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WHY DO CONSUMERS BUY WHICH HEATING SYSTEM? A SURVEY-BASED MODEL OF DECISION CRITERIA

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OVERVIEW

New and innovative technologies like wood pellet or electric heat pump systems have entered the market for space heating in Germany in the recent years. The new technologies were supported strongly by state subsidies and from 2009 on also by use obligations. This support, together with comparably high fuel prices for the conventional fuels (oil and gas) led to sharply decreasing market shares of the conventional technologies. From an investment point of view, the decision for those innovative heating systems seemed not always reasonable, as the higher investment costs compared to the conventional technologies were not compensated by probable future savings in operational cost. Therefore, other than economic factors are supposed to play an important role in the decision for a heating system as well.

This paper presents an analysis of the decision criteria for/against heating systems by applying a discrete-choice consumer decision model based on survey data. Technologies included in the analysis are fuel oil, natural gas, wood pellet or electric heat pump systems, all four combined or not with solarthermal collectors as well as micro CHP.

METHODS

In order to create a profound data basis of the above mentioned decision reasons, an online-survey with more than 150 records has been carried out. In the survey, participants who had installed a new heating system in the last three years were asked about several decision criteria, including:

- The role of external consultation
- The importance of investment costs vs. operational cost
- Ecological properties of the heating system
- The energy consumption of the building
- The previous heating system

as well as social characteristics of the participants like income, education, number of children etc.

In a subsequent modelling step, the relationship between the individual characteristics of the decision-maker and the decision is quantified. This is done by designing a so-called discrete choice model. This type of model is used for calculating the probability that a decision maker decides for one specific option *i* out of a choice set of *n* alternatives [1].

The parameters (logit coefficients) of the model are estimated by using the method of maximum likelihood as proposed in [2].
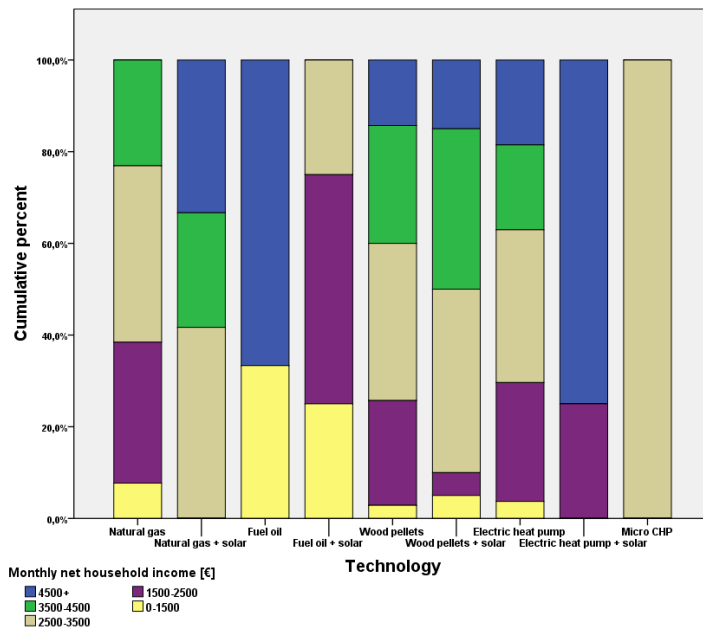
RESULTS

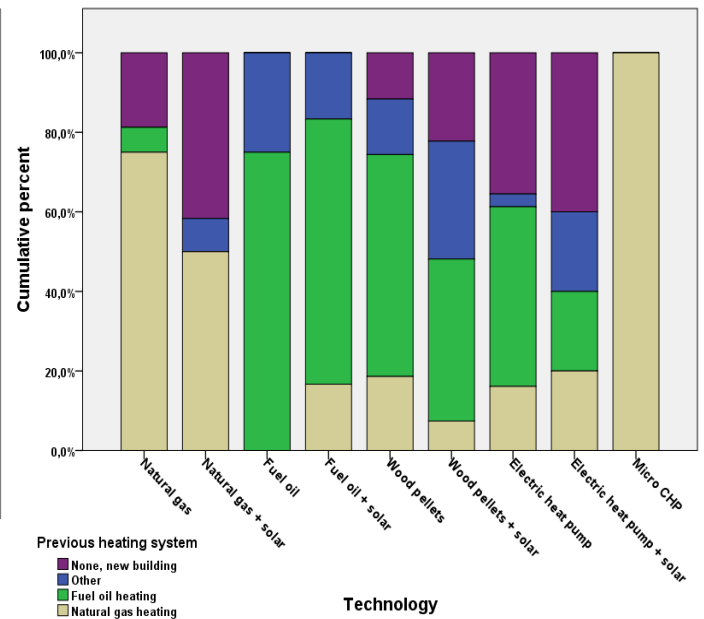Fig. 2: Technology choice vs. income

Fig. 1: Technology choice vs. previous heating system

Fig. 1 and Fig. 2 show two exemplary results: The income has a positive effect on the innovative technologies, i.e. households with higher incomes are more likely to buy an innovative heating system. Fig. 2 shows that the majority of the households which previously had a natural gas heating installed will install a gas heating again. Household which had a fuel oil heating (mainly installed in the 60s and 70s) are much more likely to buy either a fuel oil system again or an innovative heating system like wood pellets or electric heat pump.
Moreover, based on the logistic regression model, several conclusions can be drawn, such as:
- The relative importance and the "financial value" of the different factors
- The elasticities for different factors

CONCLUSIONS

The decision for/against a specific heating system is not dominated by economic criteria only. However, many other criteria play an important role as well. The previous heating system e.g. is quite important as houses can be categorised in houses "with storage room" and "without storage room". Other important parameters are the ecology of the heating system and the existence of state subsidies.

REFERENCES

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