Concurrent Provision of Frequency Regulation and Overvoltage Support by Electric Vehicles in a Real Danish Low Voltage Network

Expected deployment of electric vehicles (EVs) introduces big technical challenges for power system operation, but also offers advantages provided that EVs are not considered merely as passive loads. With the development of Vehicle-to-Grid technology, EVs will be able to provide a number of ancillary services for grid support, e.g. implemented electronic equipment will allow them to exchange reactive power with the grid for voltage regulation while using active power for other services. This paper investigates the concurrent provision of local and system wide services from EVs in a real Danish low voltage network with high penetration of photovoltaic installations (PVs). The main focus is potential reactive power support when EV provision of frequency regulation coincides with PV production. Furthermore, the paper evaluates benefits of overvoltage support and addresses the issue of increased loading. The analysed network has been modelled in Matlab SimPowerSystems and is based on real hourly metered data from a Danish MV/LV substation with numerous households.

General information
State: Published
Organisations: Department of Electrical Engineering, Center for Electric Power and Energy
Contributors: Knezovic, K., Marinelli, M., Andersen, P. B., Træholt, C.
Number of pages: 7
Publication date: 2014

Host publication information
Title of host publication: Proceedings of IEEE International Electric Vehicle Conference 2014
Publisher: IEEE
ISBN (Print): 9781479960750
Keywords: Distribution network, Electric vehicle, Frequency regulation, Photovoltaic, Power system modelling, Reactive power control, Voltage support
Electronic versions:
IEVC_full_Concurrent_provision_of_frequency_regulation_and_overvoltage_support_by_EVs.pdf
DOI:
10.1109/IEVC.2014.7056099
Source: PublicationPreSubmission
Source-ID: 101717184
Research output: Research - peer-review › Article in proceedings – Annual report year: 2014