

High-megawatt Power Conditioning Systems for Fuel Cells

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Abstract:

High-megawatt Power Conditioning Systems (PCS) are required to convert the low voltage power produced by fuel cell modules in central station scale plants to the very much higher voltage levels required for delivery to the grid. The SECA power plant PCS cost goal of \$40 - \$100/kW is generally recognized as a difficult stretch goal that cannot be met with today's technology. To address this challenge, DOE and NIST have entered into an Interagency Agreement to evaluate various advanced technology options for the PCS and to identify technologies requiring development to meet the SECA cost and efficiency goals. For example, direct grid-connected inverters using high-voltage, high-frequency (HV-HF) SiC devices result in reduced cost of the passive components, cooling system, and switchgear. Prototypes of advanced HV-HF SiC devices have been developed, characterized and compared with Silicon devices, and circuit simulation models have been developed to simulate the performance of advanced PCS approaches using these devices.