

U.S. DOE Office of Fossil Energy Solid
Oxide Fuel Cell Programs

Mark C. Williams and Joseph P. Strakey

US Department of Energy, National Energy
Technology Laboratory,

*PO Box 880, 3610 Collins Ferry Road,
Morgantown, WV 26507-0880*

The US Department of Energy's (DOE) National Energy Technology Laboratory (NETL), in partnership with private industries, is leading the development and demonstration of high efficiency solid oxide fuel cells (SOFC) and fuel cell turbine hybrid power generation systems for near term distributed generation market with emphasis on premium power and high reliability. Several integrated systems employing tubular SOFC have been installed and operated on pipeline natural gas in the U.S., Europe, and Japan. Electrical conversion efficiency in the range of 45 to 53% has been obtained during the operation. Measured stack emissions of NO_x, SO_x, VOC and particulate matter have also remained negligible. NETL is partnering with Pacific Northwest National Laboratory (PNNL) in developing new directions in research under the Solid-State Energy Conversion Alliance (SECA) initiative for the development and commercialization of modular, low cost, and fuel flexible 3 to 10 kW SOFC systems. The SECA initiative, through advanced materials, processing and system integration research and development will bring the fuel cell cost to \$400/kilowatt (kW) for stationary and auxiliary power markets. By 2015, SECA developed technologies will provide the basis for the development of systems that achieve 80% electrical efficiency, near zero emissions, and integrate in "Vision 21" power plants.