IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 8, March 2025
Impact Factor: 7.67

Design and Implementation of a Vehicle-to-Vehicle (V2V) Charging System

M. Kalaivani[1], V. Saddam Basha[2], S. Sai Vamsi[3], P. Sri Hari[4], A. Theja[5], G. Yoganad[6]
Assistant Professor, EEE Department[1]
UG Students, Department of EEE[2-6]
Siddharth Institute of Engineering & Technology, Puttur, India
kalaivanieee219@gmail.com[1], vadlasaddambasha@mail.com[2], vamsisurepalli@gmail.com[3],
pantrangamsrihari987@gmail.com[4], thejaannuru2004@gmail.com[5], yadavyoga38@gmail.com[6]

Abstract: *Electric vehicles (EVs) are rapidly gaining popularity due to their environmental benefits and efficient energy utilization. However, the current EV infrastructure faces challenges in ensuring convenient access to charging stations, particularly in remote areas or during emergencies. To address these issues, this project introduces a novel approach for vehicle-to-vehicle (V2V) energy transfer using on-board converters. The proposed system integrates a battery with a two-switch bidirectional DC-DC converter, a four-switch bidirectional isolated converter, and additional two-switch and four-switch isolated converters. These components enable controlled, bidirectional energy transfer between vehicles while ensuring electrical isolation and high efficiency. This innovative design allows EVs to safely and efficiently share energy, optimizing power transfer and reducing dependence on external charging infrastructures.*

The system operates in two modes:

- *Mode 0: EV1 is charging while EV2 is discharging.*
- *Mode 1: EV1 is discharging while EV2 is charging.*

In both modes, the state of charge (SOC) is regulated by maintaining a constant voltage of 350 V. When charging, the current becomes negative (drops below 0), indicating energy inflow. Conversely, during discharging, the current becomes positive (rises above 0), reflecting energy outflow. The flexibility and scalability of the proposed system make it suitable for diverse EV configurations, enhancing energy resilience and supporting sustainable transportation networks. This approach represents a significant step toward addressing the limitations of existing EV infrastructures and fostering a more robust and interconnected energy ecosystem.

Keywords: Electric Vehicles (EVs), Vehicle-to-Vehicle (V2V) Energy Transfer, On-Board Converters, Bidirectional DC-DC Converter, Isolated Converters, State of Charge (SOC) etc.

DOI: 10.48175/IJARSCT-24562