

# Capacity mechanisms and the technology mix in competitive electricity markets

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**Abstract** Capacity mechanisms are increasingly used in electricity market design around the world yet their role remains hotly debated. In this paper, we introduce a new benchmark model of a capacity mechanism in a competitive electricity market with many different generation technologies. We consider two policy instruments, a wholesale price cap and a capacity payment, and show which combinations of these instruments induce socially-optimal investment by the market. Changing the price cap or capacity payment affects investment only in peak generation plant, with no equilibrium impact on baseload or mid-merit plant. We obtain a rationale for a capacity mechanism based on the internalization of a system-cost externality – even where the price cap is set at the value of lost load. In extensions, we show how increasing renewables penetration enhances the need for a capacity mechanism, and outline an optimal design of a strategic reserve with a discriminatory capacity payment.

**Keywords** Investment, wholesale electricity market, capacity mechanism, capacity auction, strategic reserve

**JEL Classification** D41, L94

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