FTA RESEARCH
FEDERAL TRANSIT ADMINISTRATION

REPORT SUMMARY

U.S. Department of Transportation
Federal Transit Administration

Connecticut Nutmeg Fuel Cell Bus Project: First Analysis Report

Background

This report summarizes the experience and early results from the Connecticut Nutmeg Fuel Cell Bus Project, a fuel cell bus demonstration funded by the Federal Transit Administration (FTA) under the National Fuel Cell Bus Program (NFCBP). A team led by the Northeast Advanced Vehicle Consortium and UTC Power developed a next-generation fuel cell electric bus (FCEB) for demonstration. A total of four FCEBs are being operated in service by Connecticut Transit (CTTRANSIT) in Hartford, Connecticut. The National Renewable Energy Laboratory (NREL) was tasked by FTA to evaluate the buses in service. This report documents the early development and implementation of the buses and summarizes the performance results through May 2012. This is an interim report for an ongoing project.

Objective

The objective of the overall research effort is to develop and demonstrate a next-generation fuel cell electric bus and to move the industry closer to commercialization of fuel cell technology for transit buses. The objective of the report is to disseminate analysis results from the independent evaluation conducted by NREL of the subject vehicles.

Findings and Conclusions

With improved manufacturing processes and availability, fuel cell buses show significant fuel benefits.

During the evaluation period of the report—October 2010 through May 2012—the FCEBs accumulated more than 100,000 miles and 7,305 operating hours on the fuel cell systems. The FCEBs were filled 817 times with a total of 16,922 kg of hydrogen. Overall, the FCEBs averaged 6.86 miles per kilogram of hydrogen, which equates to 7.75 miles per diesel gallon equivalent (DGE). The report compares FCEB fuel economy to that of diesel and diesel-hybrid buses as a baseline. The average fuel economy of the FCEBs is 97 percent higher than that of the diesel baseline buses and 46 percent higher than that of the diesel hybrid buses for the evaluation period. The average availability for the FCEBs was 52 percent. This is lower than the expected availability (which should be above 85%) and has been due to start-up issues that are now resolved.

One of UTC Power's goals for the project was to introduce the technology to other interested transit fleets. The company has finalized arrangements with Flint MTA for a one-year demonstration. CTTRANSIT will continue to operate the remaining buses for as long as possible.

Benefits

This report documents the progress toward commercialization of a fuel-cell-dominant FCEB that can meet the needs of U.S. transit agencies. Building on the success of the manufacturer's previous experience, the bus design takes FCEBs to an advanced stage, incorporating the lessons learned with the earlier fleet.

Project Information

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This research project is led by the Northeast Advanced Vehicle Consortium. The report was written and the evaluation conducted by the National Renewable Energy Laboratory. For more information, contact FTA Project Manager Christina Gikakis at (202) 366-2637, christina.gikakis@dot.gov. All research reports can be found at **www.fta.dot.gov/research**.