Connecticut Center for Advanced Technology, Inc. www.ccat.us

January 25, 2010

Connecticut Energy Advisory Board
c/o Gretchen Deans
CERC
805 Brook Street, Building 4
Rocky Hill, CT 06067

Re: CEAB Request for Written Comments on the 2010 Integrated Resource Plan

Dear Ms. Deans:

The Connecticut Center for Advanced Technology, Inc. (CCAT) would like to thank the members of the Connecticut Energy Advisory Board (CEAB) for the opportunity to provide written comments concerning the draft *Integrated Resource Plan (IRP) for Connecticut*, dated January 1, 2010, and submitted to the CEAB by The Connecticut Light & Power Company (CL&P) and The United Illuminating Company (UI).

CCAT's comments pertain to the information put forth in the IRP regarding fuel cells. Section 3.G. Renewable Energy Technologies repeatedly states that air emissions from fuel cells are similar to conventional natural gas and offer no environmental benefits. This information appears to be based on improper assumptions and inconsistent with information documented in the *Fuel Cell Economic Development Plan Hydrogen Roadmap (Hydrogen Roadmap)*, State of Connecticut Department of Economic and Community Development, January 1, 2008.

As detailed in the *Hydrogen Roadmap*, for each megawatt (MW) of natural gas generation capacity replaced with capacity from a fuel cell utilizing natural gas, average annual reductions of CO_2 emissions would be 4,450,080 pounds; NO_x emissions would be reduced by 2,716 pounds; and SO_2 emissions would be reduced by 184 pounds. At 40 MW, average annual reductions of NO_x emissions would be reduced by 54 tons; SO_2 emissions would be reduced by 4 tons; and CO_2 emissions would be reduced by approximately 89,000 tons in comparison to electricity generated from conventional natural gas. With a combined heat and power (CHP) application and assuming additional increased efficiency from reduced transmission line losses, these annual emission reductions could be doubled.

Fuel cells have an average electrical efficiency of 48 percent, while only the most highly efficient natural gas combined cycle turbines can reach 45 percent efficiency. However, the most optimal use of a fuel cell is in CHP applications, which recovers the otherwise

wasted thermal energy. A fuel cell's efficiency increases from 48 percent to greater than 80 percent when used in CHP applications, offering far greater efficiency in addition to reductions in air emissions when compared to the most highly efficient conventional gas turbine.

Lastly, the economic development aspect of fuel cells cannot be ignored in the State of Connecticut when weighing the overall benefits of fuel cell technology. The hydrogen and fuel cell industry receives over $200 million in revenues annually and directly employs approximately 1,200 people, with an additional 1,500 indirect and induced workers for a total of 2,700 jobs in Connecticut. Annually, over $340 million in gross state product and $31 million in state and local tax revenue is contributed by the industry. Additionally, for each dollar of revenue generated by the hydrogen and fuel cell industry in Connecticut, 84 cents of revenue is received by Connecticut businesses through direct and induced impacts, and each job in the hydrogen and fuel cell industry supports an additional 1.31 jobs elsewhere in Connecticut's economy.

Support from the State of Connecticut, CL&P, and UI to facilitate the targeted deployment of fuel cell technology is well justified for environmental, as well as economic reasons. Improved market penetration of fuel cell technology will assist in improving Connecticut's global market position with increased employment and tax revenue as well as providing quantifiable environmental benefits.

Respectfully submitted,

Joel M. Rinebold
Director of Energy Initiatives

Sent electronically and via First Class Mail