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Vehicle-to-grid strategy for shared autonomous electric vehicles: A review of the charging infrastructure's impact on energy and mobility

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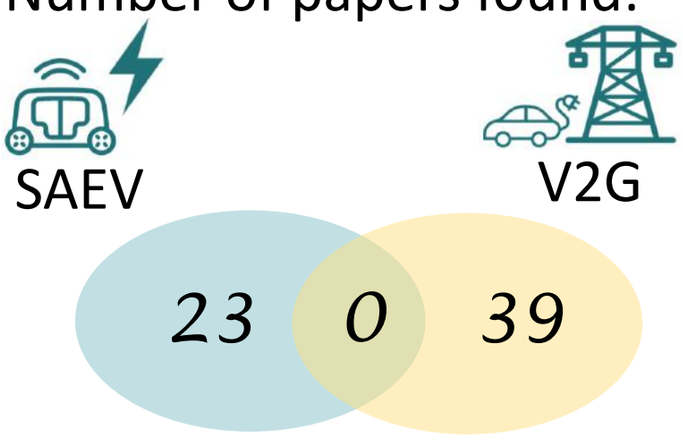
An **optimal charging infrastructure** can improve the **feasibility of V2G** in the grid by **reducing power losses** and improving the **voltage profile**. Research on optimal charging infrastructure for **SAEVs with V2G is missing** from the literature.

Introduction

Shared autonomous electric vehicles (SAEV) have the flexibility - acting as batteries on wheels - to easily perform services to the grid using the vehicle-to-grid (V2G) strategy, next to serving mobility to customers. Research shows that many problems that the grid encounters are a consequence of poor allocation of the charging infrastructure (CI). This paper reviews research on the optimal charging infrastructure for SAEVs and V2G from an energy and mobility point of view.

Literature search

Number of papers found:



RESEARCH GAP

Optimization of charging infrastructure for SAEVs with V2G from both a mobility and energy point of view.

Transport: mobility demand and customer convenience
Power: grid constraints

Results

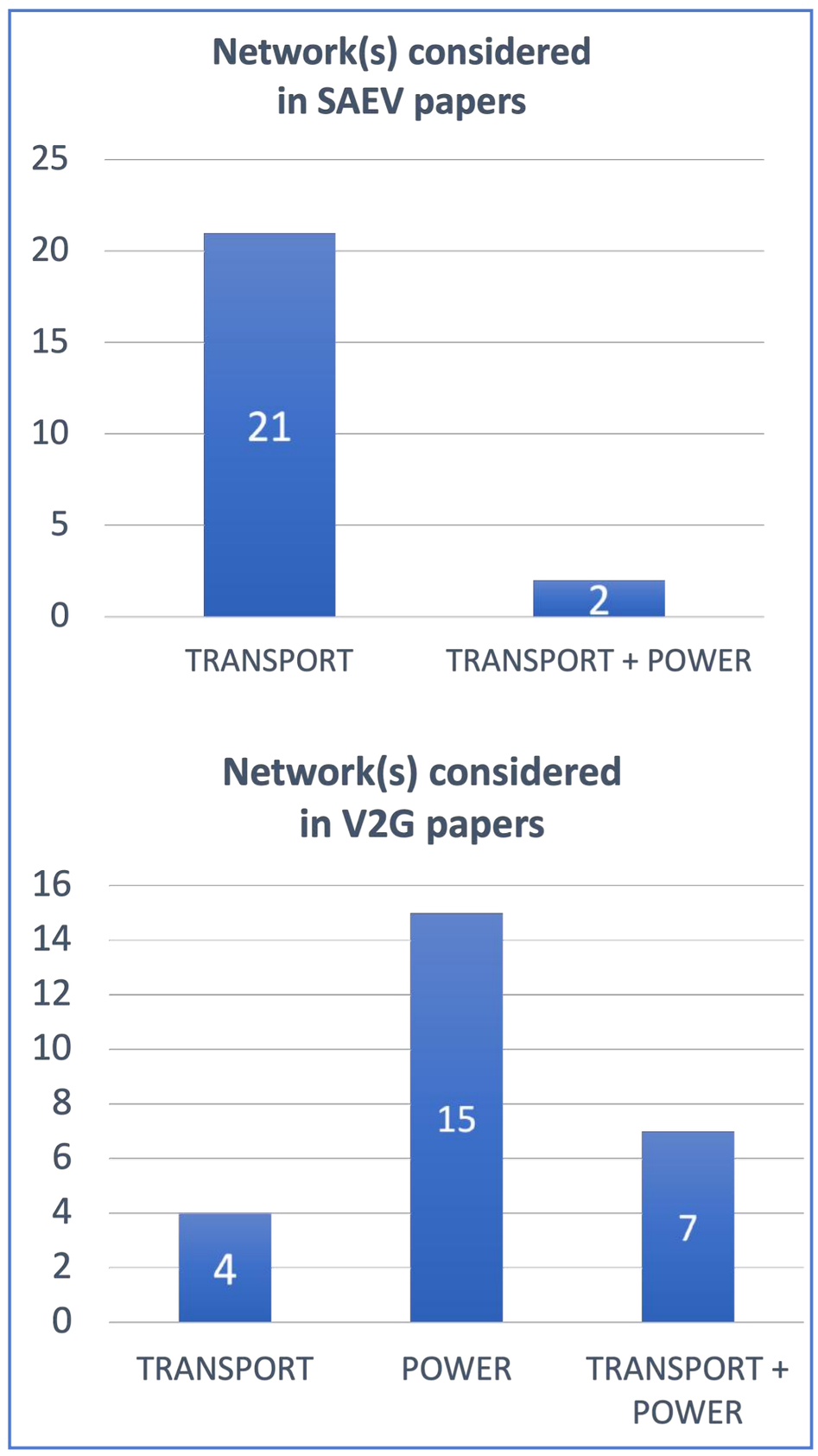
Mobility

Level II -> level III chargers:
- Less chargers needed
- Cuts charge time by ~87%
- Reduces fleet size by 20-30%

More charging stations (CS):
- Lower waiting times
- Lower travel distance

Energy

CSs beyond residential area's increases renewable penetration by 12.4%.
Distributed CI better than gas-station based fast-chargers for V2G.
Optimal CI:
- Improved voltage profile
- Reduced power losses



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