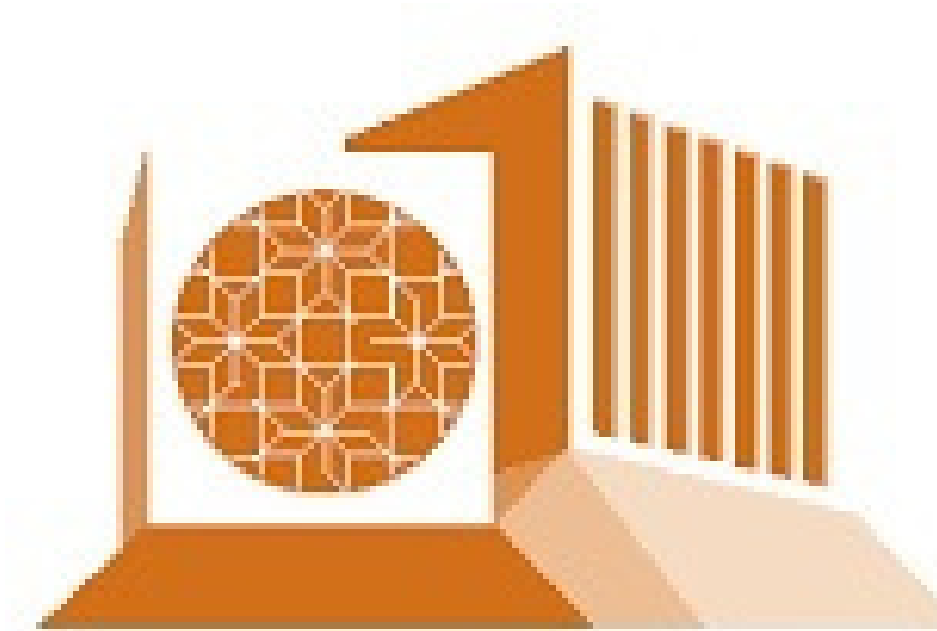


# Design and Development of Rapid EV Charging System with V2G and V2H Operations



كلية الهندسة  
College of Engineering  
QATAR UNIVERSITY جامعة قطر

LAITH KANAAN, PROF. ATIF IQBAL

## The Importance and Benefits of V2G/V2H-Enabled EV Chargers

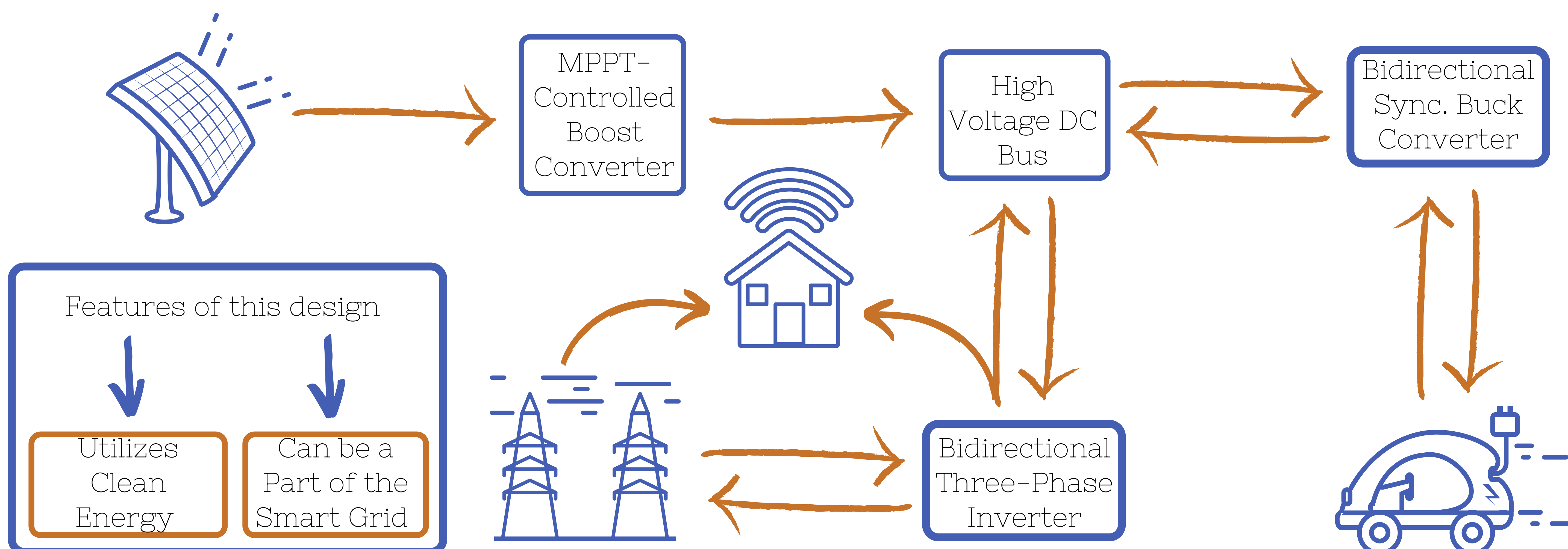
Will improve the grid by providing power at peak demand, injecting reactive power back into the grid, and smoothing out homes daily load profile.

Will be economically beneficial to the end user

EVs will be used to their full potential for the same OEM value

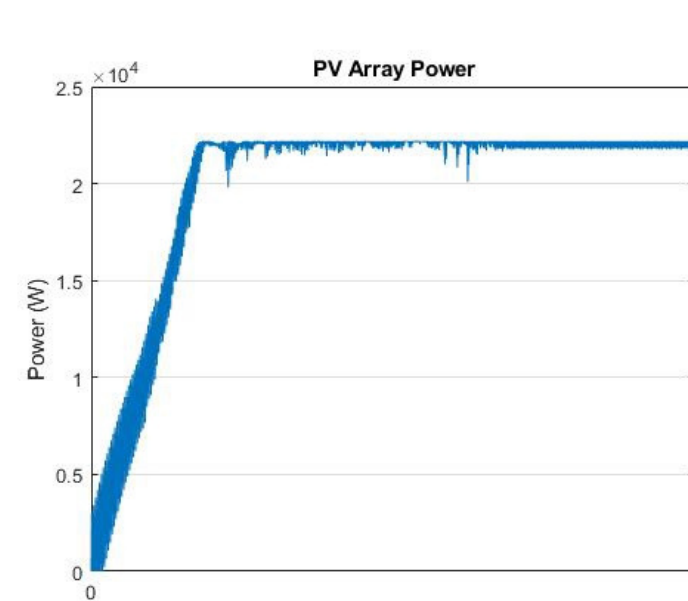
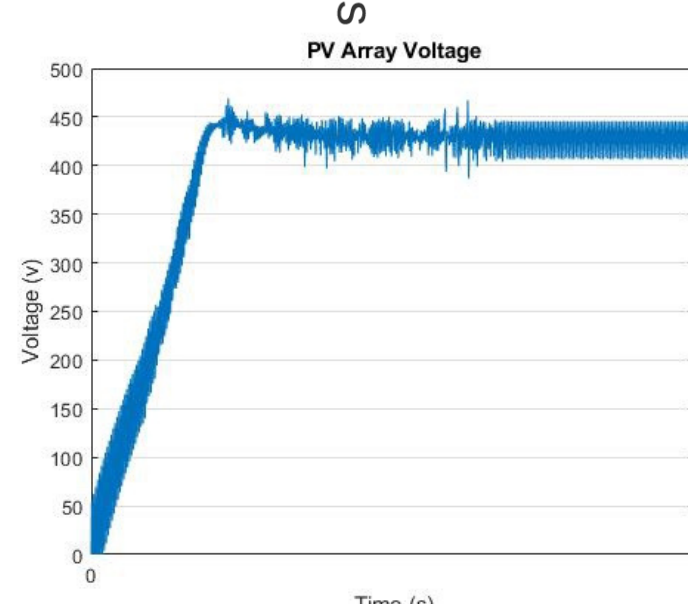
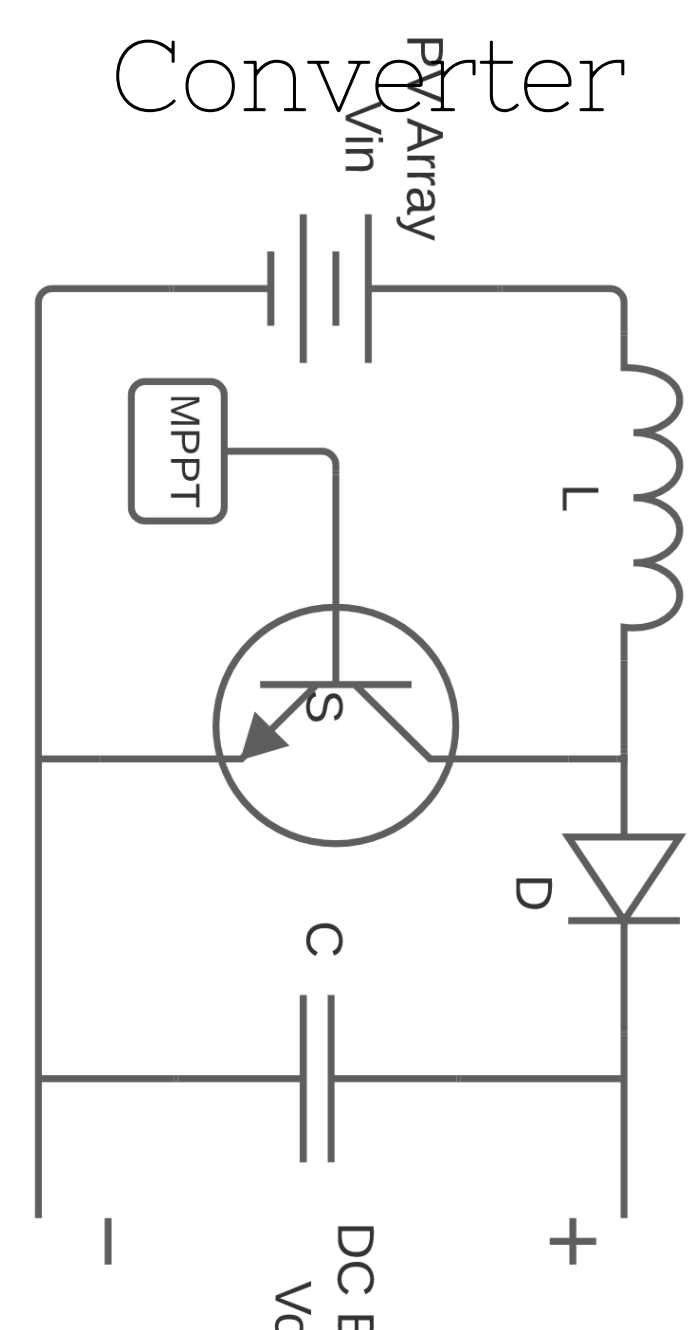
Will enable the implementation of smart homes on a large scale due to the increase of operational flexibility, as well as the increased reliability of power.

## The Proposed V2G/V2H- Enabled EV Charger Design

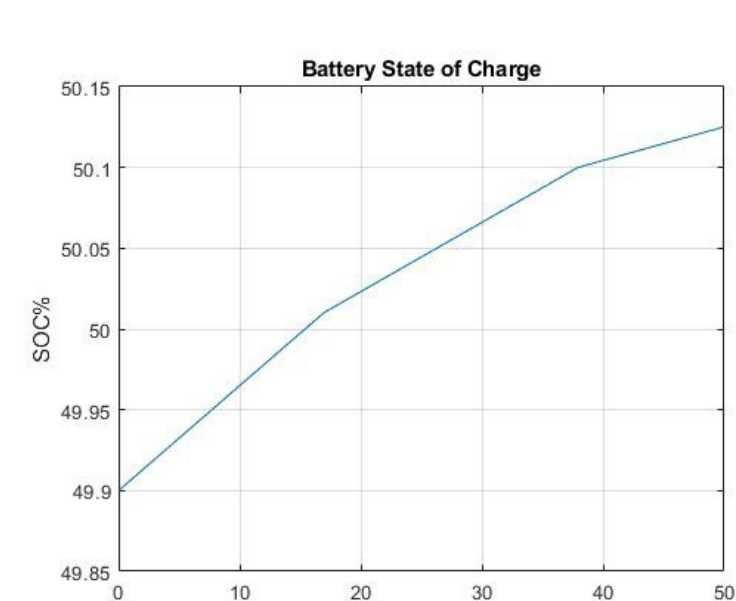
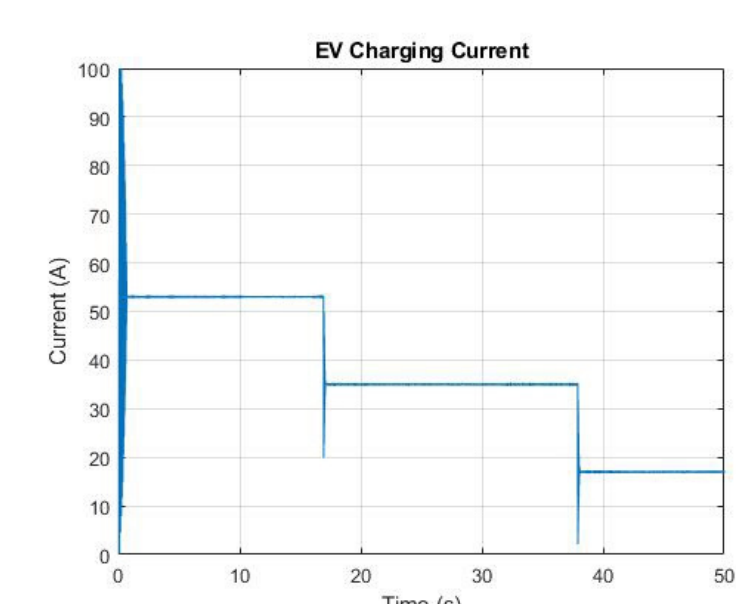
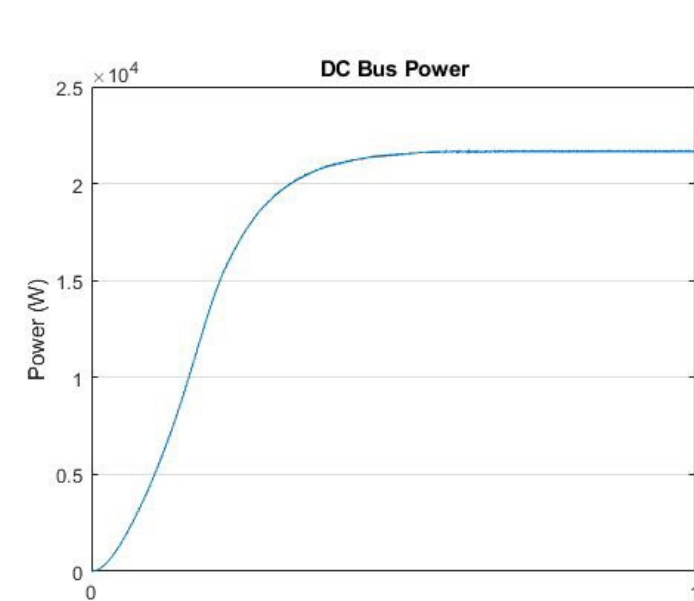
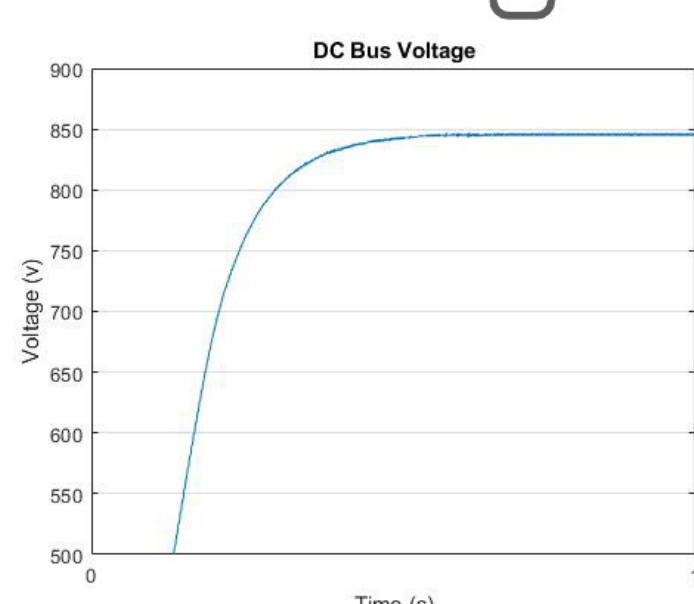
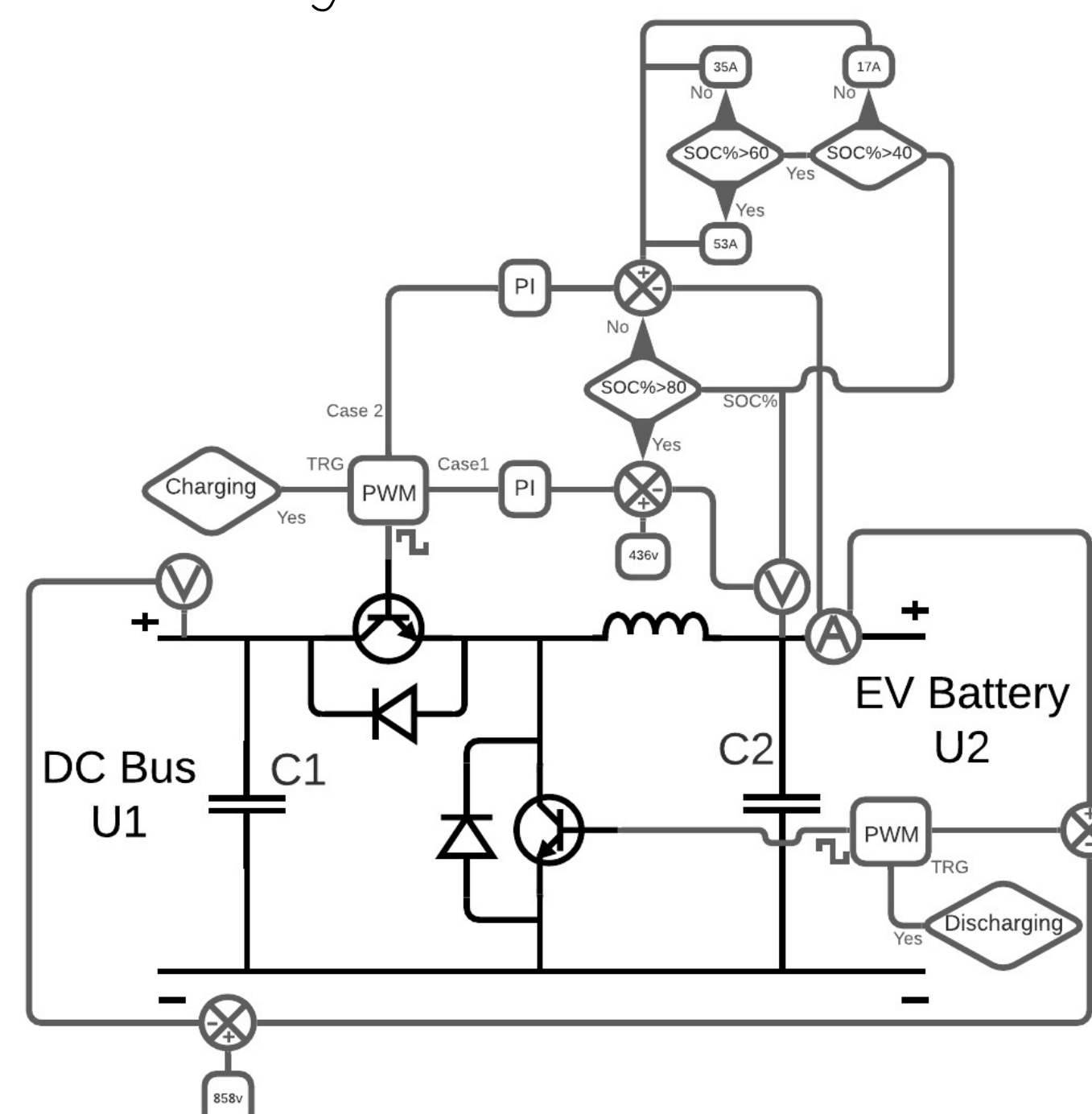


## Converters Topologies

MPPT-Controlled Boost Converter



MCC-CV Bidirectional Sync. Buck Converter



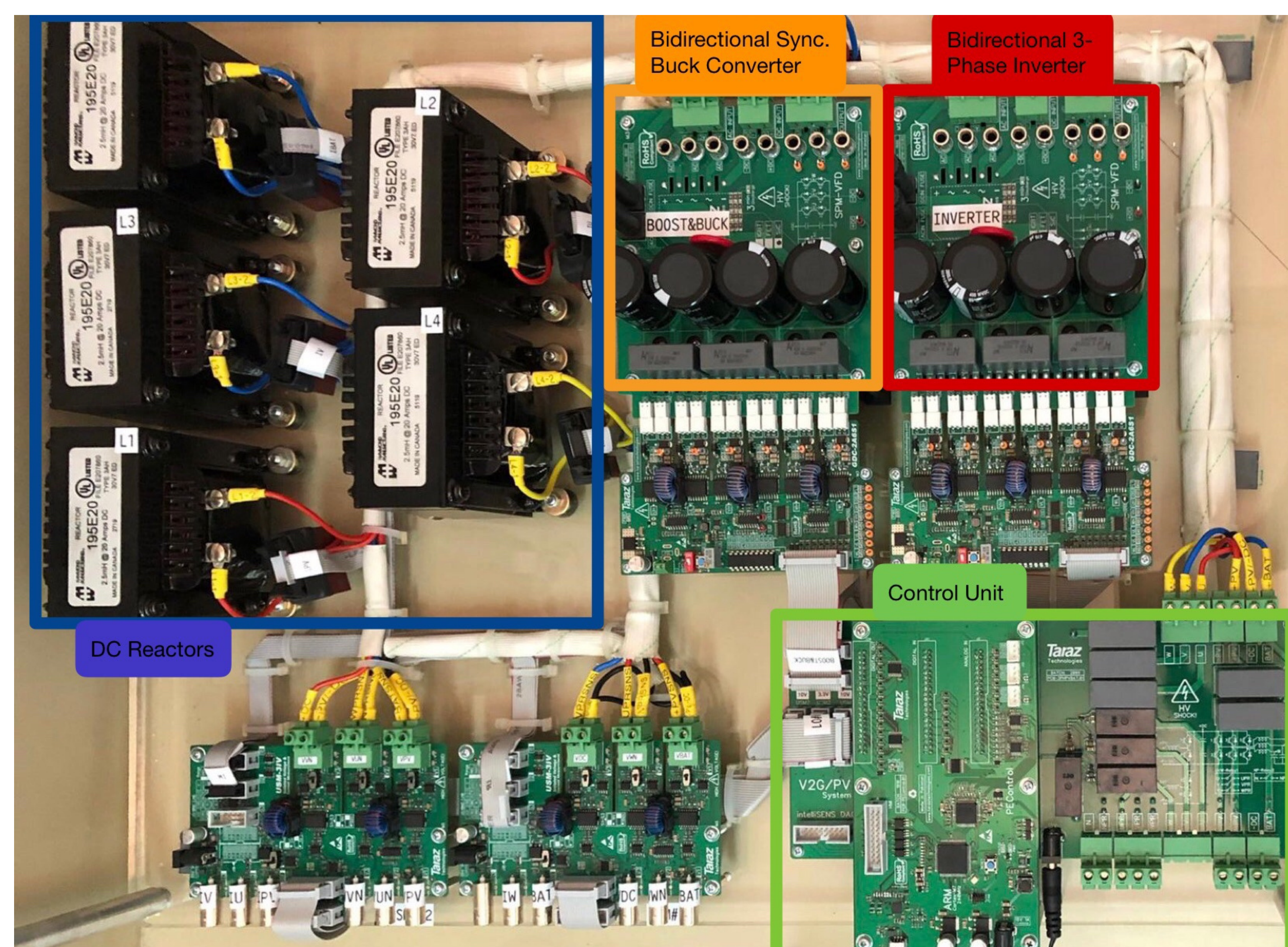
## Hardware Implementation

Benefits of a modular design

Ease of Mass Prod.

Higher Flexibility

Ease of Repair



Acknowledgement: This publication was made possible by UREP grant # [27-021-2-010] from the Qatar National Research Fund (a member of Qatar Foundation). The statements made herein are solely the responsibility of the authors.