FTA RESEARCH
FEDERAL TRANSIT ADMINISTRATION

REPORT SUMMARY

U.S. Department of Transportation
Federal Transit Administration

Design & Development of the LCO-140H Series Hydraulic Hybrid Low Floor Transit Bus: BUSolutions Final Technical Report

Background

Transit authorities today face many challenges. Operating costs, especially fuel costs, are on the rise, making it ever more difficult to meet operating budgets without subsidies. Public and political pressures continue for more efficient service with reduced environmental impact and less dependency on oil. The transit industry could benefit from a solution that significantly reduces costs and dramatically improves fuel economy without expensive and prohibitive infrastructure requirements.

Objectives

BUSolutions, a public-private advanced transit bus development initiative by Altair ProductDesign, Inc., has yielded an innovative solution to the challenges that confront America's local and regional transit systems—the world's first series hydraulic hybrid bus, the LCO-140H (Low Cost of Ownership–1st 40-foot Hybrid).

Through a "clean-sheet" design approach, the extremely lightweight, heavy-duty bus design yields more than twice the fuel efficiency of conventional buses at a lower lifetime cost. This is a first for any hybrid bus. Requiring no infrastructure upgrades to operate, the LCO-140H is an attractive option for transit authorities to cost-effectively upgrade aging fleets with hybrid vehicle technology.

Findings and Conclusions

Based on the merits of the innovative design and predicted performance benefits, in 2005, Altair partnered with Automation Alley, Michigan's largest technology business association, to explore government grant opportunities to support the physical build and testing of a technology demonstrator to validate the design. As a result, the program attracted the attention of officials from the U.S. Department of Transportation (DOT) and the Federal Transit Administration (FTA). Since 2005, FTA has provided $5.1 million in funding for the BUSolutions program, with additional program support provided by the Michigan Economic Development Corporation (MEDC) and Automation Alley, to produce a prototype demonstrator of the bus concept.

From its inception, the BUSolutions program has continually involved industry experts from the manufacturing segment, transit authorities, and rider advocacy groups to ensure that the program goals align with industry needs. Close cooperation and guidance were also provided by FTA in a partnership that continually adjusted the program goals to remain relevant and up-to-date with transit industry needs.

What started as an internally-funded "stretch" project today has resulted in an industry-first, series hybrid-hydraulic bus design that is ready for manufacture. Having successfully completed the testing phase to validate the design and performance metric, the BUSolutions LCO-140H is the lowest-cost, most fuel-efficient hybrid bus on the road today.

Benefits

The LCO-140H yields fuel economy of 6.9 MPG on the industry standard ADB duty cycle, which is 110 percent better than conventional diesel buses on the road today and 30 percent better than the best-in-class electric hybrid buses available today. More importantly, the bus will cost over 20 percent less than a conventional diesel bus to own and operate over its life and over 30 percent less than an electric hybrid. For the first time, transit authorities and municipalities can reduce their reliance on oil and save money while doing it.

Project Information

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