Investment Needs/Prospects in Southeastern Europe and a Capacity Adequacy Mechanism Design

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Generation Adequacy Studies

Several Studies Have Focused on Generation Requirements and Prospects in Southeastern Europe:

•Generation Adequacy: An Assessment of the Interconnected European Power Systems 2007-2015, ETSO, May 2005

•System Adequacy Forecasts 2007-2015, UCTE, January 2005

•Regional Balkans Infrastructure Study-Electricity (REBIS) Generation Investment Study (GIS), December 2004

Main Points/Conclusions of SE Europe Capacity Adequacy Studies

- Reliance on Imports is Essential for Meeting short term (2007-2010) Needs
- Most countries currently marginal or deficient with the Exception of short term Export Capacity in:
    - Italy (5% reserves in 2002 => 20% in 2006) deficiency (as much as 7GW) is expected to return by 2015
    - Central UCTE currently ~9GW of export capacity, but marginal adequacy after 2015. 12-15GW additions required.
    - Romania, Bulgaria export capacity expected to decline by 2010.

Main Points/Conclusions of SE Europe Capacity Adequacy Studies (Continued)

- To Meet Needs by 2015, 50GW of Additional Capacity is Needed in UCTE
- Whereas Additions are technically feasible, a Generally Accepted Prerequisite is that Investment be Market Induced!

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The Capacity Adequacy Debate

- Objective:
  - Induce Adequate (Reliability wise) & Efficient (least cost, in right location) Investment with Market-based Cost Recovery
  - Do Not Distort Efficient Operation Incentives
  - Address Market Power
- Means:
  - Appropriate Design of Dual Energy and Capacity Markets. But, is “an Appropriate” Design Feasible?

Why the Capacity Market Heresy ?

- Weak Demand Side (neither sees nor pays real time cost)
- Size and Stochastic Behavior of Price Peaks Required for Energy-Market-Only Investment Cost Recovery Transcend Load Rep and Supplier Capabilities (Exaggerated by Market Power, Spatial Variability, 5-10 year expected cost stable but waiting period too long, VOLL estimation is Difficult => averaging and capping)
- Contracting for Reliability Not Feasible under current metering/communication practices

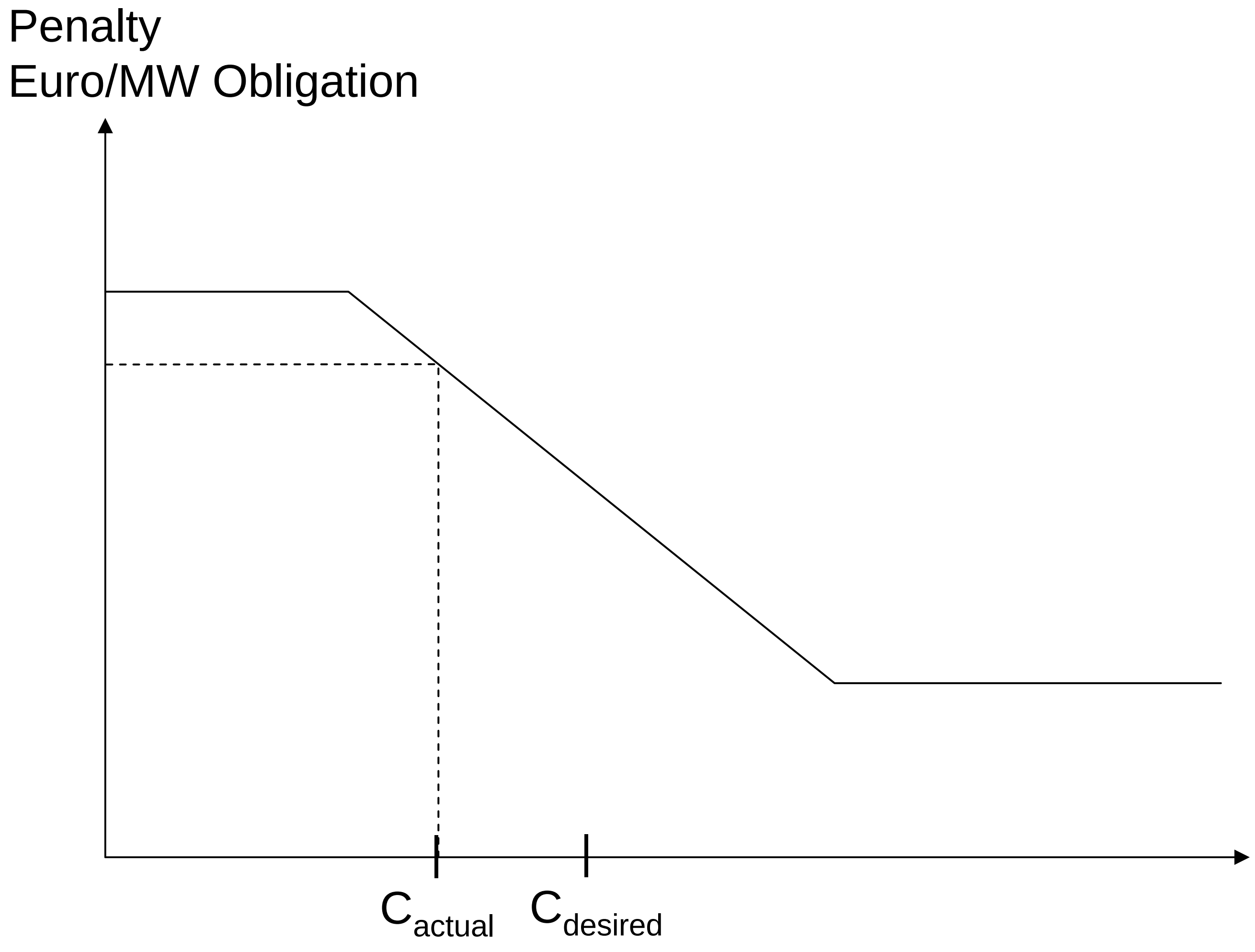
Capacity Market Supplements Generator Revenues. But, is there a Design that:

- Motivates efficient Investment Decisions?
- Motivates Efficient Operating Behavior?
- Avoids/Mitigates Exercise of Market Power?
- Deals with Artificial Nature of Capacity Market and Product Measurement Difficulties? (Capacity is not Valued by Load Reps and may not measure Availability)

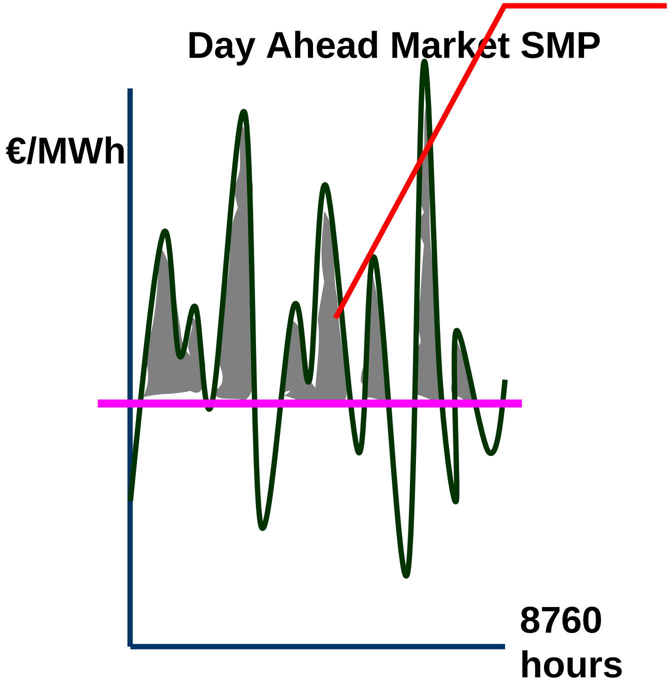
Greek Capacity Market Design

- DEMAND: Capacity Obligation of Load Reps Proportional to Load During 500 hours of Lowest System Reserves.
- SUPPLY: Capacity Rights of Generators Certified by TSO in Proportion to Availability
- Bilateral Contracts may Satisfy Capacity Obligation while being Coupled to a Call Option at a mutually agreed Backstop Strike Price
- Regulated Penalty Payment Choice Protects Load Reps from Exercise of Market Power by Generators

Regulated Penalty Choice May Satisfy Capacity Obligation



Bilateral Capacity Availability Contracts Bundled with Call Option Exceed Value of Penalty Payment Choice. Call Option is a Derivative Product of the Energy Market!



Amounts that are returned by the generator to the Load Rep in return for the pre-purchase of the Call Option

The Load Rep pays:

1. Call Option Premium
2. Min{SMP,St Pr}

The producer covers

1. Capital Cost
2. Operational Cost

Evolution to Pure Energy Market is Possible!

- Risk Sharing of Call Option is Valuable to Load Reps Rendering Capacity Market Meaningful
- Generators Induced to:
  - Hedge by Being Available When SMP is High, and
  - Avoid to Increase SMP Artificially (i.e., Exercise Market Power)
- Market Design Evolves Progressively towards
  - Lower Capacity Obligation Penalties, and
  - Higher Energy Market Price Caps

Current State Of Greek Market

- ~ 11 GW Installed Capacity, 95% Owned by Vertically Integrated Utility
- Limited Competition: Imports/Exports (~0.5GW), Some Independent Traders, and Some IPPs (0.5GW)
- ISO Plans to Induce 1.2 GW of new IPPs by Tendering Market Risk Sharing Guarantees.

Market Risk Sharing Guarantee

- ISO Guarantees Net Revenues from Short Term Energy Market:
  - Level of Guarantee Determined by Tender Competition
  - Tender Winner Transfers Capacity Rights to TSO.
  - IPP is given the Option to Relinquish Guaranteed Revenue by Reclaiming its Capacity Rights and Selling them (bundled with a Call Option) to Load Reps

Prospects that Dual Energy/Capacity Markets will Attract Private Investment and Help Liberalize the Electricity Sector

- Brief Track Record of Capacity Payments:
  - In effective use but under scrutiny in the US
  - Have been used in Spain, Italy (after 2003 interruptions) and are to be introduced in Greece
  - Used in UK and Australia where they transcended to Energy Only Market Designs
  - in SEE they are under selective consideration/ adoption (e.g. Rumania)
- Prospects? Moderate. I Look Forward to Reporting at Future NARUC Meetings!