

Abstract for 2010 SECA Meeting:

Fuel cell technology for auxiliary power or hybrid vehicle range extension offers the potential for major contributions towards long term DOE missions objectives of clean energy, efficiency, and independence. Yet fuel cell technology faces daunting entry barriers, notably including high unit costs amidst low sales volume as well as the absence of a hydrogen fueling infrastructure. Thus, reforming of liquid fuels to produce hydrogen for fuel cell stacks is a practical approach for operating fuel cells due to the high energy density and the availability of infrastructure.

Precision Combustion, Inc. (PCI) is developing ultra-compact and sulfur-tolerant Microlith[®] fuel processor technology to reform conventional fuels such as diesel, gasoline, and liquid biofuels to the sulfur-free, hydrogen-rich fuels required by high temperature PEM (HTPEM) and solid oxide (SOFC) fuel cells. By avoiding the need for a hydrogen fueling infrastructure, PCI's technology offers a major step advance towards a vital, self-sustaining fuel cell industry. Through the DOE SBIR Phase II, PCI has demonstrated this technology, along with improved catalyst effectiveness, demonstrated water neutral operation, and substantially reduced injection pressure drop without performance loss, reducing parasitic losses of the overall system. The resulting fuel processor enables fuel cell use of selected conventional fuels including medium sulfur JP-8 and ULSD/medium sulfur diesel. This system and balance-of-plant simplification will allow for cost optimization to meet commercially viable targets for the entire APU fuel cell system.