

Sharing is caring. A Choice-Based Conjoint Analysis of Wallbox Sharing Preferences in the German Market

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Abstract

The transition to battery electric vehicles (BEVs) in Germany depends heavily on the availability and accessibility of charging infrastructure. While public charging stations are critical, they often face congestion and unequal distribution across urban and rural areas. Private wallboxes represent an underutilized asset, being operational for only a fraction of the day. This study investigates the potential for wallbox sharing between owners (“hosts”) and external users (“chargees”), aiming to improve charging infrastructure utilization and foster a sharing economy in the BEV sector. Using a choice-based conjoint analysis, the preferences of over 4,300 participants were analyzed. Wallbox sharing options were evaluated based on four attributes: sustainability (electricity source), social well-being (relationship between host and chargee), cost of electricity, and ease of use (interaction level required). Results highlight that ease of use and cost dominate decision-making for both hosts and chargees. Sustainability, particularly when linked to solar PV electricity, significantly influences preferences, while social well-being shows a preference for sharing within familiar networks (e.g., neighbors). This research underscores the importance of balancing economic, usability, and environmental considerations to promote wallbox sharing. The findings provide new insights for policymakers and industry stakeholders to develop user-centric, cost-effective, and sustainable sharing models.

Introduction and Motivation

The transition to BEVs in Germany is contingent upon the availability and accessibility of charging infrastructure. Public charging stations, while essential, often face congestion and are unevenly distributed between urban and rural areas. An untapped resource in this landscape is the private charging infrastructure, notably wallboxes owned by individuals. These wallboxes are underutilized, being used for charging their owner’s BEV only for a fraction of the day. This study explores the potential of wallbox sharing between hosts and chargees, aiming to enhance the utilization of existing charging capacities and foster a

sharing economy in the charging sector. Building upon this premise, the research delves into the dynamics of wallbox utilization and the factors influencing their potential for sharing.

Applied Method

This research employs a choice-based conjoint analysis to understand the preferences and decision-making processes of over 4,300 German individuals, divided into hosts and chargees. Each participant engaged in 11 choice situations, evaluating wallbox sharing options based on four attributes: *sustainability* (type of charging electricity), *social well-being* (relationship between host and chargee), *cost of electricity*, and *ease of use* (level of interaction required between host and chargee). The study's design allows for a comprehensive understanding of the incentives and barriers perceived by both groups in the sharing process. In this context, the research methodically investigates how these attributes influence the willingness of individuals to participate in wallbox sharing.

Results

The findings reveal that both hosts and chargees prioritize ease of use and cost factors in their decision-making. Sustainability emerged as a major concern, especially when electricity from solar PV panels can be charged at the host's charging station. Social well-being, while less critical, showed interesting trends; participants were more inclined to share with neighbors or acquaintances than strangers. The study underscores the importance of balancing economic incentives with usability and environmental considerations in promoting wallbox sharing. Furthermore, these results offer insights into the nuanced preferences and concerns of potential participants in a wallbox sharing scheme.

Conclusions

Wallbox sharing presents a viable solution to augment Germany's BEV charging infrastructure, addressing the limitations of public CSs. The study highlights the necessity of developing user-friendly, cost-effective, and sustainable sharing models that cater to the preferences of both wallbox owners and chargees. Policymakers and industry stakeholders should consider these insights in creating regulatory frameworks and technological solutions to facilitate wallbox sharing, ultimately contributing to the broader adoption of BEVs in Germany. In conclusion, this research emphasizes the role of private charging infrastructure as a critical component in the evolution of Germany's electric mobility landscape.

References

Fabianek P., Madlener R. (2024). May I? Enabling the Sharing of Private e-Vehicles Charging Infrastructure, FCN Working Paper No. 12/2024, Institute for Future Energy Consumer Needs and Behavior, RWTH Aachen University, October.