

Vehicle to Grid (V2G) & Grid to Vehicle (G2V) Technology using Dc Fast Charging Architecture

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Abstract: In micro-grids, electric vehicle batteries can be used as potential energy storage devices. They can assist in micro-grid energy management by storing energy when there is a surplus (Grid-To-Vehicle, G2V) and supplying energy back to the grid when there is a demand for it (Vehicle-To-Grid, V2G). In order to realise this concept, proper infrastructure and control systems must be established. This study presents an architecture for establishing a V2G-G2V system in a micro grid employing level-3 fast charging of electric vehicles. A micro-grid test system with a dc fast charging station for connecting EVs is modelled. V2G-G2V power transfer is demonstrated through simulation research. The findings of the tests reveal that EV batteries may actively regulate power in the microgrid using G2V-V2G modes of operation. The charging station's design guarantees that grid injected current has little harmonic distortion, and the controller provides good dynamic performance in terms of dc bus voltage stability.

Keywords: Electric Vehicle, Vehicle to Grid, Grid to Vehicle, Grid connected inverter

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Appendix

Parameter	Value	Parameter	Value
Rated Capacity	250 kVA	EV rated power	40 kW
VBatt	500 V	Battery Capacity	48 Ah
Cdc	850 μ F	C _{filter}	133 μ F
Linv	0.25 mH	L _{grid}	0.25 mH

Charging Station Parameter