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Efficiency Test Method for Electric Vehicle Chargers

This paper investigates different methods for measuring the charger efficiency of mass produced electric vehicles (EVs), in order to compare the different models. The consumers have low attention to the loss in the charger though the impact on the driving cost is high. It is not a high priority area for the Original Equipment Manufacturer (OEM), which means the cost of the power converter equipment is minimised. The internal wiring and the composition of components within an EV is different for each OEM and model, hence a unified test method is needed in order to compare results across different vehicles. A unified method for testing the efficiency of the charger in EVs, without direct access to the component, is presented. The method is validated through extensive tests of the models Renault Zoe, Nissan LEAF and Peugeot iOn. The results show a loss between 15 % and 40 %, which is far above the state of the art power converters. This is an unnecessary high consumption of electrical energy during charging, which not only affects the consumer financially, but also creates unnecessary load on the grid.

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