

Attila Mate Kovacs: Capacity market mechanisms – missing money or market? - Summary

Are capacity payments essential for guaranteeing security of supply in a high renewables power system? Or is their promotion all about keeping legacy power plants solvent well past their sell by date?

Achieving the perfect balance between maintaining enough electricity generating capacity to meet peak demand while not paying for a glut of idle power stations is notoriously difficult for any power system. Too much capacity adds unnecessary cost and too little risks blackouts. In developed countries, where power cuts can have economic consequences far greater than paying a little too much for a reliable supply, excess capacity has historically been an acceptable expense. That is no longer the case.

Generators and suppliers in liberalised economies must dance to the disciplines of market efficiencies. Uneconomic generation is being pushed out and sometimes the production unit is retired before it has even paid for itself.

German utility RWE, Europe's third largest generator, is vociferous about its shrinking profits. It is taking 3GW offline in Germany and the Netherlands and is assessing further units for retirement. "Due to the continuing boom in solar energy, many power stations throughout the sector and across Europe are no longer profitable," it said in a recent financial report. In Denmark, Dong and Vattenfall between them have reduced thermal capacity by 35%, removing 2.4GW since 2008. The growing renewables business of all three companies has apparently yet to equal the balance.

In North America the story is similar, albeit with a lower penetration of renewables in most regions. The federal Energy Information Administration reports that wind is supplanting baseload generation across the entire Southwest Power Pool that takes in Kansas, Oklahoma and parts of New Mexico and Texas - all big wind states - as well as Arkansas, Louisiana, Missouri and Nebraska. The closure by 2020 of about 100GW of coal plant across Europe (49GW) and North America (53GW) in reaction to the rise of renewables and tighter emission controls is projected by Navigant Research.

In the US, the three power system operators in the eastern states run arguably the most advanced centralised capacity markets in the world. They aim to procure enough capacity to meet the planning reserve margin "at just and reasonable rates".

PJM Interconnection, ISO New England and the New York Independent System Operator rely on the crossover point between a supply and a demand curve to set the market price, just as in any market. The demand curve is an administratively calculated approximation of customer need plus a margin over and above the capacity needed to meet peak demand. The supply curve is based on actual offers from power suppliers.

Shaping the curves to achieve long-term capacity adequacy at "just and reasonable rates" is complex. Market prices must avoid distortions caused by the "cost of new entry" (CONE), currently a particular focus of discussion in energy market reform in the UK. Capacity costs must be net of CONE for a market to provide the right price signals and CONE is yet another administratively decided value (thus open to human error) with considerable influence on market prices.

Variable supply from renewables is one of the complications to consider, but not the most challenging. Capacity has to be available at the right time in the right place to avoid transmission constraints. And the greater reliance on gas and its "just in time fuel delivery" is a new challenge for system reliability. The timing of capacity auctions is also crucial; short term auctions do not offer attractive investment horizons; long term auctions risk investment stranded in worthless assets, or consumers having paid in advance for production not required.