Energy Centre

Energy Research Briefings

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The Energy Centre's research team targets top international peer-reviewed journals as their benchmark. The Energy Research Briefings series translates their work into plain language summaries for businesses, government agencies and the community, highlighting the impacts for practice and policy.

Real-time pricing and market power in electricity: New modelling shows extra gains

Among the many quirks of electricity markets is that demand does not vary much with price. This is because most customers, especially households, do not watch, or pay, the real-time price: they are on fixed price contracts and their meters are only even read monthly. They therefore consume heedless of cost in peak hours instead of, say, delaying that extra load of washing till off-peak times.

Because supply is inelastic too (being limited by capacity), wholesale prices that generators charge see-saw frequently and across a wide range, often 100% in a day. That price volatility in turn exposes electricity users more to generators' "market power" to manipulate prices anti-competitively.

Real time pricing (RTP), long advocated by energy economists for efficiency and effective capacity utilization, requires smart meters. Now that these are finally becoming more available (they are technically feasible for 70% of New Zealand households albeit often not actually offered), RTP looks doubly relevant.

One justification for RTP is still largely missing from modelling, though: what happens when generators do indeed wield market power? A new study* models just that and applies it to a simplified version of the New Zealand market, where the big five wholesalers generate over 90% of electricity. The results when even a mere 20% of users switched to RTP were enticing.

Overall demand became more sensitive to wholesale prices, mitigating market power. As expected, wholesale prices see-sawed less and the peak/off-peak gap shrank. Generator profits dropped nearly 15%. Total installed capacity fell, which helped reduce system costs.

Through another quirk, switching to RTP actually raised off-peak prices. However, the drop in peak prices more than compensated. In fact, "consumer surplus" – how much more consumers would have been willing to pay if pushed, so all as-it-were cream to the consumer – went up 10.4% under market power versus 1.3% under perfect competition. Efficiency gains, which economists also call social welfare (consumer surplus plus its mirror image, producer surplus), rose by 1.9%. Though modest in itself, that is an impressive 41% more than under perfect competition. In another, new, quirk, even those fixed price consumers who did not switch to RTP benefited – effortlessly. This novel result provides an extra rationale for RTP when generators wield market power.

Encouraging or mandating RTP could therefore make electricity markets like New Zealand's more competitive, although big generators may well lobby against losing so much profit.

The thrust of these outcomes is not new. In 2017 the Electricity Authority estimated significant potential consumer savings from RTP. It has been redesigning wholesale market pricing to encourage uptake. Meanwhile, smart-grid advocates see RTP as vital to integrating more renewable generation and battery storage into the grid.

Just how these results – which are only indicative and not the last word – inform policy depends how authorities weigh other factors against total social welfare. But in places like New Zealand where market power seems a concern, RTP's ability to help offset it may well lie heavy in the scales.

* For the full article by Stephen Poletti and Julian Wright, see "Real-Time Pricing and Imperfect Competition in Electricity Markets", Journal of Industrial Economics 2020, vol LXVIII(1): 93–135.

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The Energy Centre is located in The University of Auckland's Business School. Its mission is to undertake independent research on energy-related issues important to New Zealand. The Centre's research, education and outreach activities are supported by The Energy Education Trust of New Zealand.