



**Testimony of UTC Power
In Support Of
Raised Bill No. 5212
*An Act Concerning Fuel Cells***

**Before the Energy and Technology Committee
February 26, 2009**

Good afternoon Senator Fonfara, Representative Nardello, and members of the Committee. I am Mike Brown, Vice President, Business Development and General Counsel at UTC Power. UTC Power appreciates the opportunity to convey its support for Raised Bill No. 5212, *An Act Concerning Fuel Cells*. The bill directs the Department of Transportation to establish a program that would result in transit buses in Connecticut powered by fuel cells and directs the Office of Legislative Management to perform an engineering study and develop plans to install fuel cells at the Capitol complex.

Connecticut is in a unique position, both on a national and global level. Connecticut is home to both of the world leaders in fuel cell technology for large stationary applications, is home to the world leader in fuel cells for heavy duty vehicle applications and has companies with technology that lead hydrogen applications in transportation, standby power and hydrogen generation. Connecticut has a wealth of talent in the technologies that are necessary to move the world toward a hydrogen-based energy economy and away from an energy economy that is dominated by imported petroleum. In addition, Connecticut, because of its geographic size and location, has the opportunity to quickly assume the global leadership in demonstrating how hydrogen can drive the economy, improve the environmental condition of the state, address climate change concerns and reduce the exposure of its citizens to the harmful effects from combustion of diesel fuel for transportation and other forms of combustion for electrical generation.

Raised Bill 5212 will improve the environment of the urban population in Connecticut through the introduction of a fleet of zero emission transit buses, will stimulate growth in an industry that is indigenous to the state and fosters significant economic development. Not only does the fuel cell industry in Connecticut today ensure that the State has a significant place in the future hydrogen economy, but the fuel cell industry also has the ability to improve economic development in those areas of the state that are currently encountering a constrained energy infrastructure and those areas that will face the same energy constraint in the future.

Background on UTC Power's PureMotion® Fuel Cell System for Transit Buses

I'd like to provide the Committee some brief background on UTC Power's experience in fuel cell bus power systems. UTC Power's current PureMotion® 120 fuel cell power system (FCPS) for transit buses represents more than six years of Connecticut-based UTC research and development in partnership with the U.S. Department of Defense through the U.S. Army Tank, Automotive and Armaments Command (TACOM) and the U.S. Department of Transportation.

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We have been supplying fuel cell bus power systems since 1998 for programs in Washington, D.C., California, Spain and Italy and more recently in Belgium and Connecticut. Today, we have six of our latest generation buses on the road: four in California, one in Belgium and one here in Hartford, Connecticut. Two years ago, New England's first zero-emission fuel cell-powered hybrid bus made its debut at the Connecticut Convention Center and entered CT Transit service, Connecticut's state-owned bus system. Operation of the bus is funded by the Connecticut Department of Transportation. Recently, through the Federal Transportation Administration (FTA), a contract was signed that will have four more fuel cell powered buses delivered to CT Transit in late 2009 and early 2010. In addition, a contract was signed with AC Transit, also through the FTA, 8 more buses will be provided to AC Transit to increase the size of their fleet. As of January 2009, the UTC Power bus fleet of six buses had accumulated 26,344 hours and 269,267 miles of successful operational service. The success with fuel cell buses to date belongs not just to UTC Power but rather to committed public-private partnerships, including stable funding sources, like that set forth in the Bill. It is these public-private partnerships that create the market, jump start the essential elements of the supply base and enable the commercialization of early stage products.

Benefits of Fuel Cell Buses

The benefits of fuel cell buses are evident to everyone who takes a ride on one or simply stands on the street when one goes by.

Zero Emissions. Fuel Cell buses have zero emissions - no soot and no smog forming pollutants. Transportation with no NOx, SOx or particulate matter is especially important in densely populated urban centers where concerns about street level emissions, and its health effects, are heightened. Zero emissions also mean no CO₂ emissions, which will contribute to Connecticut's climate change goals. The only thing that exits a fuel cell bus tail pipe is water vapor. This means immediate positive impact on street level emissions and the beginning of improvement of the health of those in the vicinity of transit traffic. Studies in both California and in Europe have tied significant health impacts and related costs to the particulate emissions of transit bus fleets.

A point of comparison to illustrate the environmental benefits of one fuel cell-powered bus versus a diesel bus: just one PureMotion[®] 120 fuel cell power system reduces NOx emissions equivalent to removing 77 cars from the road per year and creates the same CO₂ benefits as would planting 31 acres of forest.

Quiet Operation. Fuel cell buses are incredibly quiet. The inside cabin noise is similar to a luxury sedan. This provides comfort for passengers and increases their inclination to take a bus instead of their own car. Exterior noise is comparable to golf cart, which significantly reduces noise pollution in our Connecticut communities. When UTC Power brought a fuel cell bus here to the State Capitol a number of years ago, the universal reaction of legislators and others who came by to take a short ride around the block was exactly what we hear from people who ride our fuel cell buses in California or Belgium. They ask whether the bus is actually operating since they can't see, hear or smell anything.

Energy Security and Productivity. A fuel cell bus operating on hydrogen reduces dependence on foreign oil and provides a more diverse, secure energy infrastructure. Hydrogen can be produced from a variety of sources and Connecticut has a number of companies, including UTC Power, that have advanced technologies for generating hydrogen through a reformation process or through the process of electrolysis. A fuel cell hybrid bus delivers approximately twice the fuel economy of conventional diesel. The fuel cell bus can go 300 - 350 miles without refueling. The carbon footprint of the bus operating in Connecticut today is simply the diesel truck used to move the hydrogen from its generation near Niagara Falls using hydroelectricity to Connecticut. The cost is also comparable to the cost of a gallon of diesel fuel.

Traffic Congestion Mitigation. Connecticut's traffic congestion problems are significant, and in some areas, acute and growing. This problem imposes costs. Moving people out of cars and onto fuel cell buses will help alleviate traffic congestion, and do so in a way that contributes to the state's climate change solutions and air quality goals. Reducing the number of personal auto commuters cuts environmental impact once, putting them on fuel cell powered buses more than doubles the benefit. Part of the transit activity that must be addressed is how to make commuting on fuel cell buses the preferred transit method for many of the state's residents. With their clean operation and quiet interiors, fuel cell buses provide an inviting platform for other enhancements that may entice ridership, including amenities that might make a bus trip a productive journey instead of unproductive commute time.

These tangible and diverse benefits leave no question why the Federal Transit Administration's expressed desire is to have fuel cell buses represent a significant percentage of new U.S. transit bus purchases by the year 2015. We urge your favorable consideration of Bill 5212's call for transit buses powered by fuel cells to make Connecticut a global leader in achieving these benefits for its citizens and its economy.

Fuel Cells at the Capitol Complex

UTC Power also supports the deployment of fuel cells to reduce total energy cost, improve energy efficiency and, as a result, reduce carbon footprint. Using fuel cells in base load, distributed generation application should also eliminate the need for the purchase, maintenance and use of a stand-by generator. The ability to provide power, heating and cooling at the heart of state government, regardless of the availability of the grid, can send a powerful message to the marketplace and stand as a shining example of the leadership of the State of Connecticut in alternative energy. The integration of the thermal energy is important to achieve energy efficiency, and thus lower total energy cost, in a fuel cell application. The Capitol Complex study should take into consideration the opportunity to fully use the thermal energy, either within the Complex itself, or in some nearby business or group of businesses. While thermal integration can be a challenge in existing buildings, the opportunity is worth the investigation. Partnering with both the gas and electric utilities to improve the opportunity may also be worth exploring. Energy security, energy productivity and energy responsibility should be key drivers in evaluating the opportunity within the Capitol Complex.