



Schweizerische Eidgenossenschaft
Confédération suisse
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Department of the Environment, Transport, Energy and
Communication DETEC

Swiss Federal Office of Energy SFOE
Energy Research

Annual report 2017

Reducing Swiss household energy demand

Modeling and assessing non-monetary incentives
(information and social norms)



In cooperation with the CTI



Energy funding programme
Swiss Competence Centers for Energy Research



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Swiss Confederation

Commission for Technology and Innovation CTI

Date: 15. November 2017

Town: Bern

Publisher:

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SFOE contract number: SH/8100087-00-01-02

The author of this report bears the entire responsibility for the content and for the conclusions drawn therefrom.

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Project goals

In this project we provide an assessment of the effects of social norms and information on energy use (e.g. mobility, electricity demand and space heat) for different types of households. We first empirically investigate the effects of information and norms on household energy demand. Second, we develop a numerical model of household energy use describing the influence of soft instruments on aggregate energy use and the interactions with monetary instruments. This model covers feedback effects as well as the influence of policy measures.

Summary

In this project, we started to analyse the role of information on energy demand. To this end, we construct an index capturing the respondents' energy literacy and regress it on different energy related behaviours. While we find that information has a significant impact on different reported behaviour and habits. But we cannot document a negative impact of literacy on energy costs. For example, we find that high energy literacy is associated with low motor vehicles ownership, low personal flight travel, lower consumption of warm water (in terms of showers and baths) and more saving behaviour related to space heating (e.g. turning down the heat during longer absence from home). But, we do not find a similar negative association between energy literacy and electricity and heat costs. Thus, our hypothesis that better informed people behave in a more energy saving way can be partially confirmed. Moreover, our results show that people who get information on how to reduce their energy consumption from family, friends and colleagues (which is also the source of information for 54% of the respondents) report lower electricity and energy costs. Thus the network effects that are to be modelled later in the project appear to be of high relevance.

Work undertaken and findings obtained

The project started in Fall 2017 and the work that has been done focuses on Task 1.1. "Information and Social Norms" (Workstream 1 "Empirical Analysis"). In this first step, we base our analysis on the Swiss Household Energy Data Survey (SHEDS), which has been developed by an interdisciplinary group of CREST researchers with the objective of studying household energy-related behavior. The survey is a longitudinal household panel representative for the Swiss, German and French speaking regions. The analysis and results reported below are based on 2'860 observations (households) from the survey wave 2016.

In this first phase of work, we focused on the role of information on energy related behaviour. To this end, we construct an index which capture several aspects of the respondents' energy literacy, like for example knowledge on the average Swiss price of 1 kWh of electricity and knowledge on the electricity consumption and usage costs of several household appliances. Similar to Blasch et. al 2017, answers to these questions were combined creating a measure for energy literacy ranging from 0 to 13 (mean: 7.15; SD: 2.14).

Using this index, we gained preliminary results regarding the relevance of information for the demand of electricity, mobility and behaviour related to space heating and warm water. Our main hypothesis is that, on average, households with higher energy literacy behave in a more energy saving way. Our preliminary analysis shows a number of interesting results which are mostly consistent with our hypothesis. We list below the most important findings.

- **Space heating and warm water:** we find that households with a higher level of energy literacy are more likely (to report) to turn down heating when absent for longer periods (e.g. during holiday), to set different temperatures in different rooms and to set different



temperatures during day and night. Moreover, the average living room temperature is lower in households with higher energy literacy, even though the difference is small. We also find more saving behaviour with respect to warm water usage among better informed people: they tend to take fewer showers and baths per week and they tend to turn down the water more often while showering when soaping. However looking at the reported costs for warm water and heating we cannot confirm the results. This outcome will be investigated further.

- **Mobility:** for the mobility sector, we analysed the household ownership of motor vehicles (cars and motorbikes) and the respondents' frequency of flight travels. Our results report a negative relationship between energy literacy and vehicle ownership as well as personal flight travels (short, middle and long distance flights).
- **Electricity:** looking at the reported electricity costs we cannot establish any relationship between the level of energy literacy and electricity consumption. However, further analysis is needed in order to investigate whether relevant omitted variables may bias the results.
- **Source of information:** reported information on the source where people take up recommendations for changing energy behaviour enable us to investigate different information channels. Preliminary results show that taking up information from family, friends or colleagues seems to be negatively and significantly correlated with electricity and heat costs. However, households who gather recommendation by local energy suppliers report higher levels of energy consumption (electricity and heat costs).

All results discussed above are based on regressions which include several control variables varying from socio-economic household characteristics, to accommodation characteristics and to geographical aspects.

Finally, we also start looking at different household typologies. For this purpose we employ a social segmentation based on the Gunnar Otte's lifestyle concept (Otte, 2004), which has already been applied to SHEDS by SCCER CREST affiliated researchers. This household segmentation differentiates between 9 lifestyle types depending on endowment level on the one hand and modernity together with biographical perspective on the other hand. This segmentation results in the following household classification: 2.5% traditional workers, 6.8% conventionalists, 2.6% conservatives, 8.3% home-centered, 29.5% advancement-oriented, 16.3% liberals, 4.4% entertainment-oriented, 17.9% hedonists, and 11.7% reflectives. As the number of observations in some household typologies is too small for a detailed analysis in this typology, we plan to reduce the number of segments to 3-4 types in order to obtain larger (but internally still sufficiently homogenous) groups.

National cooperation

Our project is embedded within the Swiss Competence Center for Research in Energy, Society and Transition (SCCER CREST) that aims at contributing to the energy transition in Switzerland. This competence center brings together research groups from different disciplines and almost all major Swiss research institutions. More specifically, our project benefits from the ongoing survey SHEDS and related research which is carried out in Workpackage 2 "Change of Behaviour".

Evaluation 2017 and outlook for 2018

Within the very first project phase, important tasks including the preparation of data, some preliminary regression analysis for the average household and the household segmentation were successfully conducted. The results of these analyses will be the base for the development of the model that will start in Spring 2018. In addition, important empirical work still needs to be undertaken. For example, we will investigate in more detail whether the sources where people get informed on how to reduce



their energy consumption and the degree of trust on information sources play a role. We will also start to analyse the role of social norms in 2018.

References

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