



Key elements and attributes affecting prosumers' behavior

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Introduction

Many aspects of households' willingness to participate to the energy market are not yet well understood. Hence, the mechanisms to promote flexibility among households are still inadequate. This pilot study provides an ex ante evaluation of households' acceptance for hypothetical flexibility contracts and services in Finland

We use a survey-based method referred to as the Choice Experiment (CE) to analyze individuals' preferences for different characteristics of demand side flexibility.

Method and material

CE involves decomposing flexible energy service alternatives into their important characteristics, and further allows us to study trade-offs between these characteristics. In our CE respondents were provided with 3 choice alternatives and asked to choose their preferred alternative among them. One of the alternatives corresponded to the present situation (i.e. status quo) without flexibility characteristics, whereas the two other alternatives presented possible choice scenarios with flexibility characteristics. Each respondent faced 6 choice tasks.

Example of a choice task.

CHOICE TASK 1	Alternative 1	Alternative 2	Status Quo
Electricity distribution contract	Two-rate tariff	Power based pricing scheme	Fixed rate tariff
Electricity sales contract	Real time pricing	Fixed price	Fixed price
Remote control of heating	7 am – 10 am	5 pm – 8 pm	No control
Remote control of electricity use	No control	5 pm – 8 pm	No control
System level emission reduction (CO ₂)	-10%	-30%	0%
Annual savings (€)	30€	80€	0€
My choice:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The pilot study was conducted via web-based questionnaire in Webropol in January 2016. We received 92 responses to the pilot survey.

Preliminary results

- Results imply that households required, on average, around 153€ compensation in their annual electricity bill in order to choose real-time pricing contracts over fixed price contracts. This is a clear indication that uncertainty in the monthly energy bill created disutility among respondents.
- Regarding electricity distribution contracts respondents were indifferent between the presented contract alternatives. In turn, there is likely some room for new flexible distribution contracts such as power based pricing schemes in the market.
- Respondents' sensitivity to restrictions in household electricity usage was greater than sensitivity to restrictions in heating. There was also considerable differences in respondents' perceptions between electricity control in the morning and in the evening. Control during the evening required higher compensation than control during the morning (304€ vs. 118€).
- Respondents were on average willing to pay 46€ annually for system level emission reductions. This shows that there existed also some other value creating elements how to increase demand side flexibility than just reductions in annual energy payments.
- Respondents were a very heterogeneous group: (1) the the choice probability of status quo was greater among high-income households; (2) the existence of electric heating system increased the probability of remote control of heating selection; (3) bigger households were less likely to opt for remote control of electricity use than smaller households; (4) men were more likely to choose power-based pricing contracts.

