

6. Title: An EV charging architecture to enable continuous charging with Grid intermittency

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Key words: EV charging architecture, Bi-directional charging, Grid intermittency

Domain: Electric Vehicle

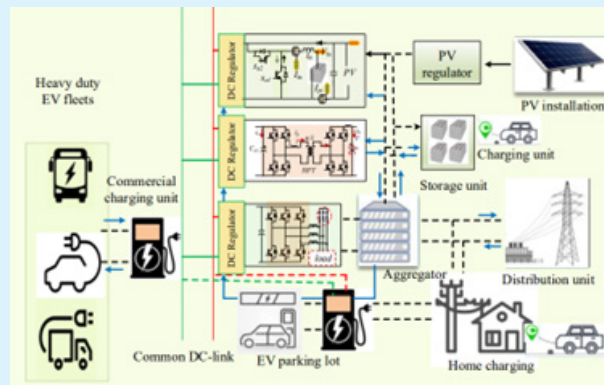


Diagram: Smart bidirectional EV charging architecture

Summary: An indigenous dedicated EV charging facility is developed for seamless charging of an electric vehicle irrespective of the grid intermittency. It can charge an electric vehicle in 6-7 hours. It provides a centrally coordinated charging algorithm for a grid feeding charging architecture and a modular battery swapping system architecture with flexible grid islanding. The charging infrastructure is modular and can operate in standalone mode (without grid support) with a wide range of voltage adaptability. This architecture further helps in controlling battery storage unit, operation of PV array, MPPT operation, and operation of front-end converter. It does not inject harmonics during charging, and thus maintains the grid health.

Advantages:

- » Seamless bi-directional charging with vehicle-to-grid, grid-to-vehicle, and vehicle-to-home solution
- » Superior performance due to continuous charging with 40% voltage sag and 10% harmonic distortion
- » It supports a futuristic solution of a battery-swapping station

Applications: EV charging and bi-directional charging infrastructure

Scale of development: A functional prototype is developed and deployed at IIT Delhi vehicle parking and its performance is evaluated by obtaining seamless charging of an electric vehicle.

Technology Readiness Level: 6

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