SULFUR TOLERANT SOLID OXIDE FUEL CELL

NATIONAL DEFENSE CENTER FOR ENERGY AND ENVIRONMENT

PROJECT OVERVIEW

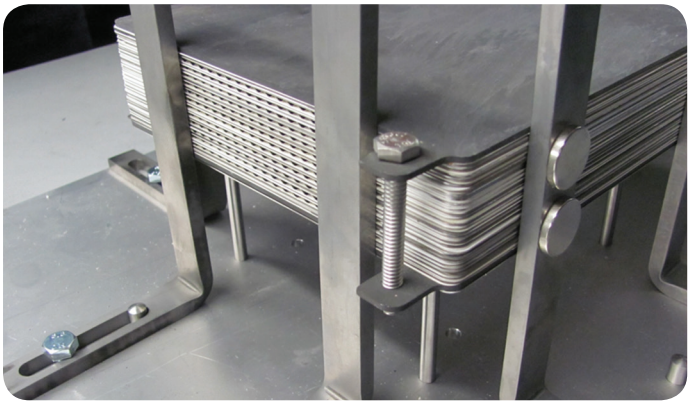
Power and energy provided by fuel cells offer higher efficiency compared to current combustion/turbine engines, translating to reduced fuel consumption and noise. The downside is the fuel cells run on pure hydrogen gas, a logistical challenge, as well as the sulfur in JP-8 fuel which is converted to hydrogen, is a poison to the catalysts in the hydrogen producing reformers and fuel cells. The objective is to develop sulfur-tolerant solid oxide fuel cell (SOFC) stacks, without the need for a sulfur removal subsystem which is ready for testing, demonstration, and integration with a JP-8 reformer. The product will be integrated into a standalone generator, a vehicle auxiliary power unit, or provide propulsion for a manned/unmanned vehicle.

BENEFITS

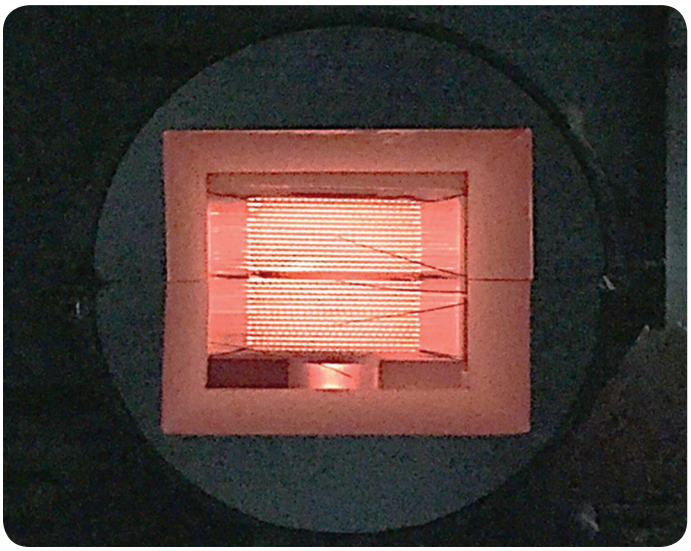
Stakeholders/Beneficiaries include USSOCOM, Army Ground Vehicle Robotics, and Air Force Unmanned Aerial Vehicles (UAV). All applications will benefit from electrical power generation that is quieter, longer lasting, and more fuel efficient than traditional sources. A successful outcome to this NDCEE project will result in the SOFC generating up to 5-kW of power, for a mission duration limited only by the amount of JP-8 fuel the Special Forces operator, robotic vehicle, or UAV can carry.

PATH FORWARD

Four technical tasks will be carried out over the 12-month duration of this NDCEE project. The first three tasks focus on preparation for stack testing (establishing requirements, fabrication and qualification of test support hardware, and delivery and installation of test support hardware at TARDEC's Ground Systems Power and Energy Laboratory). The project culminates with the fabrication and demonstration testing of a 5-kW scale high power density stack in the fourth task.



12-Cell Stack



Hotbox Thermal Map

FOR FURTHER INFORMATION:

NATIONAL DEFENSE CENTER FOR ENERGY AND ENVIRONMENT (NDCEE): http://ndcee.army.mil/

U.S. ARMY TANK AUTOMOTIVE RESEARCH, DEVELOPMENT AND ENGINEERING CENTER (TARDEC): http://www.army.mil/tardec

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