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THE WEATHER WILD CARD: ASSESSING TIME-OF-USE ELECTRICITY PRICING

Reid Miller, Lukasz Golab & Catherine Rosenberg

The theory behind time-of-use electricity pricing is simple. Charge more for electricity when demand is highest, and consumers will either reduce the amount they use or shift their consumption to a lower-cost time of day. However, quantifying that impact isn't so simple.

Yes, you can compare electricity consumption before and after time-of-use pricing is introduced. However, weather changes from year to year, affecting how much people use fans, air conditioners, furnaces and space heaters. To date, researchers haven't agreed on the best way to account for those confounding variables.

Lukasz Golab and his colleagues at the University of Waterloo aimed to address that question by creating a methodology for modelling how weather affects residential electricity demand.

They began by using data from an electricity distribution company in southwestern Ontario to compare consumption in the summer before time-of-use pricing was introduced with consumption the following summer.

Next, they took Environment Canada data for the same period and assessed the impact of temperature, humidity and wind-chill. They also considered the time it takes for outside temperatures to affect indoor temperatures, and the fact that different households set their air conditioning to kick in at different temperatures.

In this particular case, Golab and his colleagues showed that time-of-use pricing reduced summer on-peak demand by 2.6 per cent. More importantly, they showed how weather-related variables influenced that demand. And while the impact of each variable will vary from community to community, their research highlights the importance of taking Mother Nature's nuances into account.

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Partners: Natural Sciences and Engineering Research Council of Canada, WISE-Cisco Systems Smart Grid Research Fund

Source: Miller, R., Golab, L., & Rosenberg, C. (2017). Modelling weather effects for impact analysis of residential time-of-use electricity pricing. *Energy Policy*, 105, 534-546.