Impacts of market power in the day-ahead electricity market on incentive-based demand response

Yukihide Kurakawa [†] Makoto Tanaka [‡]

Abstract

This study investigates how firms' market power in the day-ahead electricity market influences the performance of incentive-based demand response (DR) programs during the balancing period. We demonstrate that market power in the day ahead increases the marginal cost of DR, thereby reallocating resources from DR to thermal generation in the balancing market. The distortions in the day-ahead market spill over into the balancing market, creating additional social costs. We further investigate the case where some firms in the day-ahead market own thermal generation resources available during the balancing period. The results indicate that strategic firms have the incentive to manipulate the baseline consumption level downward in the day ahead to increase their integrated profits across markets, which is in contrast to the consumers ' incentive to inflate the baseline to gain more revenues. Procompetitive policies in the day-ahead market will alleviate the distortions caused by firms' strategic behavior across markets.

Keywords: incentive-based demand response, market power, electricity, day-ahead market, balancing market

JEL classifications: L13, Q41

[†]Kanazawa Seiryo University, Email: kurakawa@seiryo-u.ac.jp
[‡]National Graduate Institute for Policy Studies