INCREASING POWER SELF-SUFFICIENCY OF GERMAN HOUSE-HOLDS – IMPLICATIONS FOR ENERGY COMPANIES' BUSINESS MODELS

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Content

With shrinking costs for local production plants and rising retail prices for electricity, the decentralized generation of electricity and its direct consumption is getting increasingly attractive (Bardt et al. 2014, 5). While for some time past there has been the possibility of power self-supply of house own-ers, concepts for the direct power supply of tenants are recently developed under the term 'Mieterstrom'.

The decisive difference between both end-consumer groups is that house owners are able to buy or lease the decentralized energy plant and so become the plant operator. Tenants do not have this possibility. At a first glance, the tendency towards power self-sufficiency displays a threat to energy companies since it reduces the amount of electricity sold and challenges their traditional business models.

Starting at this observation, the superior research question of the master's thesis underlying this paper is '(How) Can companies respond to households' power self-sufficiency?' (Hillenbrand 2015). It is divided in the following sub-questions:

- Which regulatory features have to be considered?
- What are business models in the field of residential power self-sufficiency in Germany?
    - Which players are involved and how are they related?
    - What are the main characteristics of the business models?
- What does a closer look at the profitability of the business models reveal?

The aim of the investigation was to analyze the German market for residential power self-sufficiency. It is focused on both consumer groups: house owners as well as tenants. The technologies under consideration are: PV systems, CHP units and storage solutions if offered in context with the first two.

Methodology

To answer the research questions a qualitative, exploratory methodology was chosen. A case study implying eight companies was conducted. Interviews were carried out, four personally and four per phone. Complementary, a literature and online research was done. Based on a general market overview, for the in-depth analyzes business models were chosen covering the variety of the market for residential power self-sufficiency. Relevant criteria for the selection process were the customer group served (house owners, tenants), technology used (PV, CHP, storage), type of company (start-up, cooperative, established energy company), complexity of the offering and the availability of in-formation.

The data evaluation was based on the business model canvas concept of Osterwalder and Pigneur (2010). It contains the four pillars: 'value proposition', 'customer interface', 'infrastructure', and 'financial aspects'.

For taking a closer look at the profitability of different business models, the net present value (NPV) method was applied. The economic analysis was done for two representa-tive projects encompassing both customer groups: house owners and tenants.

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Results

Regulatory framework

In the event of power self-sufficiency, electricity production and consumption take place in direct spatial context and the public grid is not used. This leads to the exemption from paying most statutory levies included in the end-consumer's electricity price.

There is a special rule for the EEG appor-tionment. If plant operator and end-consumer are the same person and if electricity is generated in a renewable energy or CHP plant, the EEG levy has to be paid only partially (EEG 2014). Since only house owners can fulfill the 'same person condition' tenants do not have this privilege. If the plant's capacity does not exceed 10 kW the surcharge is relieved for the first 10 MWh consumed per year.

Business model analysis

Setting up business models for self-sufficiency solutions requires the implementation of several players from different fields. In the center of such concepts are the end-consumer and the owner of the building, which may be the same person. Besides the solution provider, especially partners for the installation of the plant and the financing as well as institutions from the energy market are involved.

Mainly young companies and start-ups, such as DZ-4 and BEEGY, are active in the field of power self-supply of house owners. Recently, more established energy companies, like RWE, join the market. Some, like EnBW and MVV Energie, realize this by participating in start-ups. Looking at 'Mieterstrom' offerings, well established companies can be found more frequently. They often ex-pand their heating contracting agreements based on CHP units by the supply with electricity pro-duced in the same plant (e.g., MVV ImmoSolutions). For both customer groups the 'value proposi-tion' varies strongly.

Some offerings imply a full service package covering nearly the whole value chain, like that of DZ-4, Engynious, MVV ImmoSolutions and Heidelberger Energy Cooperative. Oth-er companies focus on single services, as among others BEEGY, LichtBlick, and MVV Energie do. Common features of the business models are creating close relationships to customers as well as operating small-scale and customized projects. These aspects combined with a difficult legal situa-tion leads to a high complexity. Therefore, among the intersections in the 'infrastructure' pillar is the network of partners necessary to handle the complexity. The financial aspects are subject to the profitability analysis.

Profitability analysis

The representative cases imply a four-person household and a multi-family house with 100 rental units. While PV plants are operated in both cases, it is supposed that only multi-family houses use CHP units. Considering the one-family house, an internal rate of return (IRR) of 3.1 % can be reached if a realistic self-consumption rate (SCR) of 30 % is assumed.

Looking at tenants, a positive NPV can only be earned if the direct consumption rate (DCR) exceeds 40 % in case of PV-based solutions. If an IRR > 2 % is intended to be gained, a DCR of 60 % is needed. Considering business models focusing on CHP units, at least 56 % of the total electricity output needs to be directly con-sumed for being profitable.

This requires about 64 % of the tenants to take part in the 'Mieterstrom' offering. After this threshold is reached, the model stays lucrative also if discounting with 4 %. The sensitivity analysis revealed that irradiance, CHP bonus and investment costs are the most im-portant variables. While storage solutions combined with 'Mieterstrom' offerings are not yet gainful, they are relevant for house owners if a SCR of more than 70 % is achieved.

Conclusion

Innovative business models have been set up recently in response to increasing residential power self-sufficiency. Whereas the scope of the available business models varies strongly, they share common features such as establishing close relationships to customers as well as operating small-scale and customized projects within a network of partners.

The economic analysis revealed that particularly PV based solutions for house owners are promising while the profitability of 'Mieterstrom' offerings strongly depends on the legal framework.

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