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Default Effects, Follow-on Behavior, and Welfare in Residential Electricity Pricing Programs

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Electric utilities have a problem. Residential customers are used to "flat" electricity rates that are the same no matter when electricity is used. But the reality utilities face is that the cost of generating electricity varies wildly depending on how much demand is on the system. On a hot summer afternoon, when utilities must call on every possible resource to meet the demand of air conditioners running full blast, the marginal cost of providing electricity can easily by ten times the normal rate. Since customers don't see this price signal, they have no reason to respond—but if it could be shared with them, a little restraint in the use of electricity during key hours could go a long way towards improving the efficiency and lowering the costs of the whole system.

But would customers accept and respond to a rate that included a price signal to use less electricity during times of peak demand? Customers can and do respond to complex electricity pricing signals, Catherine Wolfram reported in Monday's energy policy seminar, in her presentation of a paper that not only has significant implications for utility pricing policies, but that also explores new questions about how "nudges" can work in public policy.

Wolfram and her co-authors worked with the Sacramento Municipal Utility District (SMUD) to study customer responses to two pricing options—"time of use" prices, which charge more for use during peak electricity demand hours, and less for use at other times, and "critical peak pricing," which charges significantly more for electricity use on critical peak days identified by the utility (typically, very hot summer days, when air conditioning usage is expected to spike), while lowering rates at other times.

The study was designed with multiple customer groups, to enable researchers to evaluate not only how customer electricity use responds to different rate structures, but also whether it matters how the new rate is offered to customers—as the default rate, from which customers could "opt out," or as a rate option, to which customers would have to "opt in."

The theory of policy "nudges" suggests that making the preferred customer choice the default option will likely increase the number of customers subscribing to that option. The classic example, Wolfram explained, is retirement savings—you are likely to get higher retirement savings rates if you incorporate devices such as automatic 401K contribution increases (with the option to opt out) into your retirement plans, rather than simply encouraging employees (those being nudged in this case) to "opt in" by acting to increase their contributions.

As Wolfram explained, however, this classic example of a "nudge" requires little of the person nudged other than passive acceptance. The less the nudge calls attention to itself, the better. Will a nudge still work when its effectiveness requires the target to notice it and change his or her behavior in response? In the case of the new electricity rates, this is the relevant question—the point is not to change bills, the point is to get customers to adjust their peak electricity usage. So the customer must be aware of the new rate—but will aware customers respond to the rate, ignore the rate, or defect from the rate?

SMUD customers responded to the rate, Wolfram reported—a result that suggests new possibilities for more efficient electricity rates, and also an interesting corollary to the theory of nudging—nudges can, at least sometimes, go beyond passive acceptance to create benefits by evoking active responses.

Wolfram spoke as part of the Kennedy School's Energy Policy Seminar Series, which is jointly sponsored by the Energy Technology Innovation Policy research group of the Belfer Center and by the Consortium for Energy Policy Research of the Mossavar-Rahmani Center on Business and Government.