TECHNOLOGY

# Integrated Reformer/Solid Oxide Fuel Cell/Combustor for Portable Power

## OVERVIEW

Many manufacturers supply compact power systems that weigh in excess of 15 lb and producing greater than 1 kW of power utilizing the pairing of a liquid hydrocarbon fuel engine with an electric generator. Modern gas turbine engines use shaft-driven electric generators to generate electrical power.

Researchers at the Department of Aerospace and Mechanical Engineering, University of Maryland have developed an Integrated Reformer/Solid oxide Fuel Cell/Combustor for Portable Power. Existing systems for providing thermal and electric power generation consist of separated components with external thermal integration. The current system provides a means for eliminating heat exchangers and minimizing system volume to improve portability as well as overall system efficiencies due to reduced heat losses. The single-enclosure system can replace simple combustion components in conventional heat engines with a multifunctional thermal and electric power generating unit.

The novel aspects of the hybrid power system are:

• Integration of a fuel cell pre-processor, solid oxide fuel cell and recuperating combustor for waste energy recovery in a single enclosure.
• Ability to provide thermal power and electric power in varying continuously adjustable proportions.
• Ability to operate on a wide range of hydrocarbon fuels.
• Potential for retrofit to existing gas turbine engines as a replacement for mechanical generators.

This technology could be used to replace conventional engine generator sets, could be miniaturized to replace batteries in portable electronic devices, and could be modified to replace mechanically-driven generators on aircraft. On aircraft, large amounts of power would be available possibly enabling the development of all electric aircraft.

## CONTACT INFO

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# Additional Information

## INSTITUTION

University of Maryland, College Park

## PATENT STATUS

Patent(s) pending

## LICENSE STATUS

Contact OTC for licensing information

## CATEGORIES

- Clean Technology
- Chemical
- Power Electronics

## EXTERNAL RESOURCES

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