



Electrical and Mechanical Testing of High Speed Machines and Drives

Jesse Leonard
Clemson University
Duke Energy eGRID Center
N. Charleston, SC

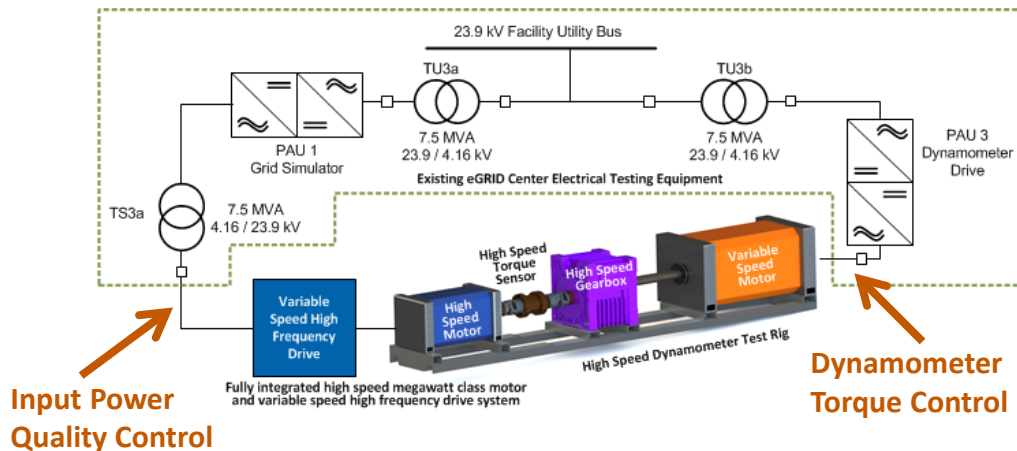
5th Annual Grid Simulator Workshop
November 15-16
Florida State University – Tallahassee, FL



Next Generation Electric Machines

DOE EERE AMO \$6.7M grant in partnership with
TECO Westinghouse Motor Company

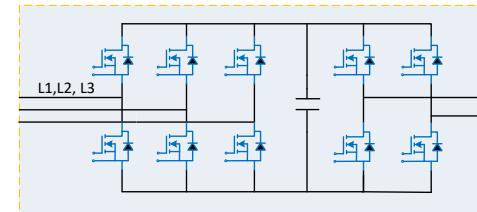
Output power	1 MW
Motor speed	15,000 rpm
Motor voltage	4.16 kV
Drive topology	Series H-bridge
Switching device	1.7 kV SiC MOSFET



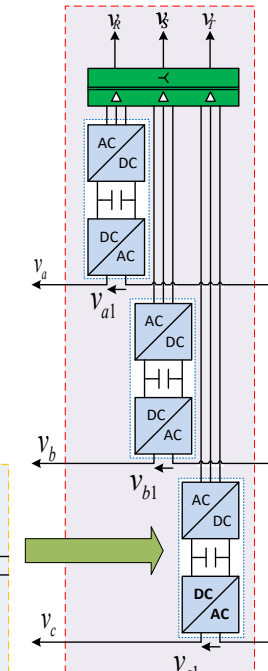
Full Scale Prototype Testing at eGRID



Power Converter Module



Power Converter Module Schematic



MPBB Configuration Schematic

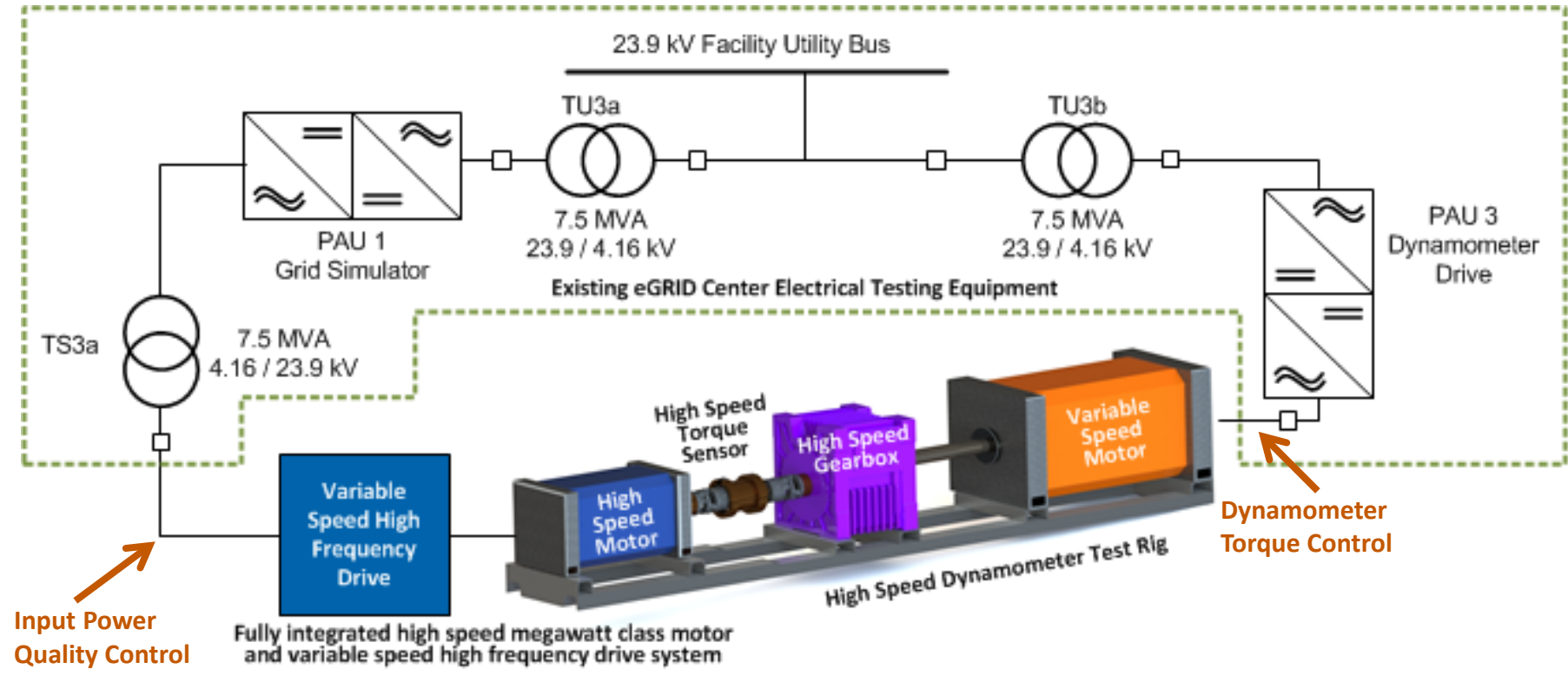
MPBB Configuration



SiC MOSFET drive design: reduce losses, higher f_{sw}



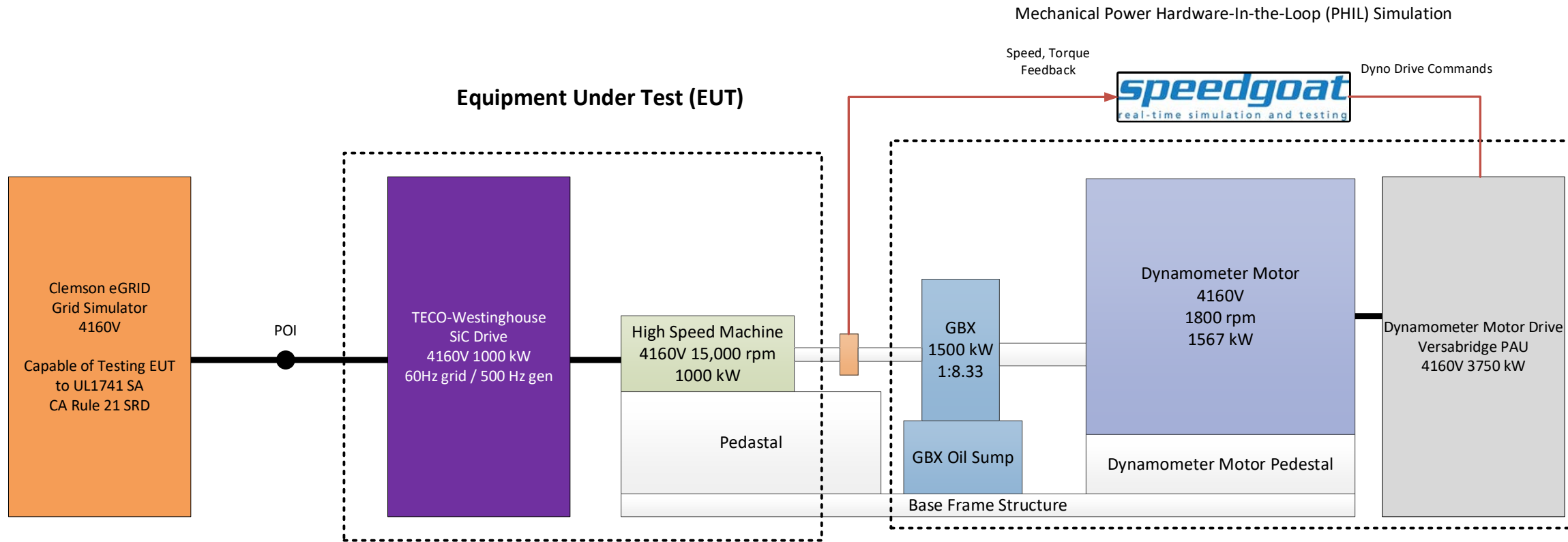
Next Generation Electric Machines



Full Scale Prototype Testing at eGRID



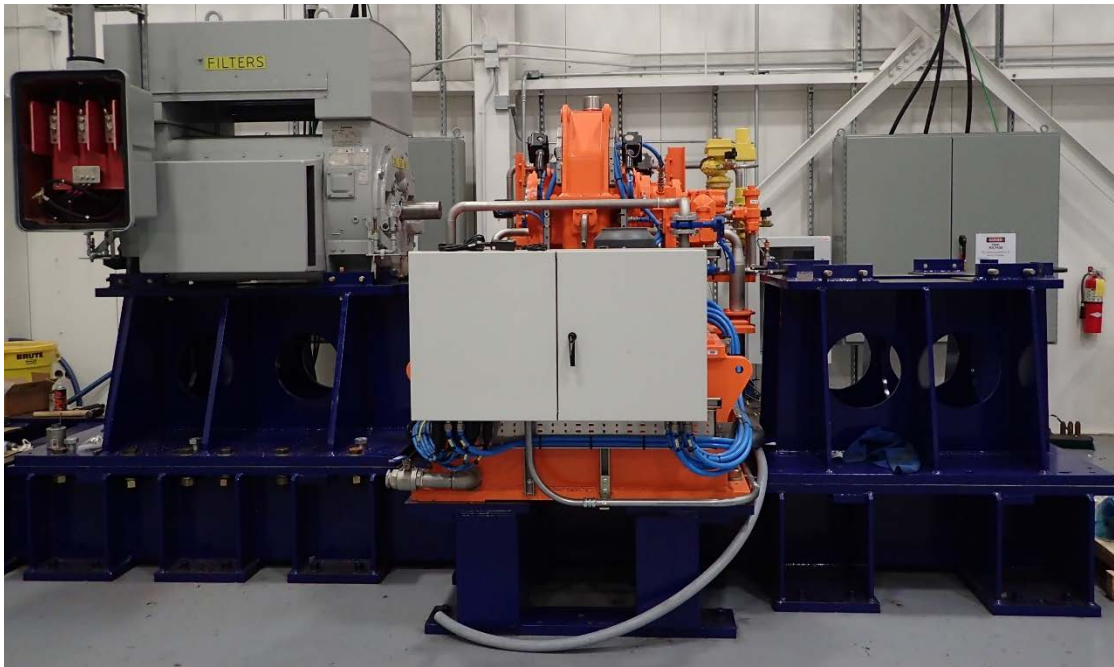
Speedgoat for Mechanical HIL





DOE CHP – High Speed Generators + SiC

» SiC AC/AC converter to improve GT grid support functions



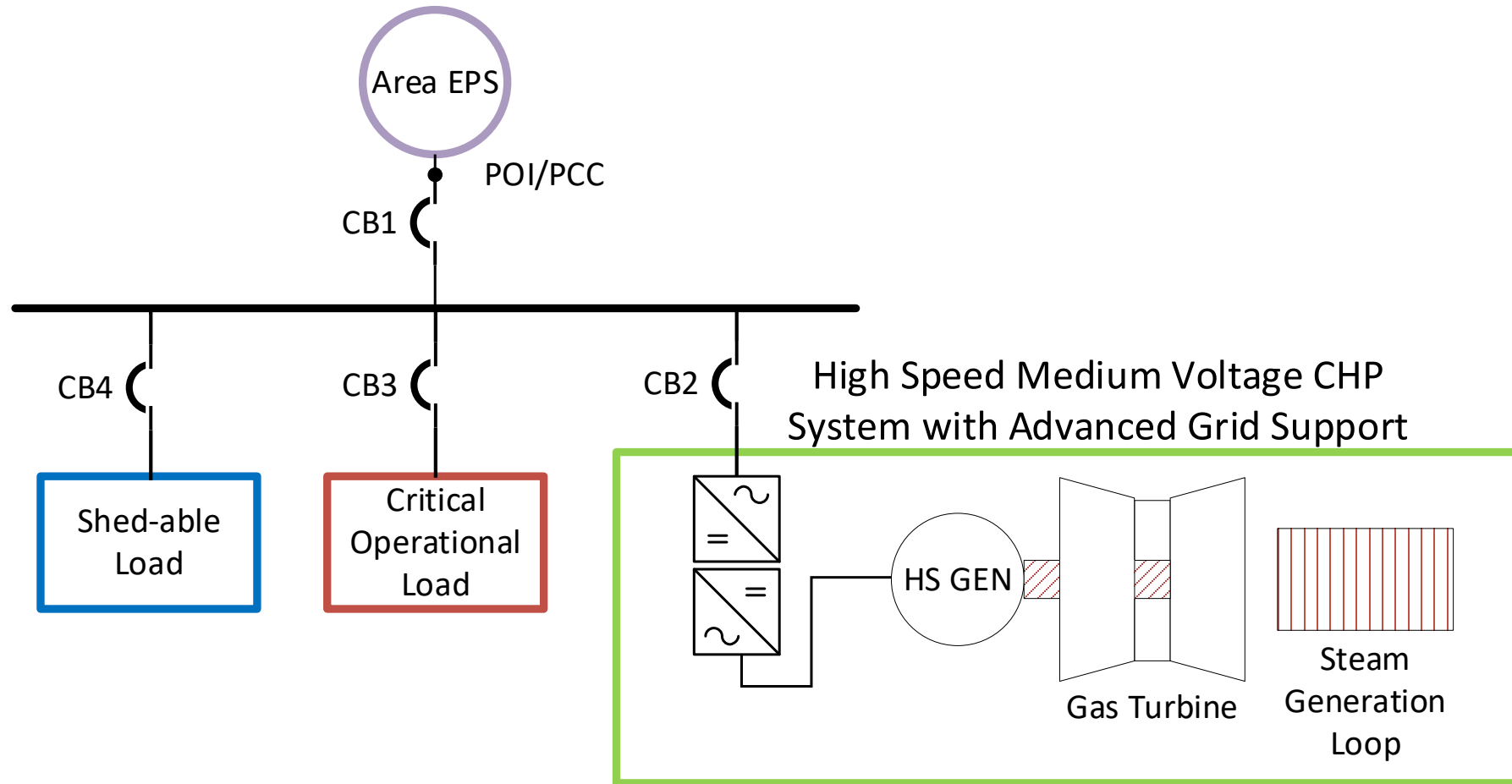
Dyno LS + GBX emulating gas turbine



High speed generator + SiC generator, PHIL for grid support of microgrids, islands

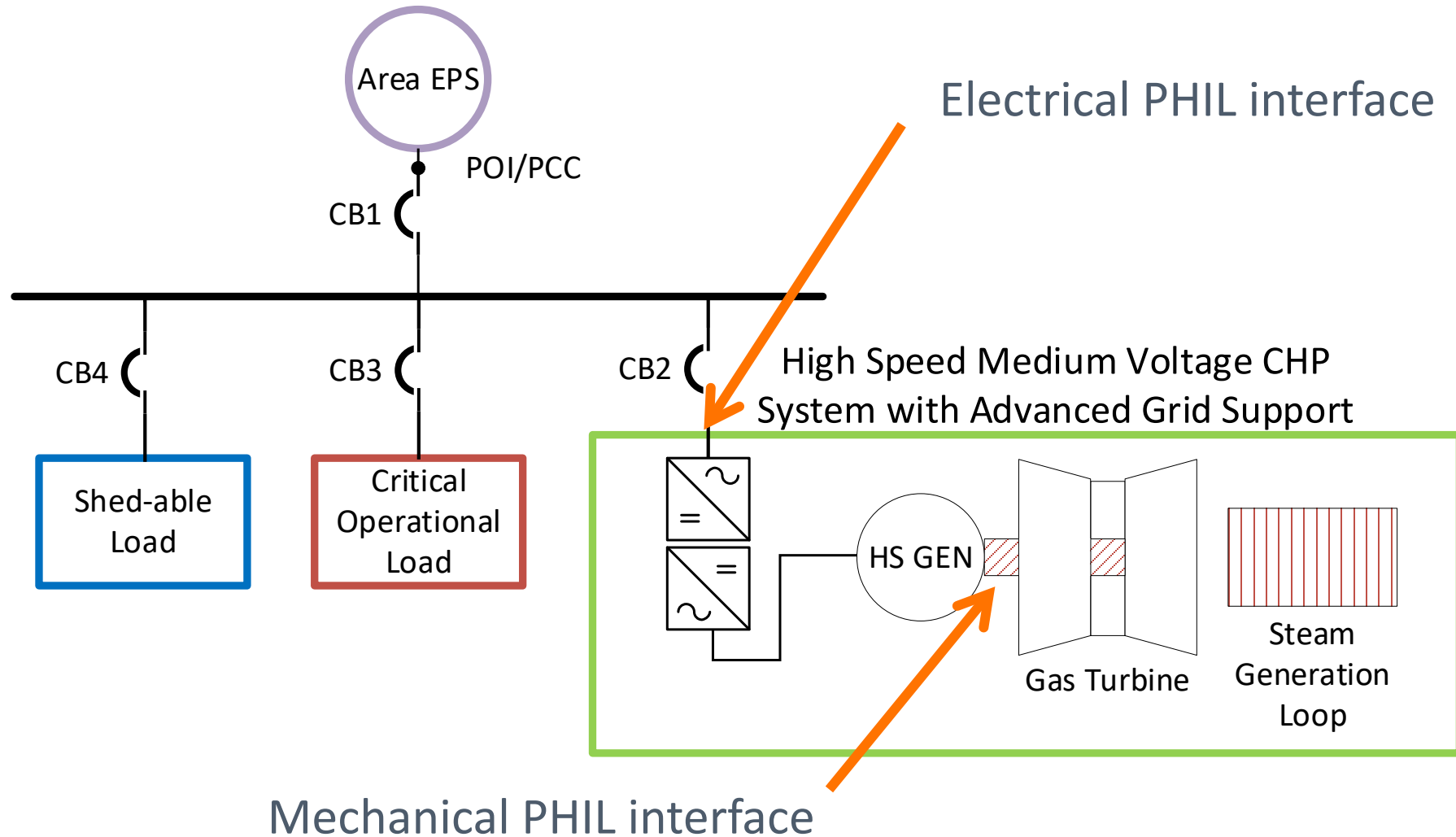


Onsite CHP with Microgrid Capability



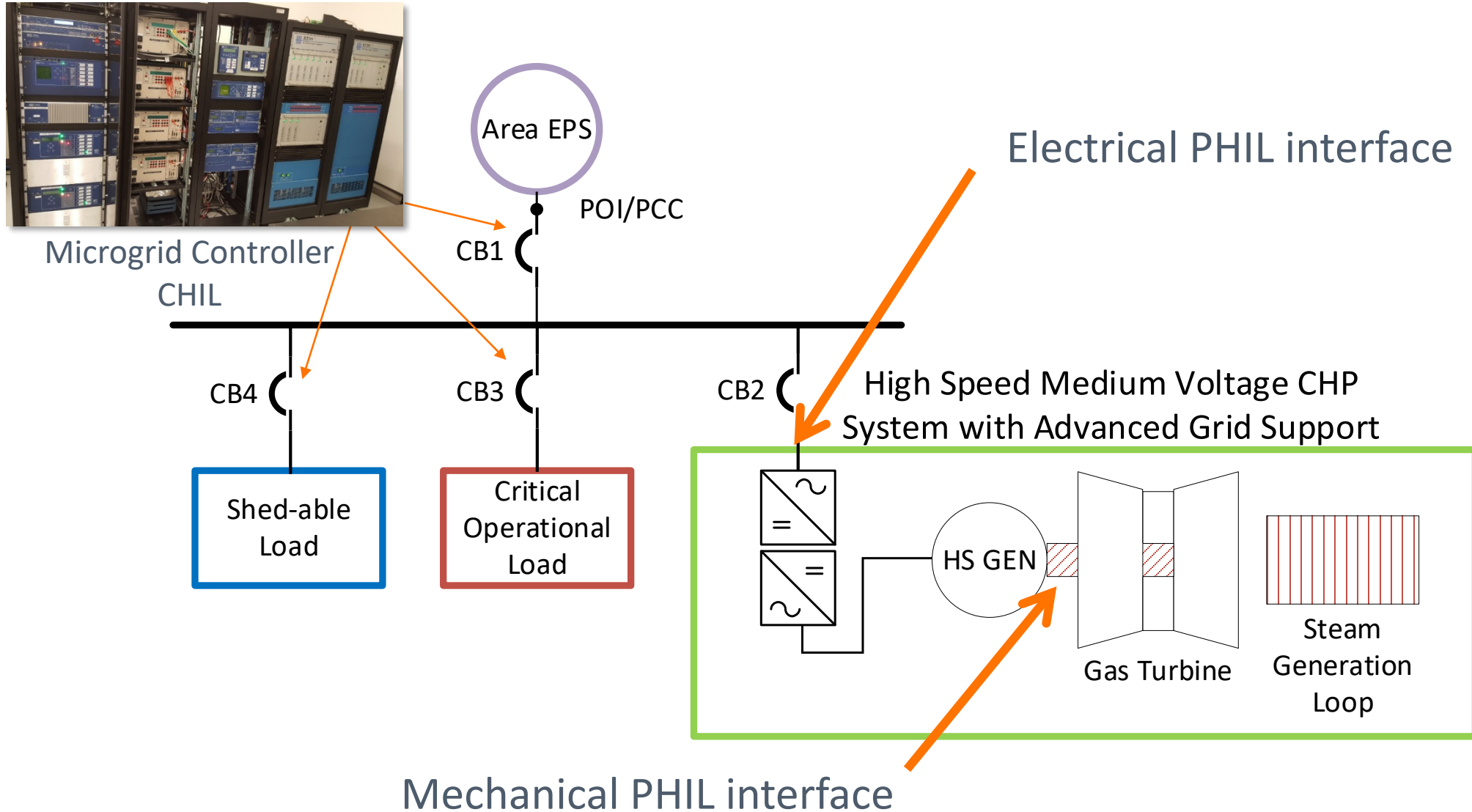


Onsite CHP with Microgrid Capability





Onsite CHP with Microgrid Capability





Thank You

