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Missing Money and Missing Markets: Reliability, Capacity Auctions and Interconnectors

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The EU Target Electricity Model (TEM) is intended as an energy-only market design and came into effect across most of the EU at the end of 2014, coinciding with the date of Britain's first capacity auction. The TEM leaves capacity adequacy to profit-motivated investment decisions by liberalized and unbundled generation companies. The UK's *Energy Act 2013* setting out the Electricity Market Reform (EMR) rejected relying on an energy-only market and legislated for auctions to deliver capacity adequacy.

This paper examines the design and justification of that capacity auction, its relation to the wider issue of reliability, and criticizes the under-studied issue of how the amount of capacity to procure was determined. It argues that typical capacity auction designs have a bias towards excess procurement, in contrast to fears that the energy-only market would lead to under-procurement. Capacity auctions are intended to address the *missing money* problem, but by ignoring the *missing market* problem they perversely exacerbate the missing money problem.

Energy policy aims to deliver security, sustainability and affordability, but politicians treat security of supply as over-riding. Short term security of supply is the responsibility of the system operator (SO). Capacity adequacy is often the subject of regulatory and political concern. If investment were guided by commercial decisions and if markets were not subject to policy interventions or price caps, it is plausible that capacity adequacy could be delivered by liberalised energy-only markets. For this, investors need confidence that the revenue they earn from all the energy markets (including those supplying ancillary and balancing services) will be adequate to cover investment and operating costs. If not, there is a "missing money" problem. If it is adequate but not perceived to be so by companies or their financiers, then there is a "missing market" problem. *Missing money* problems arise if price caps are set too low or ancillary services, such as flexibility, frequency response, etc. and/or balancing services are inadequately remunerated, or transmission access charges are inefficiently high (distorting exit decisions), and/or, energy prices are inefficiently low. Inefficiently low prices seem less likely if market power raises prices above their competitive level. Prices are not necessarily *inefficiently* low just because of excess capacity.

Missing markets create problems if risks cannot be efficiently allocated with minimal transaction costs through futures and contract markets, or if important externalities such as CO_2 and other pollutants are not properly priced. The concept of missing markets can be usefully extended to cases in which politicians and/or regulators are not willing to offer hedges against future market interventions that could adversely affect generator profits. Almost all the discussion about capacity mechanisms concentrates on the missing money problem and whether the various market and regulatory/political failures are sufficient to justify a capacity mechanism, and if so, what form it should best take.

Absent adequately long-term futures markets for fuel, carbon and electricity, and given the stressed balance sheets of major electricity utilities, there has been a dramatic decline in willingness to invest in merchant unsubsidised generation, and growing concerns about capacity adequacy. The UK approach has been to design a capacity auction to procure capacity four years ahead of delivery, following the examples from PJM and other US markets. However, there are considerable problems in determining how much capacity to procure, how best to determine the type of capacity to procure (from generation, the demand side or imports), and how best to remunerate it. The British example illustrates one approach to these challenges and demonstrates some of the flaws in leaving the volume decision to the political process.

Many EU countries aim to meet peak demands from domestic supply, ignoring or under-playing the potential to import electricity over interconnectors. This is expensive both from excess EU-wide capacity, and failing to locate new generation in least-cost locations. The TEM has successfully coupled the day-ahead markets from Finland to Portugal to better integrate markets and improve efficiency. However, National Grid in advising on the capacity to procure assumed a zero net contribution from interconnectors, despite studies arguing that they might displace the need for domestic supply by 50-80% of their import capacity. As a result GB likely over-procured capacity, depressing future wholesale prices, adversely reducing its ability to finance renewables and undermining the case for needed interconnection.

One EU concern is whether capacity markets adversely distort trade over interconnectors and whether they should be subject to harmonised rules. If each country offers efficient prices into the European auction platform that reflect scarcity value, then it should benefit regardless of how other countries set prices (and whether or not they have capacity payments) provided trade is not subject to intervention abroad for “security of supply” reasons nor arbitrary price caps on the auction platform. It is therefore important for System Operators to agree efficient and trustworthy out-of-market arrangements for allocating interconnectors when the market fails to clear, and for regulators to bind themselves not to intervene if markets and agreements work well.

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