

Capacity Area B1 Topic 1.3 Deliverable 3

Final report or paper on electric mobility’s charging impacts and cost-effective distribution grid adaptation incl. generalizable grid adaptation recommendations for distribution grid operators

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A comprehensive overview paper on EV charging impacts has been published in July 2020: *Jochen Stiasny et al., “Sensitivity Analysis of Electric Vehicle Impact on Low-Voltage Distribution Grids”, PSCC 2020*

The work performed identifies the dominating influencing factors in electric vehicle (EV) modelling on low-voltage distribution grids to establish guidance for reliable impact assessments of increasing EV penetration. Seven aspects are distinguished with respect to the modelling of the load of EVs that influence the flows and voltages in the grid. For each of these aspects sensitivity analyses are carried out by running power flow simulations in a Monte-Carlo fashion to account for the stochasticity in the model parameters. The impacts are analyzed using a variety of metrics including transformer and line loadings. The highest sensitivities are observed for the number of vehicles in the grid, the used charger power rating and the modelling of driving patterns. The grid configuration as well as locally higher EV shares gain significance for line loading assessments. Car modelling and people’s charging behavior play minor roles.

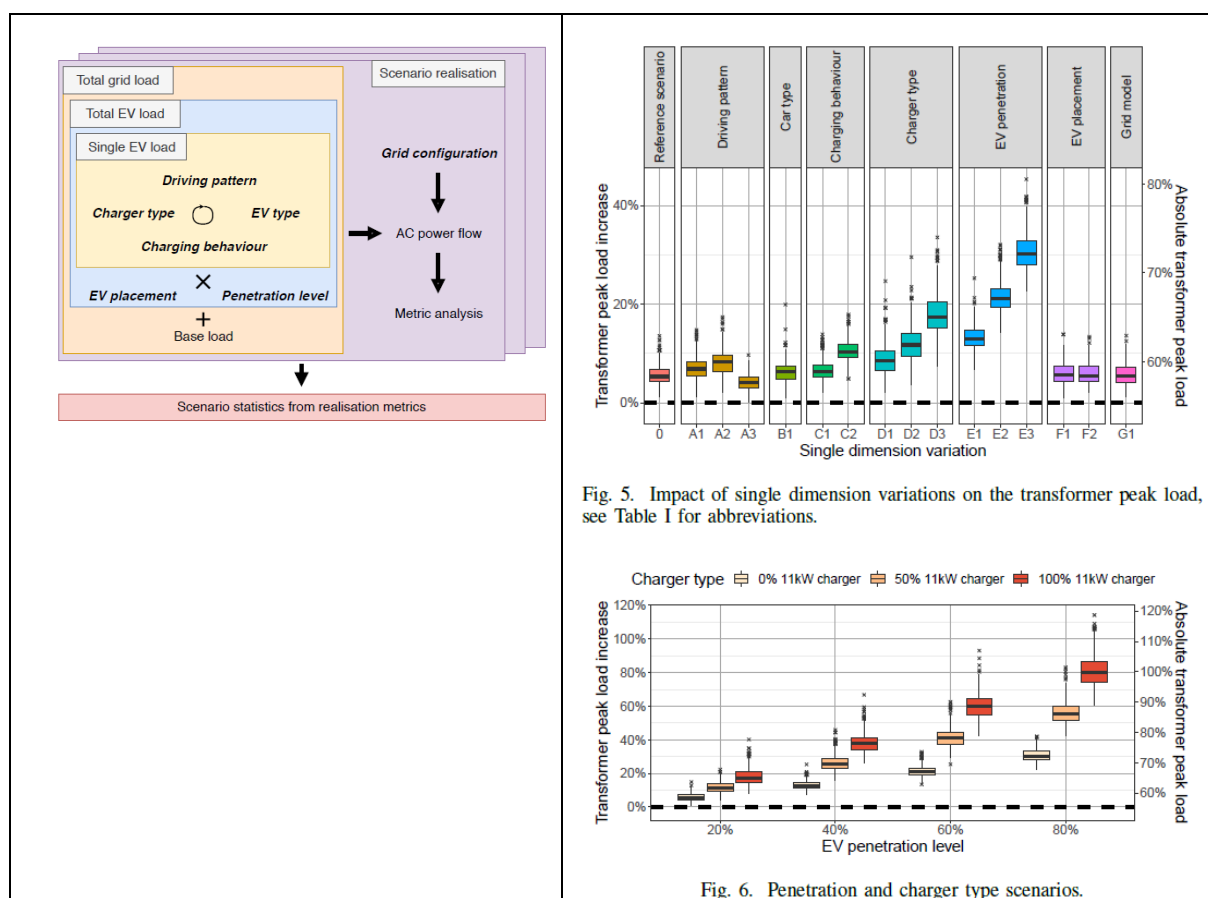


Fig. 5. Impact of single dimension variations on the transformer peak load, see Table I for abbreviations.

Fig. 6. Penetration and charger type scenarios.