

VeRail Near-Zero Emissions Locomotive Demonstration

Technology Manufacturer
VeRail Technologies, Inc.

Co-Participants

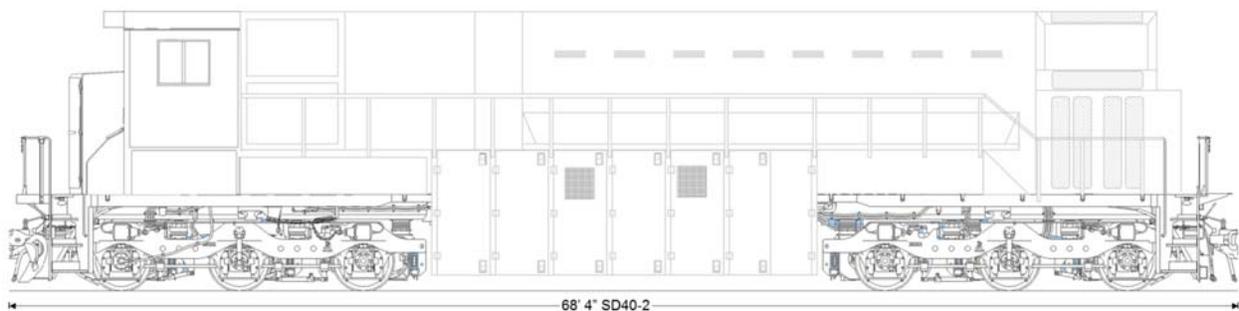
Port of Long Beach, Port of Los Angeles, Pacific Harbor Line, US EPA, Southern California Gas Company

Project Objective

VeRail Technologies, Inc. (VeRail) is developing a locomotive that combines near-zero emissions locomotive engines with onboard compressed natural gas (CNG) fuel storage. This project began at the tail end of 2016 and is currently underway.

Technology Description

VeRail is converting an EMD SD40-2 locomotive into the VeRail VR21C4-nz locomotive, which will be equipped with the VeRail TRI-PACK 1,350 diesel gallon equivalent (DGE) CNG tank system supplying renewable natural gas to four near-zero emissions natural gas engine/generator modules (EnGens). The VeRail locomotive is specifically designed to meet current operating requirements for heavy-duty switching locomotive activities. The VR21C4-nz will undergo a one-year demonstration in Pacific Harbor Line (PHL) operations for at least 3,000 hours as required by the California Air Resources Board (CARB) for verification that the locomotive achieves EPA Tier 4 switcher locomotive engine emission standards and CARB near-zero emission requirements. The engine will also meet the recently proposed ARB EPA Tier 5 locomotive emissions levels. The one-year demonstration will further validate the locomotive's in-use performance, durability, and reliability.



Status

The project is currently in the system design and integration phase. Integration of the core locomotive EnGens is expected to be completed prior to the EPA preliminary emissions testing scheduled for end of October/early November. The full converted locomotive is expected to be delivered to PHL late 2nd quarter 2018 and demonstration of the in-use performance at the end of 2nd quarter 2018/beginning of 3rd quarter 2018.

Early system design work prompted VeRail to drop the original backup diesel gen-sets from the scope of work. VeRail found that by increasing the capacity of the locomotive to run on renewable natural gas, the locomotive could reach near zero emissions without fossil fuel dependence. In addition, the design allowed for VeRail to utilize the longer SD-40-2 frame which can accommodate battery storage. VeRail has redesigned the locomotive to be “battery-ready” for over 2,000 HP in batteries and is considering demonstration of a zero-emission locomotive. Although the additional battery storage component is presently outside the scope of the TAP project, VeRail’s redesign, which includes an FRA crashworthy, high-visibility “road-switcher” cab, is incorporated in the TAP project.

Projected Benefits

The VeRail VR-series locomotive is the first locomotive designed specifically to meet CARB’s proposed Tier 5 locomotive emissions standard, which ARB on April 13, 2017 officially petitioned EPA to adopt by 2015, as well as proposed ARB near-zero locomotive emissions levels. The CARB petitioned EPA Tier 5 targets aim for an almost 85% reduction in NO_x (from 1.3 g/bhp-hr of NO_x to 0.2 g/bhp-hr) and PM below current EPA Tier 4 locomotive standards. VeRail VR-series natural gas locomotives are projected to meet near-zero emissions targets for locomotives.

Project Costs

The Ports are contributing \$300,000 each in co-funding to this project with a total project budget of \$4,443,801.

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