Capacity mechanisms in Europe

The fundamental issues behind the ongoing sector enquiry

Session 2 - If a capacity mechanism, which design is most appropriate?

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Future RES Development

Renewable share on final gross consumption*

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>Reference Scenario</th>
<th>Target 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,4%</td>
<td></td>
<td>24,4%</td>
<td>&gt; 27.0%</td>
</tr>
</tbody>
</table>

RES investments still needed to achieve 2030 targets

(*) RES target refers to all sectors (electricity, heating and cooling, transport) Sources: Primes 2013, 2030 Climate Energy Package
(**) ENTSO-E Scenario Outlook & Adequacy Forecast 2015, page 27
Adequacy Forecast
2016 - 2025

New capacity needed

Source: ENTSO-E Scenario Outlook & Adequacy Forecast 2015, pages 50 and 58
Future Trends in European Electricity Markets

**Now**
RES still not dominant in the energy mix
- Energy prices >0 most of the time
- RES offer limited balancing services
- Predictable imbalance costs

**Near future**
RES more prominent in the energy mix
- Energy prices >0 most of the time, but many hours with 0 and <0 prices
- RES offer some balancing services
- Imbalance costs increases

**Next Decade**
Bulk of energy from RES
- Energy prices 0 and <0 for many hours
- RES offer balancing services
- Imbalance costs very high

Variability in energy prices increases financing costs for new projects
Low revenues for programmable capacity could bring problems of Security of Supply

Note: Graphs are illustrative
Current Debate

Examples

Focus on energy-only market: how to foster day-ahead, intraday, and balancing prices

Capacity mechanism based on capacity tickets

The two sides have started tackling some issues of the current market design BUT they miss the major point: how to foster long-term signals
Capacity Remuneration Mechanisms (CRMs)

- Price-based
  - Capacity Payment
- Volume-based
  - Strategic Reserve
  - Capacity Tickets
  - Capacity Auctions
  - Reliability Options

Ability to provide long-term signals
Introduction of Reliability Options in Italy

**Legislative Decree 379/2003**
- Introduction of interim Capacity Payment
- NRA to define an adequate competitive Capacity Remuneration Mechanism

**2008**
First Consultation on possible models of CRMs

**2009**
Second NRA Consultation on CRMs

**Directive 2009/28/EC**

**2010**
Two NRA Consultations on details on parameters of Reliability Options

**NRA Decision 375/2013**
Final NRA approval

**NRA Decision 98/2011**
Regulators defined criteria to be followed by TSO’s proposal

**30/06/2014**
Ministerial approval

**1/7/2014**
Entry into force
Guidelines on State aid for environmental protection and energy

**First Auction**

Today
Reliability Options in Italy
1-way CfD between TSO and selected counter-parties

**Rights**
Receive premium (€/MW/year) during delivery period

**Obligations**
1. To submit offers in DAM and Ancillary Service Market (ASM)
2. To pay the difference between spot price and strike price (if>0)

**Benefits**
1. Deliver long-term signals for all capacity
2. Incentives to deliver capacity when is needed
3. Market-defined triggers and penalties
Auctions for Reliability Auctions in Italy

- **General Auction**
  - Lead time 4 years
  - Delivery period 3 years

- **Adjustment Auctions**
  - Lead time 3, 2, 1 year
  - Delivery period 1 year

- **Secondary Market**
  - Lead time <1 year
  - Delivery period 1 month
Reliability Options
Supply and Demand

**Zonal Demands**
Negative sloped zonal demands defined by TSO considering VOLL, electricity demand and required reserve (netting for foreign interconnection capacity)

**Supply**
Voluntary participation of not incentivised new and existing national programmable capacity > 10 MVA (de-rated capacity, calculated by TSO)
Possible participation of foreign capacity, distributed generation and demand side management in future auctions

Note: Graph is illustrative. For existing capacity under discussion the possibility to receive a minimum premium equal to avoidable fixed costs
Calculation of de-rated capacity considers average unavailability due to incidents and technical and regulatory imitations
VOLL: Value of Lost Load
# Spot and Strike Prices

**Note:** the graph is illustrative, table from Terna

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Spot price</th>
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<tbody>
<tr>
<td>Accepted on the Day-ahead market</td>
<td>Offered price ≤ strike price</td>
</tr>
<tr>
<td>Presented but not accepted on the Day-ahead market (DAM) and not presented on the Dispatch Services Market (DSM) or Not presented on the DAM nor on the DSM</td>
<td>Price on the Day-ahead market (P_DAM)</td>
</tr>
<tr>
<td>Presented and accepted on the DSM</td>
<td>Max (P_DAM; Max Price on the DSM)</td>
</tr>
<tr>
<td>Presented but not accepted on the DSM</td>
<td>Strike price</td>
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</table>

**DAM:** System Marginal Price  
**DSM:** Pay as Bid

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**CO2 and GC Imbalance Costs**

**Fuel Costs**

**Strike Price**

Single strike price for all accepted capacity, calculated on variable costs of peak technology – updated

Variable O&M and other variable costs
Thank you very much for your attention