

Programma formativo della borsa di studio (learning program of the scholarship):

### **Isolated DC-DC converters for electric vehicle fast chargers**

Isolated DC-DC converters play a significant role in electric vehicle (EV) fast chargers allocated in public zones such as highway service areas, highway pump stations, parking sites, etc.

The learning program deals with the investigation of different isolated DC-DC converter configurations, pointing out the different efficiencies, the reliability, the power range. Particular attention must be spent to the possibility of bidirectional power flow, which enables operating in both Grid to Vehicle (G2V) and Vehicle to Grid (V2G) modes, and the use of SiC and/or GaN MOSFET devices, being these emerging technologies suitable for higher switching frequencies.

Once the topology is selected, the study of control and modulation techniques have to be carried out and, finally, a real-time converter model has to be implemented by the hardware-in-the-loop (HIL) device available at the department DEI (specifically, the RT-Box by Plexim).