

PRESS

CONVERGENT SCIENCE COLLABORATES WITH WABTEC, OAK RIDGE, AND ARGONNE ON HYDROGEN-POWERED LOCOMOTIVES

Madison, Wisconsin—January 5, 2023—Convergent Science has partnered with [Wabtec](#), a leading manufacturer of freight locomotives, and Oak Ridge and Argonne National Laboratories to research decarbonization strategies for the rail industry. The four-year project will focus on establishing the viability of hydrogen and other low- and no-carbon fuels for locomotive engines.

Current freight locomotives operate on diesel engines, which will need to be modified to be compatible with alternative fuels. The research team will develop hardware and control strategies for the engines so they can run on a combination of hydrogen and diesel or completely on hydrogen or other alternative fuels. Because locomotives have a long service lifetime—upward of 30 years—it is critical to develop solutions that can be applied to the existing fleet to reduce emissions in the near-term. In parallel, the teams will explore new technologies that can be implemented as current locomotives are phased out, which will help ensure decarbonization in the long-term.

“Getting to net-zero emissions by 2050 requires dramatic energy efficiency and emissions improvements in the overall transportation system, including railways, which are difficult to electrify,” says Dr. Muhsin Ameen, Senior Research Scientist at Argonne. “Hydrogen has been used in light-combustion engines but is still a very new area of research in railway applications.”

A Wabtec single-cylinder, dual-fuel locomotive engine was recently installed at Oak Ridge National Laboratory, where researchers will use it to conduct experimental tests with low-life-cycle carbon fuels. Convergent Science and Argonne National Laboratory will focus on running computational fluid dynamics (CFD) simulations of the engine using Convergent Science’s CONVERGE CFD software. Simulating the engine will provide insights that will inform the direction of experimental testing. In addition, the team will take advantage of machine learning techniques and Argonne’s high-performance computing facilities to speed up the development process.

“Each of the groups involved in the project has unique areas of expertise that complement one another,” says Dr. Tom Lavertu, Senior Engineer at Wabtec. “Bringing all these groups together will accelerate the research pace and knowledge gains to help develop solutions that will benefit the environment and that industry will want to adopt.”

This collaborative project exemplifies the synergistic relationship between U.S. national laboratories and industry, helping to translate fundamental research into commercially available solutions that contribute to society at large.

The project is funded by the Vehicle Technologies Office under the Department of Energy’s Office of Energy Efficiency and Renewable Energy, the Federal Railroad Administration, and Wabtec, with in-kind contributions from Wabtec and Convergent Science.

“We’re excited to be a part of this collaboration and to contribute our expertise in simulating hydrogen and alternative fuels,” says Dr. Kelly Senecal, Co-Owner and Vice President of Convergent Science. “This project has the potential to make a huge impact on carbon emissions from the rail industry and help bring us closer to our decarbonization goals.”

About Convergent Science

Headquartered in Madison, Wisconsin, Convergent Science is a global leader in computational fluid dynamics (CFD) software. Our mission is to enable our customers to perform revolutionary CFD simulations by creating accurate, versatile, user-friendly software and providing unparalleled support.

Our flagship product, CONVERGE, is an innovative CFD software that eliminates the grid generation bottleneck through autonomous meshing and features a suite of advanced physical models, fully coupled detailed chemistry, and the ability to easily accommodate moving geometries. CONVERGE is revolutionizing the CFD industry and shifting the paradigm toward predictive CFD.

For more information about Convergent Science, please visit convergecf.com.

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