Do consumers want smart meters? Incentives or Inertia
Evidence from North Carolina and lessons for policy*

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Executive Summary

Demand side measures on the part of households are one aspect of energy conservation, and internationally, policymakers seek to make consumers more active participants in conservation activities. In the United States, the American Recovery and Reinvestment Act of 2009 made available close to $300 million for states to subsidize households’ cost of replacing older appliances with Energy Star certified models.

We recognize that demand side contributions to energy conservation combine both behavior and technology. For some households the incentives to change behavior or adopt new

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technologies are either lacking or ill understood. Also, a subset may have behavioral inertia rooted in a bias for the status quo. One route to behavioral change is to make consumers more price aware. Ideally, this would be achieved with time-varying prices for energy, but that solution is not everywhere politically feasible. An intermediate step is to make price and use fluctuations visible to consumers. Both price variation and energy use display can be achieved using smart meters. Many utilities in the U.S. and Europe have rolled out smart meters in parts of their service areas. In the U.S. the meters are primarily used to assist utilities in meter reading and to provide consumers with more frequent and detailed information about their energy use. Smart meters could also be used to charge dynamic prices.

There remains uncertainty over the benefit cost ratio of extensive smart meter deployment, but movement continues in that direction. Using mail survey responses from two counties in western North Carolina we try to determine which households are more likely to adopt energy saving appliances and technologies in their homes and which suffer from inertia toward the status quo. Because dynamic pricing is not universally embraced but is increasingly feasible, we also address technological adjustments by assessing consumers’ interest in smart meters.

The two counties surveyed differ in their peak energy use. Watauga County is located in the mountains at an elevation over 3000 feet; peak energy use occurs in the winter with little need for air conditioning in the summer. Forsyth County is more urban and warmer (elevation 900 feet) with peak energy use in the summer. We received over 700 completed surveys representing an overall response rate of approximately 40%. The difference in the total degree days between the two counties provides an interesting case study to examine incentives where two counties differ by climate but not demographics.
Households were first asked a series of questions on energy use and conservation measures. We find that consumers respond to incentives to the extent that Watauga residents are more likely to take actions that reduce energy needs for heating, while Forsyth residents are more likely to look for savings from more efficient appliances. Second, we developed a hypothetical scenario where respondents were offered a smart meter that could potentially reduce their electric bill by an amount $A. Variable A randomly took the value of 5, 10 or 15 dollars. Fifty-eight percent of respondents replied that they would indeed want such a meter if their utility installed it for no charge. However, only 19% of respondents overall would be willing to pay $100 to have the meter installed (this corresponds to 33% of those who would want it for no charge). The low percentage suggests that paying an upfront charge lowers consumers’ willingness to participate in a smart meter program because they have to commit both money and time to acquire savings.

Bivariate probit analysis of our data shows the amount of potential savings from adopting a smart meter (5, 10 or 15 dollars) would not affect the desirability of the meter if it were offered for no charge. However, savings were highly significant when the meter had an upfront fee of $100. Demographics and consumers’ perceived time flexibility also play a role in households’ willingness to participate in a smart meter program. Most respondents who were not interested in having the meter believed the expected monthly savings was not worth making behavioral changes, and many did not want to give up the flexibility they enjoy from a single price. In addition, households were more likely to want a smart meter the greater the potential bill reduction, and they were more likely to install more insulation the colder the temperature, yet there was significant reluctance to change behavior based in part on the lack of interest in altering routines. Consumers showing the most behavioral inertia were those with lower levels of education, of a higher age and those whose electric bills were a larger portion of their income.
A pessimistic conclusion from our survey is that many households are not prepared for the adjustments necessary to benefit from the time varying prices that smart meters make possible. The lack of interest and preparedness could create political resistance both to changing utility rate schedules and completing roll outs of smart meters. As appliances become “smarter”, households may be less averse to behavioral change. Educating consumers about new technologies is an important part of gaining consumer acceptance, and utility’s customer service and proactive attempts to minimize frustrations will have an impact on household attitudes.