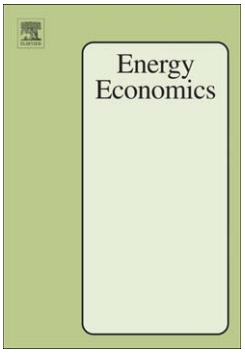

Inducing truthful revelation of generator reliability

Mel T. Devine, Muireann Á. Lynch

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Inducing truthful revelation of generator reliability.

Mel T. Devine*[1,2] and Muireann Á. Lynch[1]

[1]Economic and Social Research Institute, Dublin, Ireland / Department of Economics, Trinity College, Dublin, Ireland

[2]Mathematics Applications Consortium for Science and Industry (MACSI), Department of Mathematics and Statistics, University of Limerick, Ireland

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Abstract

Liberalised electricity markets often include a capacity remuneration mechanism to allow generation firms recover their fixed costs. Various de-rating factors and/or penalties have been incorporated into such mechanisms in order to reward the unit based on the contribution they make to system security, which in turn depends on the unit's reliability. However, this reliability is known to the firm but not to the regulator. We adopt a mechanism design approach for capacity payments based on a declaration by the firm of their reliability. The mechanism scales payments and penalties according to this declared reliability such that the firm's profit-maximising strategy is to truthfully reveal its reliability. A stochastic Mixed Complementarity Problem (MCP) is used to model the interactions between the firms, and we apply this methodology to a test system using Irish electricity market data. Truth-telling is induced, increasing the efficiency of capacity payments while eliminating the requirement for the regulator to allocate resources to discovering reliability.

Keywords: Capacity payments, reliability, mechanism design, mixed complementarity problem
JEL Classifications L51 · C61 · Q40

*Corresponding author: mel.devine@esri.ie