

Statement for the  
DOE Hydrogen and Fuel Cell Technical Advisory Committee

July 15, 2009

Good morning Mr. Chairman and members of the Department of Energy's Hydrogen and Fuel Cell Technical Advisory Committee. My name is Michael Brown and I am Vice President, Government Affairs and General Counsel for UTC Power. UTC Power is located in South Windsor, CT and is the world leader in the design, development and manufacture of fuel cells for use in stationary, transportation, space and defense applications. For over fifty years, UTC Power has led the development of fuel cells enabling man to land on the moon, facilitating clean, quiet and highly efficient large distributed generation for commercial application and making possible mass transit that has no carbon footprint. We are the only US provider of fuel cells for heavy duty vehicle application and are leading the technology development in support of light duty vehicle transportation applications. UTC Power is the only company in the world that has worked on all five major fuel cell technologies and continues to investigate other basic technologies that could expand the fuel cell portfolio of technologies. UTC Power is a subsidiary of United Technologies Corporation, a Fortune 50 company, headquartered in Hartford, CT. UTC Power draws on the resources and expertise of its parent and sister companies in developing fuel cells and other energy efficient and environmentally friendly distributed generation systems.

There are three topics that we believe are key to prioritizing the application of resources for rapid development of fuel cells leading to a significant change in how energy is provided in both stationary and transportation applications and fundamentally change the impact we all have on the global environment. These three keys are fuel cell applications for light duty vehicles, the transportation potential of fuel cell powered heavy duty transit vehicles, and the application of fuel cells for distributed generation applications. The success of all of these programs depends on near term government support to facilitate not only market development, but also the creation of a robust and competitive supply base to provide parts, components, raw materials, services and technology development. All of these applications, we believe, have significant potential, but over very different time horizons and with different performance requirements. These time horizons are driven primarily by the complexity of the infrastructure necessary to support the deployment of the fuel cell solution. This complexity also drives the cost of adoption impacting the cost of the fuel cell, market demand and supply base development.

The most complex infrastructure is associated with the application of fuel cells to light duty vehicles. In addition to a consumer friendly hydrogen fueling infrastructure, a service infrastructure is needed to support the deployment of fuel cell vehicles used in normal, day-to-day consumer use. Technical hurdles have been falling and we believe that the only barrier remaining to the application of PEM fuel cells in light duty vehicle applications is cost. Increased volume will reduce the cost, but there must be a receptive market to support the product. Without efficient hydrogen generation, storage and dispensing, the market will not develop. While we continue to supply fuel cell technology to leading automotive OEM's around the world, we believe the infrastructure issues will not permit widespread deployment of fuel cell light duty vehicles for at least ten years.

We believe that the near term opportunity for fuel cell applications in transportation is in the deployment of hydrogen powered heavy duty fleet vehicles, such as transit buses. With a fleet, the hydrogen storage and dispensing infrastructure is much less complex since fleet vehicles return to the same point every night. Service infrastructure is also minimized and the drive cycle for transit buses is most conducive to the use of a fuel cell and battery hybrid system. UTC Power has been a leader in the development of fuel cells for transit bus applications and currently has the longest running fuel cell powered transit bus in the world without stack replacement or overhaul. There are six transit buses with UTC Power fuel cells on board in revenue service today. One operates right here in downtown Hartford. In the next year there will be nineteen buses in revenue service. The additional buses will have the latest technology on board and we believe will be the first buses to achieve 10,000 hours of operation on the original cell stacks. The development of transit bus infrastructure will permit the deployment of limited fleets of light duty vehicles and begin to build the demand, and permit the growth of hydrogen generation, storage and dispensing infrastructure.

Fuel cells for stationary, distributed generation applications are ready for the commercial market today. UTC Power has a new generation phosphoric acid fuel cell that will provide 400kW of electrical energy and over 1.7 million BTUs of thermal energy for a distributed generation application. Our target customers are commercial entities that, first, can use all of the thermal energy and, second, can use all of the electrical energy generated by the fuel cell. With the combination of the thermal and electrical energy, a fuel cell application can achieve energy efficiencies of up to 90% compared to electrical grid efficiencies of less than 35%. Our current commercial offering has a cell stack life of over 80,000 hours enabling continuous operation for over ten years without replacement of the cell stack. Since the only efficient delivery mechanism of hydrogen currently available is the natural gas distribution system, our fuel cell system includes fuel reforming and that system will also operate for ten years without an overhaul.

UTC Power continues to provide alkaline fuel cells for the space program – three fuel cells are on each space shuttle. We are also developing PEM fuel cells for application to submarine propulsion systems and are actively involved in the development of solid oxide fuel cells for future use in transportation and electrical generation applications. We are working closely with automotive OEM's to drive down cost and complexity and

improve durability of fuel cells for the automotive market. All of this work is done in South Windsor, CT where we employ directly over 550 people.

We take pride in our uniquely diverse fuel cell history at UTC Power with experience and expertise that spans five decades, involvement in five fuel cell technologies and a broad array of transportation and stationary applications. UTC Power is working diligently to ensure the commercial success of fuel cells in numerous markets and looks forward to a continued strong public private partnership with DOE to make this a reality.