

Charging Profile “HomeZone”

Customer Retention Measures and Charging Infrastructure Optimization

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Abstract—The Competence Center for Innovative Business Models at Aalen University researches solutions to supply charging stations for electromobility with renewable energies and increase their capacity. Economically resilient business models for sustainable electromobility are developed. The overall goal is to generate added value for all stakeholders involved, including electric vehicle users, grid operators, energy suppliers, and other companies. The cooperative project “low-carbon city” is state subsidized by the German Federal Ministry of Education and Research (BMBF) from August 1, 2016, to December 31, 2018, under the references 02K12A150 and 02K12A151. From the industry perspective, Überlandzentrale Wörth/I.-Altheim Netz AG supports the research project as regional distribution system operator. Bozem | consulting associates | munich provides business expertise concerning renewable energy and competitive strategy.

Keywords—*electric vehicles; charging infrastructure; grid integration of large-scale electromobility solutions; innovative business models; market design; power system integration and operation; stakeholders of the renewable energy industry*

I. INTRODUCTION

The public charging infrastructure currently finds itself under increasing expansion, supported by funding measures from the government and the federal states of Germany. However, this expansion takes place mostly in urban areas, while the expansion in rural areas is facing challenges negligible for urban space.

The higher population density in cities leads to a higher utilization rate of the charging infrastructure, more likely resulting in a cost-efficient and economic operation of such. Furthermore, the denser infrastructure in a city allows grid connection of charging stations with relatively lower constructional and financial effort.

These issues cannot easily be solved in rural areas. The grid connection efforts are higher in rural areas than in urban ones due to the wider-meshed network infrastructure. The higher grid connection efforts cause higher costs, which are difficult to be balanced through the sales of charging electricity. The lower population density results in a lower utilization rate of the charging stations. Consequently, the profitable operation of charging stations in rural areas is hampered.

II. CHOICE OF LOCATION FOR CHARGING STATIONS

The choice of location for the charging stations is more complex in rural areas than in urban ones because in rural areas, the choice includes factors which are rather insignificant in cities.

Exemplary determining factors are:

- Existing power lines for the grid connection
- Existing Internet lines for data connection
- Frequency of use of the location

These factors need to be fulfilled for locations of charging stations to enable a cost-efficient operation of such in a rural area. Facilitating the economic operation of charging stations, also under rather unfavorable location factors, innovative business models are required to offer an added value to all stakeholders.

III. EMPIRICAL RESEARCH AND DEVELOPMENT OF THE BUSINESS MODEL

Providing solutions to improve the rural charging infrastructure, a business model was developed and implemented as prototype within the state-subsidized cooperative research project “low-carbon city” (Fig. 1) [1]. This business model permits customers of the municipal utility company to charge their electric vehicle at all charging stations of that company at household electricity prices.



Figure 1. Cooperative research project “low-carbon city” subsidized by the German Federal Ministry of Education and Research

The development of the business model was conducted with a customer-centric approach to reach maximum user acceptance in the market [2]. Empirical research served to validate the user acceptance of the business model. Moreover, the business model was iteratively adapted through intensive collaboration among all stakeholders in multiple workshops [3, 4].

Fig. 2 presents the locations for charging stations favored by stakeholders.

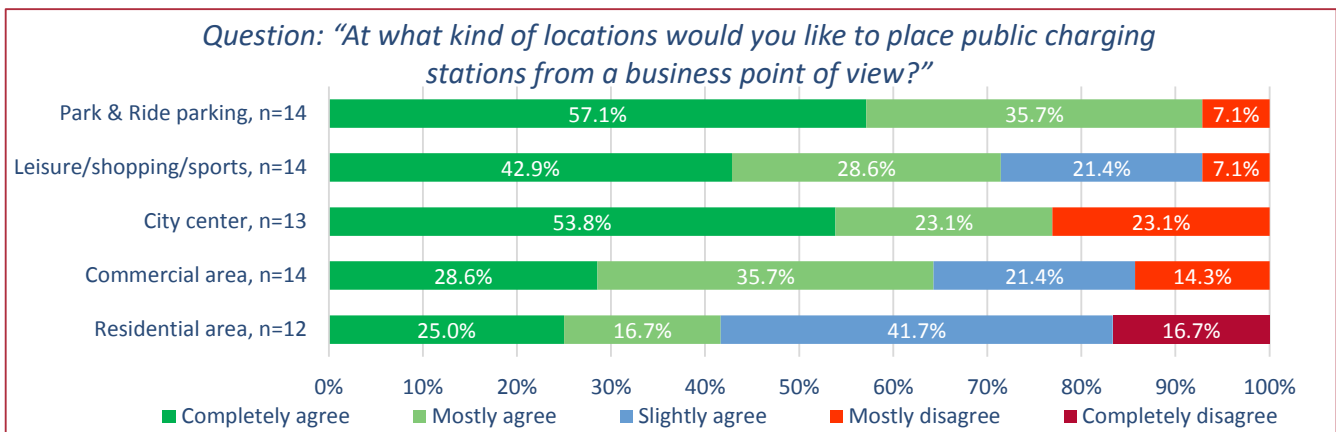


Figure 2. Findings from the written survey with a hypothesis-based questionnaire [5]

Quelle: Befragung von 1.305 ÜZW-Kunden im Oktober 2016 im Rahmen des BMBF-Verbundprojekts „CO2-arme Stadt“; Rücklaufquote = 22,2 %

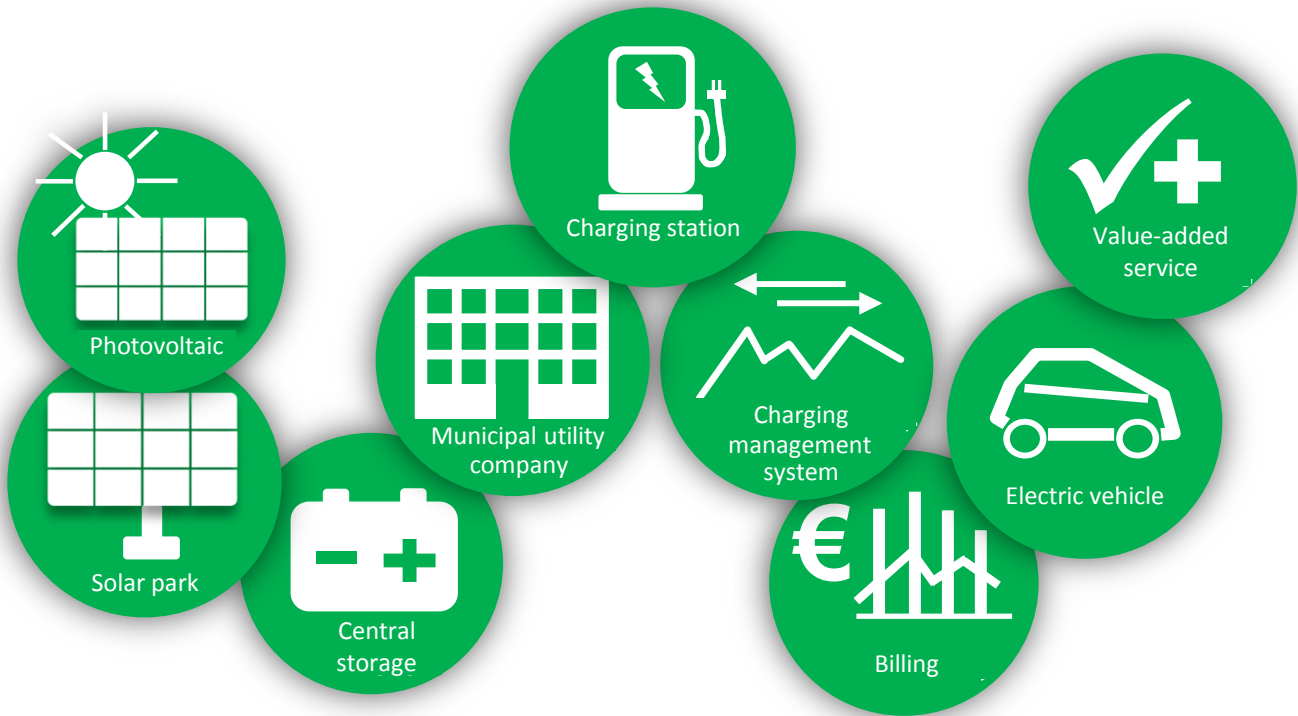


Figure 3. Charging profile “HomeZone”

IV. CHARGING PROFILE “HOMEZONE”

The products and services of the business model developed are depicted in Fig. 3. Customers can charge their electric vehicle at all charging stations of the regional distribution system operator and of all participating grid networks at household electricity prices.

The presented offer brings little direct financial advantages for the operator of the charging stations. Nonetheless, the business model achieves an increased utilization rate of the charging points eventuating in an indirect financial advantage for the operator.

The business model acts as a customer retention measure. These days, municipal utility companies often face the challenge of frequently switching customers due to the competition from low-cost electricity providers. Hence, in this case, customer-retaining and promotional effects have an even greater weight in generating added value for the municipal utility companies. At the same time, offering a charging infrastructure helps succeeding the balancing act to facilitate electromobility and being prepared as a company for the emerging market.

In addition, the cooperation of charging associations extends the charging network to the benefit of the customer, leading to a further increase in the attractiveness of the business model.

In short, on the one side, the charging profile “HomeZone” offers enhanced customer retention and higher utilization of the charging stations. On the other side, “HomeZone” allows users to charge their electric vehicle at fixed and cheap prices.

The business model is currently tested in a pilot project with the project partner and regional distribution system operator Überlandzentrale Wörth/I.-Altheim Netz AG.

V. CONCLUSION

The business model developed in the cooperative research project “low-carbon city” has the potential to significantly improve the charging infrastructure in rural areas. It simultaneously enables municipal utility companies to enhance customer retention.

Advancing the extension of charging infrastructure as well as gaining and maintaining customers can successfully be accomplished through new and innovative business models. It is pivotal to develop further business models to establish electromobility particularly in rural areas.

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