Cross-brand validation of grid services using V2G-enabled vehicles in the Parker project

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The Parker project seeks to experimentally validate that contemporary series-produced electric vehicles (EVs), capable of V2G, are ready to participate in a number of both known as well as new and advanced grid services. In such services the timing, size and direction of power and energy exchanged between the EV battery and grid is controlled as to support either a single building, the local neighborhood or the regional power system. Vehicles purposely designed for such services are referred to as grid integrated electric vehicles (GIVs). The field of research, describing how GIVs may be used to actively support the power system is called VehicleGrid Integration (VGI). The purpose of this paper is to present how the Danish Parker project has systematically categorized a range of grid services, collected in a service catalog, and then, illustrate state-of-the-art EVs ability to support such services through experimental validation. Results are presented for three different tests performed in Parker; marginal emission factor charging, frequency containment reserves and a performance test for controlling power setpoints. The ultimate aim of this paper, and the Parker project, is to promote the GIV concept so that it may inform the design and capabilities of present and future EVs, EV supply equipment (EVSE) and communication standards.

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Contributors: Andersen, P. B., Hashemi Toghroljerdi, S., Sousa, T., Sørensen, T. M., Noel, L., Christensen, B.
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