



Paper 131 Optimal Management of Electric Vehicles in a Building Environment: Real Cloud Development

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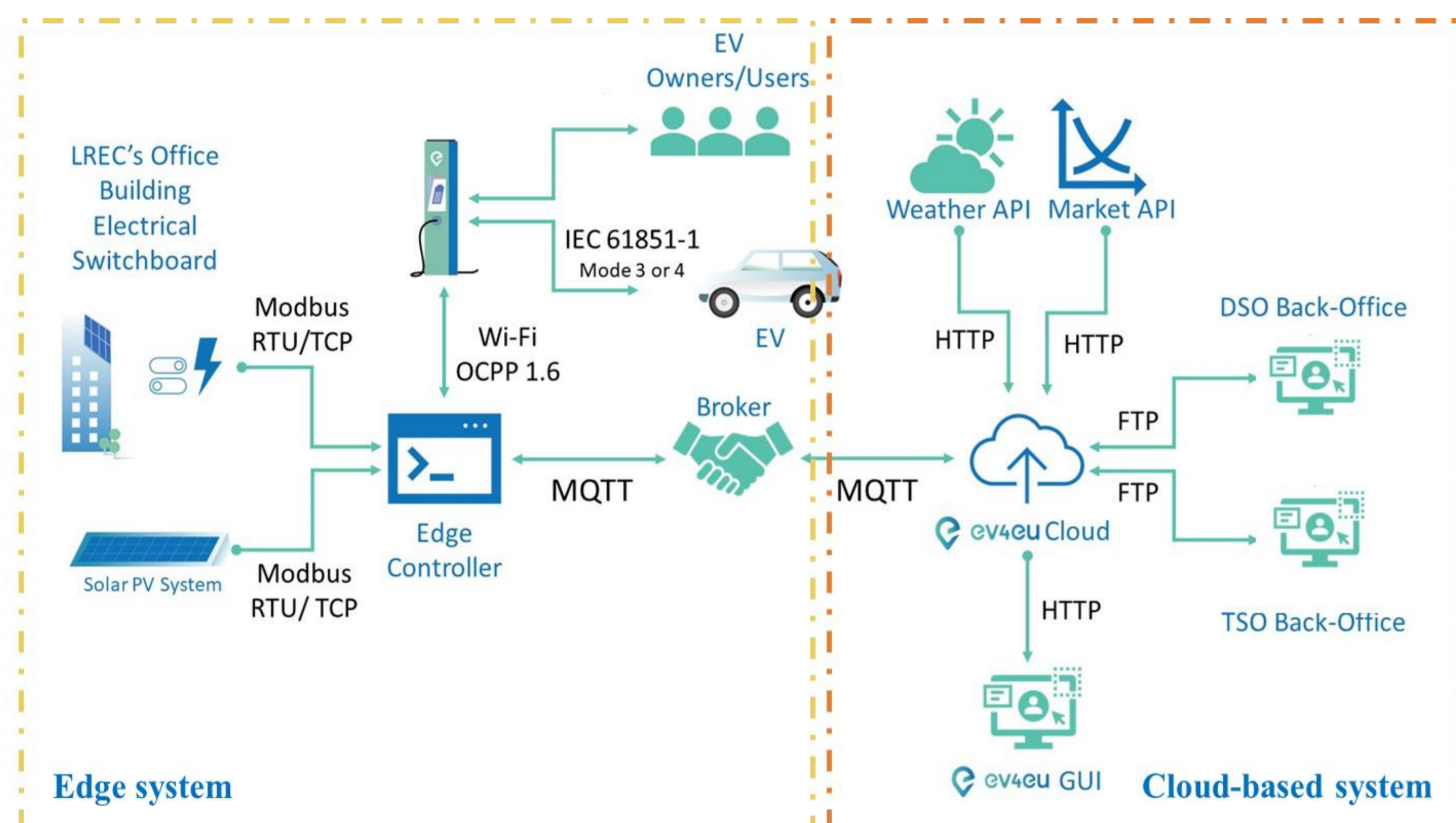
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Introduction

The adoption of electric vehicles (EVs) is rapidly increasing, becoming an integral part of many buildings, especially service buildings. This study, part of the **EV4EU project**, describes a pilot in the Azores, Portugal, where a **management platform controls two EVSEs with V2X capability**, in a real building. This building features a solar photovoltaic (PV) system for self-consumption and is contractually authorized to sell energy back to the grid during weekends and summer holidays.

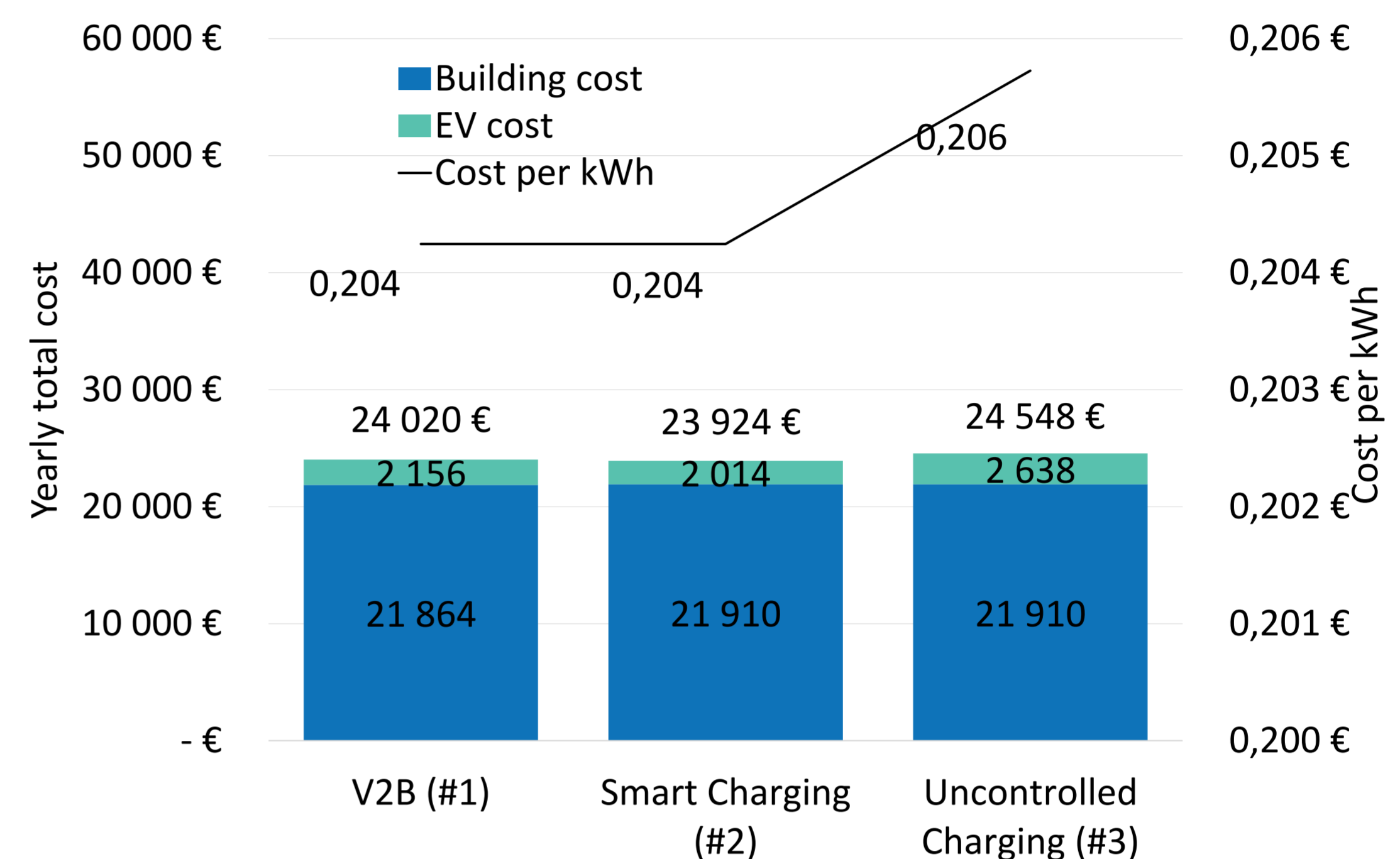
Real EVSE management platform



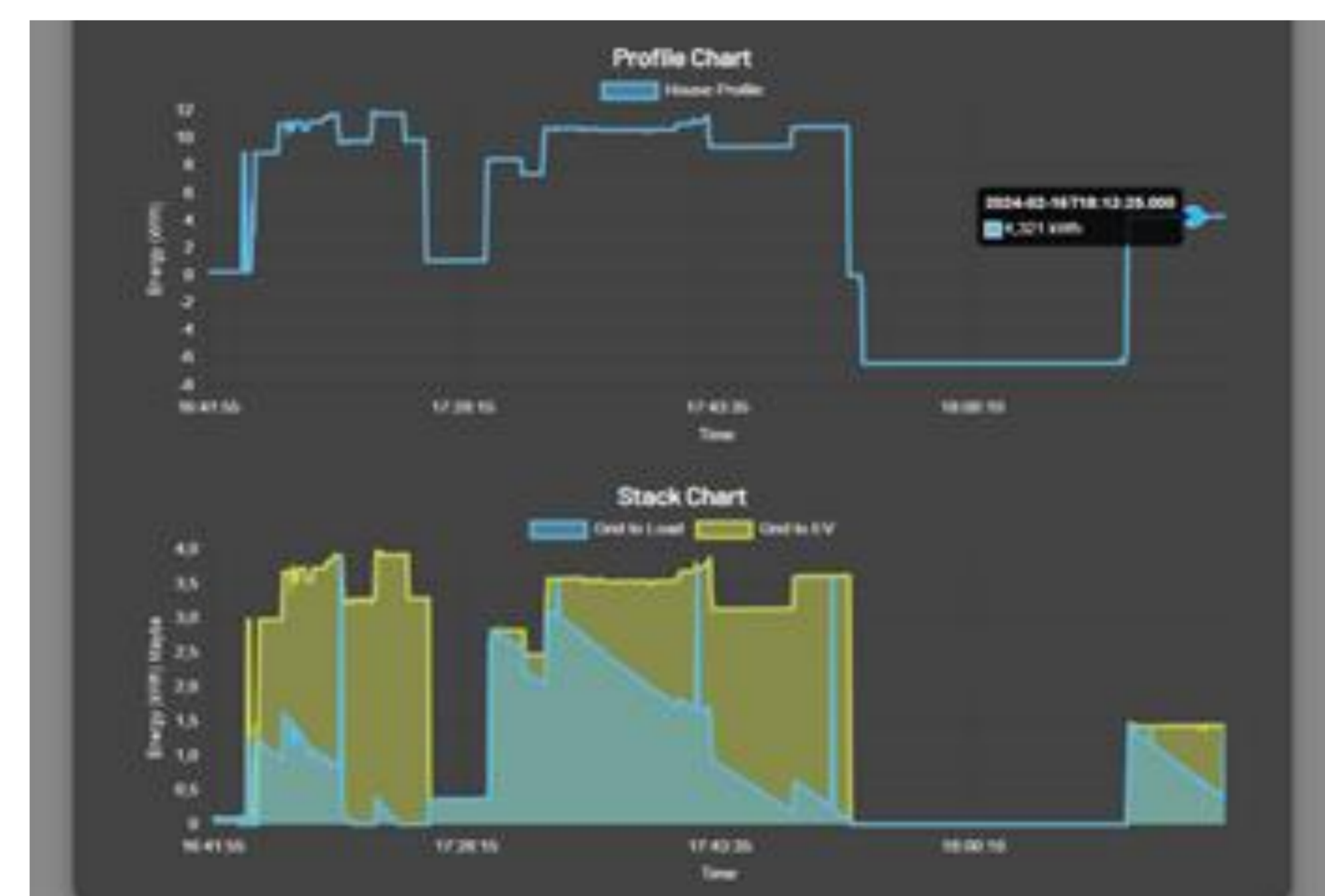
The EVSE management platform consists of two main components to manage and control the EV charging/discharging operations within the building, namely:

- A Cloud-based system: Hosts forecast and optimizer modules, APIs for data acquisition, and a GUI for user interaction. The optimizer schedules EVSE operations to minimize costs and maximize green energy usage
- An Edge system: Controls EVSEs in real time, using data from smart meters and communicating with EVSEs via OCPP.

Experimental Tests and Results



Several simulations validated the EVSE management platform, focusing on the optimizer module's behavior. Scenarios with smart control showed a significant reduction in yearly total cost compared to those without smart control.



The developed GUI facilitates visualizing energy import by the system. In addition to simulations, real-world experiments were conducted at a laboratory level to further validate the platform.

Conclusions

The EVSE management platform effectively manages EVs connected to a building in the Azores, Portugal. It utilizes cloud-based and edge systems to optimize EV charging, minimizing energy bills and ensuring optimal solutions for users.

Acknowledgements

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