



Connecticut Center for  
Advanced Technology, Inc.

Testimony of

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Connecticut Center for Advanced Technology, Inc.

before

Commerce Committee

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regarding

Raised Bill No. 6397

An Act Concerning the Development of an Energy Independent Economy in Connecticut

***The Connecticut Center for Advanced Technology, Inc. ("CCAT") offers this testimony in support of House Bill No. 6397 - An Act Concerning the Development of an Energy Independent Economy in Connecticut***

The Connecticut Center for Advanced Technology, Inc. (CCAT) is a nonprofit corporation that provides services and resources to entrepreneurs and businesses and, through collaboration with industry, academia, and government, helps companies innovate and compete in the global market. CCAT implements programs that improve the economic competitiveness of the region through solutions that lower energy costs and increase long-term energy reliability. CCAT undertakes energy planning, and promotes renewable energy, including advanced technologies and sustainable fuels such as hydrogen.

CCAT and the Department of Transportation, in partnership with the Department of Economic and Community Development (DECD) and other members of the Connecticut Hydrogen-Fuel Cell Coalition, developed the Connecticut Hydrogen and Fuel Cell Deployment Transportation Strategy: 2011-2050. This strategic plan was provided to the Legislature by the Connecticut Department of Transportation in January 2011.

CCAT supports this bill that seeks to convert not less than twenty-five per cent of the state's diesel powered heavy fleet to liquefied natural gas and compressed gas fuel. This proposed bill is similar to proposed House Bill No. 6127- An Act Promoting the Use of Fuel Cells in Vehicles, which sets goals for at least one per cent of the state's fleet of light duty passenger vehicles and one per cent of the transit bus fleet to use fuel cells by 2015 and at least ten per cent of such fleets use fuel cells by 2025. Hydrogen is a compressed gas fuel, and fuel cells efficiently convert hydrogen into electrical energy that can be used power light duty passenger vehicles, transit buses, and heavy duty vehicles.

***The use of alternative fuels, such as hydrogen, and fuel cell technology in the state's fleet is consistent with the goals for Connecticut identified in the state's Hydrogen Roadmap and the state's Hydrogen and Fuel Cell Deployment Transportation Strategy.***

The deployment of hydrogen-fueled vehicles and hydrogen infrastructure will provide the following benefits:

- Retain and expand Connecticut jobs associated with production of fuel cells, fueling stations and infrastructure products including component sub-assemblies, original equipment manufacturing and long term product support;
- Attract automobile and bus companies to demonstrate and deploy hydrogen-fueled vehicles in Connecticut;
- Accelerate commercial readiness and commercial deployment of hydrogen technology and fuel cell vehicles in Connecticut;
- Reduce controlled pollutant and greenhouse gas (GHG) emissions, reduce noise, and increase energy security and efficiency; and
- Position Connecticut to capture federal and other grant funding for research, development, demonstration and deployment of hydrogen infrastructure and fuel cell vehicles.

***Fuel cell vehicles provide significant benefits over conventional vehicles.***

Fuel cell vehicles, like electric vehicles, are propelled by electric motors utilizing the fuel cell to create its own electricity using hydrogen fuel and oxygen from the ambient air. Today, fuel cells successfully power cars, trucks, buses and other service vehicles such as forklifts. Compared to conventional vehicles, hydrogen-fueled vehicles with fuel cell power plants have many advantages, including:

- high efficiency;
- no emissions of controlled pollutants such as nitrous oxide, carbon monoxide, hydrocarbon gases or particulates from the vehicles themselves;
- no emissions of greenhouse gases (GHG) from the vehicles themselves;
- substantial reduction in GHG emissions on a “well-to-wheel” basis;
- fewer parts resulting in lower maintenance;
- ability to fuel vehicles with indigenous energy sources;
- greater range than all-electric or battery powered vehicles; and
- quiet operation.

***Connecticut companies are currently involved with the development and manufacture of fuel cells and hydrogen fuel infrastructure.***

Connecticut’s fuel cell and hydrogen companies have expertise in fuel cell systems for stationary power and transportation, and hydrogen generation and distribution. These products include fuel cell systems for transit buses; fuel cells systems to provide electricity for transit operations; electrolysis systems to convert

water to hydrogen fuel; fuel reformers for on-board conversion of conventional fuels to hydrogen fuel; combined heat, power, and hydrogen production; and the infrastructure to store and deliver hydrogen for transportation use.

UTC Power has fuel cell power plants in the drive systems of demonstration automobiles for Hyundai and Nissan, in auxiliary power units in BMW's vehicle demonstrations, and in several fuel cell buses in California, Connecticut and Europe. Connecticut companies have been involved with hydrogen generation for transportation including the co-production of hydrogen in a fuel cell unit, fuel reforming, and electrolysis, including FuelCell Energy, UTC Power, Avāence, Proton Energy Systems, Treadwell Corporation, and Precision Combustion, Inc. In 2010, the hydrogen and fuel cell industry contributed to the State's economy by providing over 1,200 jobs directly associated with research and development and the manufacture of fuel cell and hydrogen technology, and over 1,500 indirect jobs for a total of over 2,700 jobs statewide. In addition to these original equipment manufacturers, over 40 Connecticut companies are involved with the production of components or provision of services in this field.

It is projected that employment in Connecticut would increase as a result of the transition to a hydrogen and fuel cell economy. Connecticut's employment in vehicle power plant manufacturing is expected to increase to over 18,000 jobs by 2050. Hydrogen production and electrolysis manufacturing is projected to grow from approximately 110 in 2010 to over 31,000 by 2050. It is projected that these two sectors would combine to contribute over 50,000 jobs to Connecticut's economy by 2050.

***Connecticut has been a leader in the deployment of fuel cell vehicles and hydrogen fuel infrastructure.***

On the east coast, initial introduction of hydrogen and fuel cell vehicles has occurred in New York City and more recently in Connecticut. Connecticut is expected to have 6 hydrogen fuel cell buses and at least 10 passenger fuel cell vehicles operating by 2011. In addition, there will be four hydrogen refueling stations in operation in the state by 2011 to support these vehicles. However, additional hydrogen refueling will be needed to service fleets, transit buses, and transit vehicles; additional investment in vehicles will be needed to manage fuel costs and emissions; and additional support will be needed to encourage the purchase and use of fuel cell vehicles, including sales tax exemptions, signage, and use of high occupancy vehicle lanes.

*Conclusion*

The Connecticut Center for Advanced Technology is supportive of this Bill that would establish goals for the use of alternative fuels in the state's fleet. Hydrogen-fueled vehicles could potentially utilize the four hydrogen refueling stations that will be located in the state near Hartford and New Haven. The use of hydrogen fuel in the state's fleet would improve energy efficiency, reduce consumption of imported oil, improve environmental performance, and enhance near-term and long-term economic development. The use of fuel cell vehicles would accelerate the commercial deployment of hydrogen-based technology and provide jobs and economic benefits to the state of Connecticut.

Having developed the Hydrogen Roadmap and Connecticut Hydrogen and Fuel Cell Deployment Transportation Strategy, in partnership with the state, CCAT believes it is uniquely qualified and well staffed with the technical expertise to facilitate the deployment of fuel cell vehicles and hydrogen fueling infrastructure. CCAT looks forward to working with the Legislature, the Connecticut Department of Transportation, the hydrogen and fuel cell industry, and other interested stakeholders to expeditiously deploy fuel cell vehicles and hydrogen refueling stations in the state.

CCAT will make itself available to the Committee and legislature upon request to provide or clarify information in the state's hydrogen and fuel cell transportation plan. CCAT would be pleased to be considered a resource to assist in the development of a hydrogen-fueled vehicle deployment program for Connecticut.

Respectfully submitted,

CONNECTICUT CENTER FOR ADVANCED TECHNOLOGY, INC.

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