

Abstract

In the year 2020 50 % of the energy supplies in Denmark must come from renewable energy. The market for electricity is characterized by a shifting demand curve, depending on the time of day; peak demand is often during the evening. The transition requires households to be more flexible and consume energy when the wind blows, so to speak. This happens both via traditional pricing signals, i.e. higher prices when production is low – off-peak, and low prices when production is high – peak, in the present study between 20 and 23. Additionally it happens through dissemination of market information, with alternative signals, as in this study through text messages. An interesting question arises: to what extent are consumers willing to change consumption according to alternative signals?

The thesis builds on experimental data following a treatment group vs. a control group. Households are urged to shift consumption depending on the type of peak. Households are requested to shift electricity consumption either “away from” a period or “over to” a period. The analysis both focused on the overall effect and the effect from various subgroups: high consuming households vs. low consuming households and couples vs. families.

Households respond more to the treatments, if they experience the same type of peak, and if this occurs every day. Households from the lower quartile group reduce relatively more and are generally more persistent. Households from the higher quartile group tend to react with a greater absolute magnitude in the first month of the experiment, where after interest is lost. Couples and singles are also in general more persistent, this should of course be viewed in connection with the probability that they coincide with lower quartile households.

Three elements from the psychological and economic theory of behavior are combined in this experiment. The combination of information, feedback and motivation is studied. In addition to receiving requests/information on when is a good time to use or conserve energy households were randomly assigned to being confronted with different motives: Personal benefit in the form of financial incentives/rebates, social benefits in the form of CO₂ savings and lastly some were motivated by the prospect of achieving both. These motivations were part of the content in the text messages. The price, and secondly the combination of price and environment, are what drives the results, for high peak and low peak.

Regressions with the off-peak demand and the daily total demand, reveal very different patterns, often with insignificant results, rendering it difficult to determine whether the households actually shift consumption, or simply conserve on high peak days and use more, than average, low peak days. Secondly, the effect of a monthly feedback email is studied. Households were divided into categories based on how well they performed during the past month. Some households were informed that they managed to shift consumption with a certain percentage, as what was requested in the text messages. The households that received an email, with the desired content confirming that they managed to shift, were marked with a dummy variable. This gave ground to investigating how households react to negative and positive emails. The experiment began in June 2014, but the first email arrived in January 2015. This was mitigated by providing some households with an apology and others not. Households show a renewed interest in the experiment, when they receive an email, conditioned on receiving an apology and with the desired content.