

Integration of Electric Vehicles with the Smart Grid

The need for rapid charging of the electric vehicle (EV) gave rise to the widespread construction of the EV fast dc charger infrastructure. From the grid perspective, there are two main aspects to be investigated. Firstly, the high power ratings of the rapid chargers pose a tremendous challenge to the distribution grid; different options have been proposed over the years to alleviate the issues. Secondly, potential advantages of using EV to interact with the power grid (V2G) have been widely investigated; obviously, it requires the bi-directional power conversion capabilities; however, the cost of the EV battery is overwhelmingly high, and V2G is currently not cost effective to justify the bi-directional EV charger as it reduces the battery cycle life; also, the owners of the EVs come to the rapid charging stations to enjoy lightning fast energy supply, instead of waiting for hours to participate in the power flow control in the grid. This seminar is to discuss the above two aspects with some of the presenter's own R&D experiences.