MBTA HSP46 Locomotive Procurement

THE HSP46 IS A "NEXT-GENERATION" LOCOMOTIVE THAT WILL ALLEVIATE SERVICE PROBLEMS AND REDUCE CARBON EMISSIONS AND FUEL COSTS FOR THE MBTA.

LOCATION
BOSTON, MA

CLIENT
MBTA

CONSTRUCTION COST
$215 MILLION

SIZE
40 LOCOMOTIVES

Along commuter rail lines that range beyond the New Hampshire and Rhode Island state borders, and as far west as Worcester, MBTA commuter rail failures have become common and especially difficult during harsh New England winters. Cold-weary passengers are finding relief through the introduction of the HSP46, a duel-powered locomotive that is augmenting reliability while cutting down the carbon footprint of one the largest American transit agencies. STV has managed the closely watched project since 2010 and achieved a glowing success record, all while coordinating key vendors in two states and handling a scope that has doubled in size.

Most of the failing locomotives are F- and GP-series models from the 1970s and 1980s that are too old and too difficult to maintain. The HSP46 will replace those vehicles, eliminating commuter frustration while offering significant technological upgrades that save time and labor expenses for the authority's private operator, Keolis Commuter Services.

Powered by a General Electric (GE) GEVO-12, 4,600-hp engine, the HSP46 is capable of traveling 90 mph and pulling 10-car consists, a major speed and capacity increase. A hybrid, the GEVO engine is also cleaner and more efficient. It complies with U.S. Environmental Protection Agency (EPA) Tier 3 standards and can reduce the MBTA's diesel fuel consumption by 1,730,000 gallons, saving around $5.2 million a year. An individual-axle AC propulsion system and cab-mounted vehicle-level diagnostic system add even more value by making the vehicle easier to control and maintain.

STV, as the prime engineering consultant and project manager, has driven all of the innovations and exceeded expectations. The firm

has developed the commercial and technical specifications, reviewed bids, and overseen the engineering, inspection, and testing of the vehicles as they roll off MotivePower, Inc. (MPI) assembly lines in Boise, ID. A full-time inspector is stationed at the factory while other Boston- and Philadelphia-based vehicles specialists have overseen subconsultants and factory workers during periodic visits to the GE plant in Erie, PA, and other vendor locations. General work has involved structural, electrical, and mechanical experts administering a QC process with design submittal reviews, test witnessing, and inspecting.

The firm's specialized technical oversight has been particularly critical with the HSP46 because it's the first time that MPI has integrated GE engines, traction motors, engine control systems, inverters, and main generators into their trains. The challenge for STV has been making sure that assembly workers in Idaho follow an official system integration plan that the firm developed to ensure different vehicle, system, and subsystems built in Pennsylvania or elsewhere interface properly to MPI's carbody and trucks. Under STV's leadership, the complex process has encountered few flaws, even as the project has grown larger. As the first 20 locomotives started to take shape, the firm received a series of "Excellent" ratings from the MBTA Design and Construction Directorate's biannual review process in the areas of administration, scheduling, technical competence, and financial management. Although service delays continued to hamper commuter rail service, excitement over STV's work grew and the MBTA exercised two contract options, the first for an additional 7 vehicles, followed by 13 more.

In early 2013, after 3 years of production, STV released three pilots, shipping one to the MBTA Commuter Rail Maintenance Facility in Somerville, MA; one to GE's test facility in Erie, PA; and one to the TTA Test Facility in Pueblo, CO. The firm has overseen vehicle dynamics, EMI, braking, and acceleration testing in anticipation of a gradual introduction into revenue service, which started in 2014 and is expected to continue until early 2017.