University of Tennessee, Knoxville

THE UNIVERSITY OF TENNESSEE KNOXVILLE

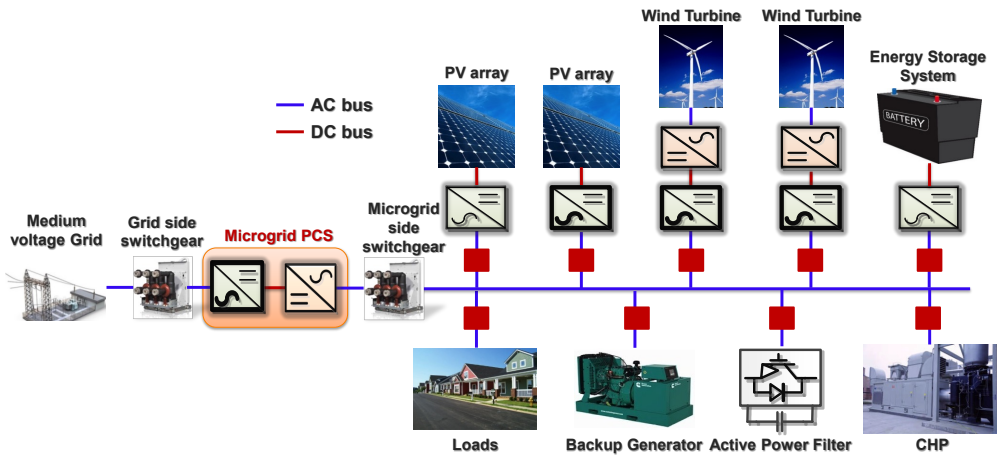
Project Title: Multi-functional High-efficiency High-density Medium Voltage SiC Based Asynchronous Microgrid Power Conditioning System (PCS) Module

Objectives: Develop a multi-functional high-efficiency high-density PCS module at medium voltage level (13.8 kVac) using 10 kV SiC power semiconductors.

Major Milestones: PCS module and its controller design, hardware assembling and testing.

Significant Equipment Acquisition: high voltage SiC devices, high voltage testing equipment

Deliverables: 1) a > 100 kW three-phase high voltage SiC based PCS prototype (single PCS converter) and final report presenting the detailed design as well as testing results



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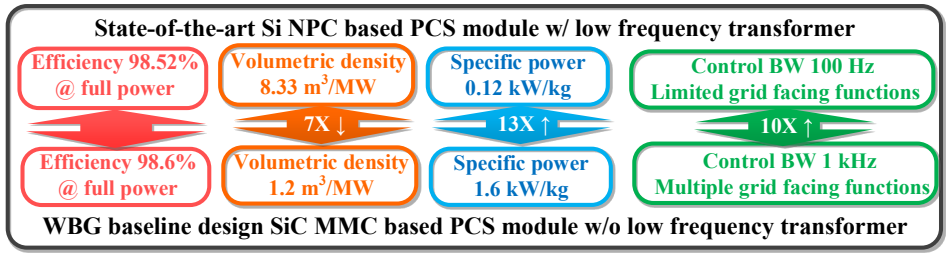
WBG Technology Impact

1. Fast switching high frequency for improved efficiency, density, control bandwidth, and resultant multiple grid facing functions compared to Si devices
2. Promote proliferation of power electronic converters in medium-voltage distribution and microgrids
3. Timeframe for commercialization: 2 to 3 years
4.



Additional impacts

1. Will potentially reduce the HV WBG cost by accelerating the proliferation of WBG devices in grid applications;
2. Will help to create jobs in distribution grid and HV SiC converter manufacturing areas, and also bring economic benefits in these areas.
3. Will allow design-oriented education and hands-on training with WBG power electronics for the next-generation power engineering workforce;
4. Will help to improve U.S. competitiveness on renewable energy integration and microgrid technologies.