

(23) Energy Conservation Sciences for operation and Security of Large-Scale Systems

The objectives of the proposed effort are to expand and/or supplement the research presently underway as part of the Center on Security of Large Scale Systems. In particular, the project will seek to (1) expand solid-state research in the area of Silicon Carbide (SiC) for the purpose of reducing size, weight, and cost of power converters for motor drives and distributed generation, (2) to investigate methods of motor control including the advantages of SiC devices to increase the efficiency and reduce the cost of electric drives, and (3) to incorporate the results of the Center's research in fuel cell testing and modeling to suggest design and operation of these devices in distributed generation during islanding of an Electric power Grid.

Total project cost: \$322,834

Funding request: \$249,999

Project Lead: Purdue University

Project Participants: Wright State University

Start Date: May 23, 2005

End Date: May 23, 2007

Presentations/Publications

None.

Patents

None.

Progress in Past Quarter and Current Status

The contract was received by Purdue on May 23 2005. Due to the timing of the academic year and the time needed to set up the subcontract with Wright State University, the technical effort did not start until September, 2005. The next quarterly report due Dec. 15, 2005 will include more information regarding work performed. It is presently not anticipated that the initial delay in starting the work will have an adverse impact upon the overall schedule.

Plans for Next Quarter

During the next reporting period, work will begin on fabrication of SiC Schottky barrier diodes as part of Task 1. In Task 2, a SiC-based buck PWM dc-dc converter will be considered. Task 3 will entail a literature survey of hybrid systems features and the start of the development of mathematical models of (a) molten carbonate fuel cell/gas turbine (MCFC/GT) and (b) solid oxide fuel cell/gas turbine (SOFC/GT) hybrid systems as delineated in the proposal