MODELLING THE FUTURE DEVELOPMENT OF THE GERMAN HEATING MARKET

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Introduction

Driven by technological development, high prices for fossil fuels as well as partly by governmental subsidy schemes, several new technologies have entered the German market for space heating in recent years. The most important of these technologies so far are electric heat pumps, wood pellet boilers as well as boiler support by solarthermal systems. The shares of those systems have been increasing for some years while in the last year a stagnation was visible, which leads to the question how this development will continue in the years to come.

Methodology

In order to answer this question the author has built a mathematical model. The model consists of two parts: The first part looks at the current state of the heating market and answers the question, which boilers are in use today and which boilers will reach the end of their lifetime and will have to be replaced in the coming years. To the new heating technologies moreover a dynamic learning curve approach is applied.

The second part of the model focuses on the individual decision process for a new heating system. In this decision process, the cost (investment cost, subsidies as well as forecasted operational cost) obviously play an import role. However, other factors like space requirement of the heating system, the personal attitude (willingness-to-pay) towards renewable energy systems or the accepted level of required boiler maintenance effort also influence the decision heavily. Unlike the previous which can be modelled generally (in a first approximation the cost of a certain boiler are the same for every household in Germany), the latter have to be determined individually. In order to capture the effects of the mentioned points, the decision process is modelled by means of a multinomial conditional logit model, which is fitted to survey data. The survey has been performed amongst households that recently invested in a new heating system.
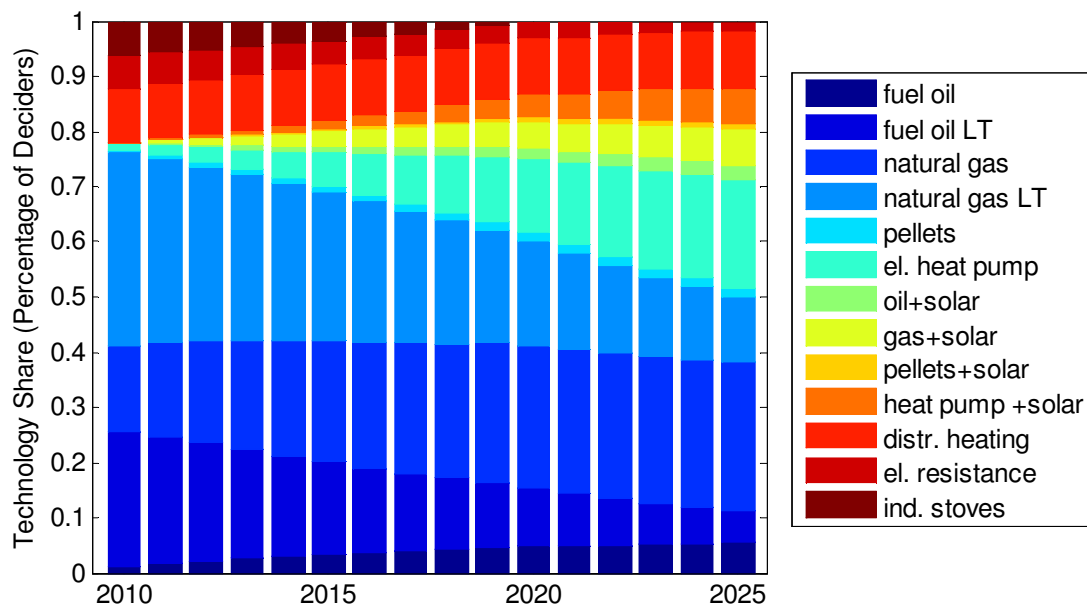

Figure 1: Development of the German Heating market until 2025

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Results

The results of the model are shown in Figure 1. According the model results, the share of conventional heating systems (fuel oil and natural gas based systems) will decrease considerably in the years until 2025. However, this share is still above 50% in the year 2025. Within the fossil-fuel based systems there is a considerable shift towards the use of condensing boilers. From the newly introduced technologies, electric heat pump based systems are the main profiteers.

Based on the presented results the development of further parameters of the heating sector like CO_2 emissions and consumption of the different fuels can be evaluated. Furthermore, the influence and economic efficiency of policy measures like investment subsidies, fuel taxes and obligations of use can be assessed.