

Abstract

Replacing the fuel-based cars with low emitting electric vehicles are critical for achieving global climate targets. The increased penetration of electric vehicles may trigger fundamental changes in the power supply system, which is expected to face increased peak power demand and distribution losses due to the significant load increase. This introduces additional challenges for grid stability besides the rising share of distributed generation. Similarly, there are also several uncertainties for companies that want to be part of the electromobility sector. Therefore, electromobility is a popular research topic that requires involvement by various domains. This paper introduces a modeling approach and software implementation of a cross-domain simulation tool, which enables assessment of the interactions between the involved parties in electromobility such as electric vehicles, charging operators and network operators. This tool can be used for comprehensive testing of various electromobility strategies. A practical use example is shown where the developed simulation tool was used to discuss alternative electric vehicle leasing options with different charging modes for a company.

Keywords: electromobility, recharging infrastructure, simulations, intelligent mobility control, electric vehicles, network management, economic modelling