients.

Commitment from producers

to make their capacities available during consumption peaks. In compensation, they are granted certificates that they will be able to sell to retailers.

> Open to Demand Side Management (DSM)

(implicit + explicit participation)

Overview of the French capacity mechanism

- **The main principles of this mechanism are :**
 - No subsidies from the government
 - No administratively fixed required amount of capacity but instead, a security margin set by the TSO
 - Technical neutrality : no difference between generation technologies, both capacity generation and demand response are promoted
 - Market tools to avoid over-capacity (in this case, capacity certificates price will be 0)
 - Assignment of a cost to volatility
 - Assignment of a value to consumption-smoothing
 - No impact on interconnection capacity booking or cross-border energy flows

Demand response (DR) : a source of flexibility that should be developed

- France was the scene of an early development of demand response : dynamic tariffs featuring differentiated prices during peak/off-peak days (massive price increase during 22 national peak days) have been offered since 1982 (up to 6,5GW of induced DR capacity in 2000).

- ➔ more **dynamic tariffs** will be allowed by new smart meters

- Development of a new framework, to better reward industrial/households flexibility :

- **encourage the development of aggregators**
 - **stimulate demand response potential**, even when suppliers do not encourage it
 - **capacity remuneration** for balancing reserves and on the future capacity mechanism

- ➔ However, there are still questions on the economic model sustainability especially for households demand response.

In a longer term, should a new design in the electricity market be considered?

- In the medium/long term, generation capacities with high CAPEX and low OPEX could become the large majority of the capacities installed :
 - Coexistence with “traditional power plants” (high OPEX and low CAPEX) could prove difficult
 - It is unlikely that the electricity markets, as designed today, will allow a recovery of fixed costs
- A new form of market could emerge relying on three pillars :
 - A short term market which would become more and more a balancing market and where the most efficient power plants would run.
 - A mid term market, like capacity markets, which would ensure security of supply.
 - A long term market based for instance on long-term contracts which would give the proper signals to the investors and allow the investments to take place.
- This new market remains to be designed !

Thank you for your attention



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Annex

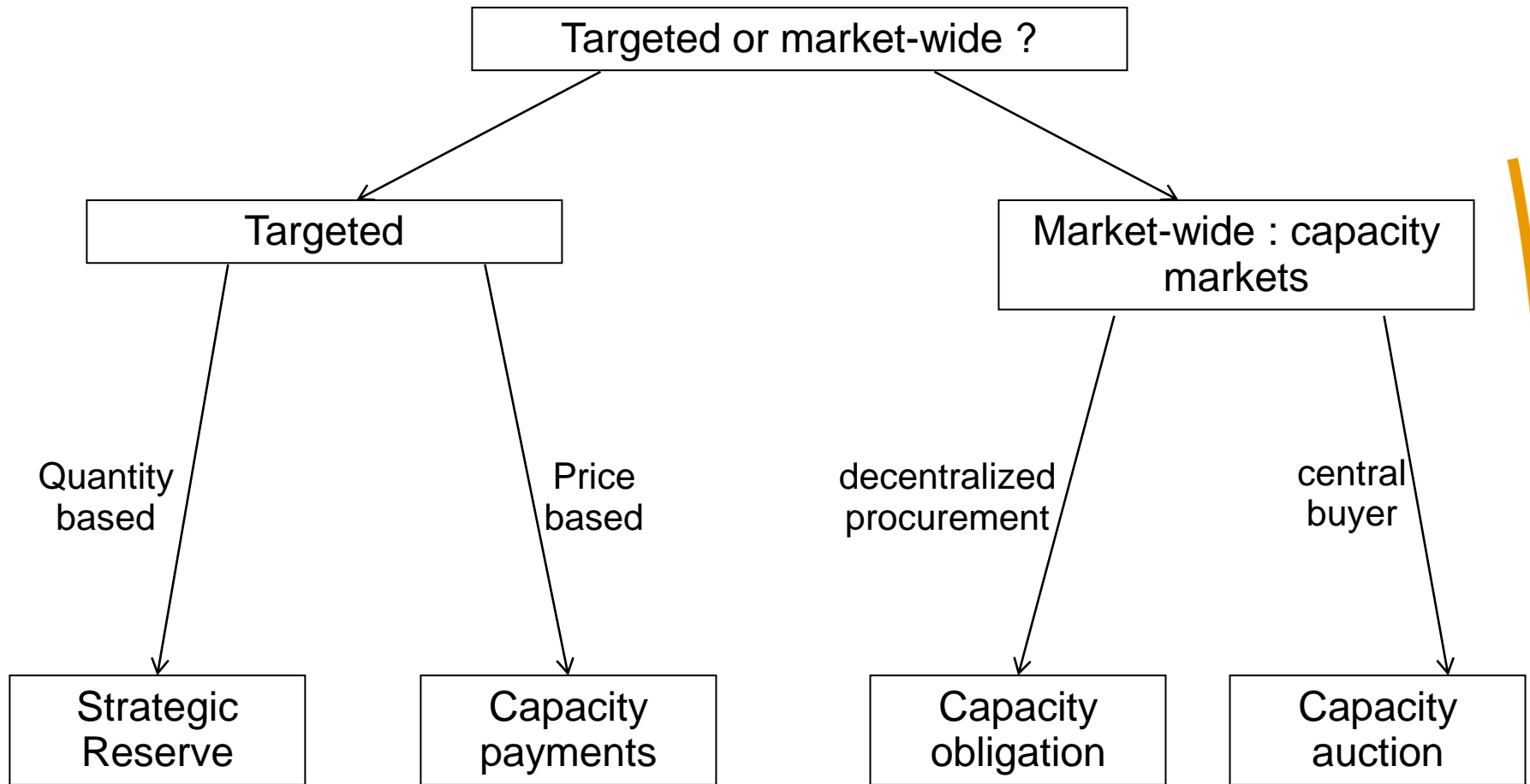


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Different types of capacity mechanisms



Norway, Sweden,
Finland, Poland,
Germany

Spain, Portugal,
Ireland, Italy*,
Romania

Greece,
France

UK

* Italy could evolve to capacity market