

## **Presentation DØRS 2012:**

# **Investigating the behaviour of Danish Power Consumers through Field Experiments**

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### **Abstract:**

We present results from a recent field experiment on Danish Power consumers (Jensen et al., 2012) and plans for extending this study in a new field experiment (INCAP).

Experimental evidence of consumers adoption of cheap energy saving technology is sparse. We present results from a field experiment in which autpoweroff plugs were provided free of charge to randomly selected households. We use propensity score matching to find treatment effects on metered electricity consumption for different types of households. We find effects for single men and couples without children, while we find no effect for single women and households with children. We suggest that this could be because of differences in saving potential (e.g. some households do not have appliances where using a plug is relevant), differences in the skills relevant for installing the technology and differences in the willingness to spend time and effort on installation. We conclude that targeting interventions at more responsive households, and tailoring interventions to target groups, can increase the efficiency of programmes.

In a now project (INCAP) we plan to undertake a similar field experimental investigation of consumers adoption of automated response technology for common household appliances. In the future such automated response facilities may be built into many common household appliances and may be made available to consumers at low cost. Such „smart“ technology allows appliances to automatically react to hourly wholesale market conditions (or other power company signals) by disengaging them during high-priced periods. If households use this facility they can help counteract the increasing variation in power supply that is expected because of increasing reliance on wind power supply the coming years. Even though many household appliances may have automated response technologies built in in the future, imperfect information and disutility of effort and reduced service

quality can cause consumers to lag in adopting these technologies. This can seriously inhibit the use of dynamic pricing and automated response technologies. Other studies suggest that such adoption barriers seem important for the reluctance of consumers to undertake economically favorable energy saving investments and habit changes. The question analyzed in INCAP is: Can consumers be induced to adopt varying tariffs and automatic response technology for common household appliances at costs that make this socially attractive? The project implements a large scale field experiment using an automatic response application for a common appliance (e.g. refrigerators). This is a novel approach allowing estimation of the distribution of adoption barriers across a large representative sample of power consumers in their natural consumption setting based on controlled variations in the application technology and intervention design. Results can point to those consumer groups where focused policies will be cost-effective and to how these policies should be designed. The representative field experimental method gives us a unique possibility for extrapolating results to general behavior patterns. We plan to exploit this by integrating results into macro models with which we will design policy strategies for inducing household supply of regulating power and evaluating their consequences.

Referencer:

Jensen, C.L., L.G. Hansen, T. Fjordbak, E. Gudbjerg (2012): Providing free autopoweroff plugs – Measuring the effect on households electricity consumption through a field experiment. *Energy Journal* 33(4) pp187-212.