Port of Baltimore Strategic Acquisition of Battery Electric Locomotives Project

Application to the FY22 Federal Railroad Administration ("FRA")
Consolidated Rail Infrastructure and Safety Improvements ("CRISI") Program

December 2022

Submitted by:

Maryland Department of Transportation
Wabtec Corporation

Cover Page

Project Title	Port of Baltimore Strategic Acquisition of Battery Electric Locomotives Project
Applicant	Maryland Department of Transportation ("MDOT") Co-Applicant: CSX Transportation ("CSX") Co-Applicant: Wabtec Corporation ("Wabtec")
Federal Funding Requested Under this NOFO	$11,584,317
Proposed Non-Federal Match	$11,584,317 In-Kind
Does some or all of the proposed Non-Federal Match for the total Project cost consist of preliminary engineering costs associated with a Highway-rail Grade Crossing Improvement Project or a trespassing prevention Project incurred before Project selection?	No
Other Sources of Federal funding, if applicable	N/A
Total Project Cost	$23,168,635
Was a Federal grant application previously submitted for this Project?	No
If yes, state the name of the Federal grant program and title of the Project in the previous application.	N/A
City(ies), State(s) Where the Project is Located	Baltimore, Maryland
Congressional District(s) Where the Project is Located	MD-7
Is this a Project eligible under 49 U.S.C. 22907(c)(2) that supports the development of new intercity passenger rail service	No

routes including alignments for existing routes?	
Is this a Rural Project? What percentage of the Project cost is based in a Rural Area?	No
Is this a Project eligible under 49 U.S.C. 22907(c)(11) that supports the development and implementation of measures to prevent trespassing and reduce associated injuries and fatalities?	No
If YES to the previous question, is this Project located in a county with the most pedestrian trespasser casualties as identified in the Federal Railroad Administration's National Strategy to Prevent Trespassing on Railroad Property?	N/A
Is the application seeking consideration for funding under the Maglev Grants Program?	No
Is the Project currently programmed in the: State Rail Plan, State Freight Plan, TIP, STIP, MPO Long Range Transportation Plan, State Long Range Transportation Plan?	Yes, MDOT's State Rail Plan

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Project Summary

Maryland Department of Transportation ("MDOT") in partnership with CSX Transportation ("CSX") and Wabtec Corporation ("Wabtec") are requesting $11,584,317 in FY 2022 Consolidated Rail Infrastructure and Safety Improvements ("CRISI") funding for the Port of Baltimore Strategic Acquisition of Battery Electric Locomotives Project ("the Project"). The Project will replace three older, non-regulated emission diesel-electric switching locomotives with three new battery electric locomotives and one battery charger at the MDOT-owned Port of Baltimore. This Project would result in significant environmental and health benefits, including benefits to the surrounding environmental justice community, while maintaining supply chain fluidity at one of the nation's busiest seaports. CSX will operate and own the battery electric locomotives within its Curtis Bay Piers terminal at the Port and will provide a 50 percent match of non-Federal private sector funding for the $23,168,635 Project. This Project would be the first use of zero-exhaust emission battery electric locomotives at an East Coast Port in the United States.

In alignment with the Port of Baltimore's objectives to offset environmental impacts from port operations, MDOT has identified the need to upgrade the locomotives used at Curtis Bay with a zero-exhaust emissions model. By replacing the three older, non-regulated diesel-electric switching locomotives currently used at the terminal with three zero-exhaust emission battery electric locomotives and one battery charger, the Project would result in the following annual emissions savings: 1,530 metric tons of CO_2, 71 metric tons of NOx, and 3.43 metric tons of $PM_{2.5}$; additionally, locomotive noise will be reduced by 70%. The estimated reduction in emissions achieved by the Project exceeds federal Environmental Protection Agency ("EPA") emission standards stated in 40 CFR Part 1039 – reducing pollution and increasing energy efficiency to promote climate resilience. This Project will achieve Port and Federal sustainability goals while also imparting significant benefits to the surrounding communities and rail customers in the form of long-term gains in transportation safety, reliability, and efficiency and increased quality of life in the region. The Net Present Value ("NPV") for the Project is $13.648 million, with discounting and the Benefit-Cost Ratio is 1.976.

Project Funding

The total estimated cost of the Project is $23,168,635. MDOT is requesting Federal CRISI funding for up to 50% of the total Project cost, not to exceed $11,584,317. MDOT will match the CRISI funding with a 50% Non-Federal contribution of $11,584,317 in private sector funding to be provided by CSX. Any additional expense required beyond that provided in this grant to complete the Project shall be borne by MDOT, as the Grantee. Appendix 1 contains a letter of funding commitment from CSX confirming its financial contribution to the Project.

Table 1: Project Funding

Task No.	Task Name/Project Component	Cost	Percentage of Total Cost
1	Detailed Project Work Plan, Budget, and Schedule	$0	0%
2	Replace three non-regulated diesel-electric locomotives with battery electric locomotives	$23,168,635	100%
3	Final Performance Report and Project Administration	$0	0%
Total Project Cost		$23,168,635	100%
Federal Funds Received from Previous Grant		$0	$0
Federal Funding Under this NOFO Request		$11,584,317	50%
Non-Federal Funding/Match		Cash: In-Kind: $11,584,317	50%
Portion of Non-Federal Funding from the Private Sector Please list amounts per source.		$11,584,317	50%
Portion of Total Project Costs Spent in a Rural Area		$0	0%
Pending Federal Funding Requests		N/A	

Applicant Eligibility

The applicant, Maryland Department of Transportation ("MDOT"), represents the State of Maryland and is able and eligible to receive federal funds. MDOT meets the applicant eligibility criteria described in the Notice of Funding Opportunity ("NOFO") for Consolidated Rail Infrastructure and Safety Improvements ("CRISI") (87 Fed. Reg. 54278 [September 2, 2022]) as a public agency or publicly chartered authority established by one or more States.

The first co-applicant, CSX Transportation ("CSX"), is a leading supplier of rail-based freight transportation in North America. CSX meets the co-applicant eligibility criteria described in the Notice of Funding Opportunity ("NOFO") for Consolidated Rail Infrastructure and Safety Improvements ("CRISI") (87 Fed. Reg. 54278 [September 2, 2022]) as a rail carrier.

The second co-applicant, Wabtec Corporation ("Wabtec"), is a rail original equipment manufacturer headquartered in Pittsburgh, Pennsylvania. Wabtec meets the co-applicant eligibility criteria described in the Notice of Funding Opportunity ("NOFO") for Consolidated Rail Infrastructure and Safety Improvements ("CRISI") (87 Fed. Reg. 54278 [September 2, 2022]) as a rail equipment manufacturer.

The point of contact for this application is: John Thomas, Assistant Director, Office of Planning and Capital Programming, Maryland Department of Transportation, 410-865-1332 – office, jthomas33@mdot.state.md.us

Project Eligibility

The Project is eligible under the CRISI Program under the eligibility for the "Rehabilitating, remanufacturing, procuring, or overhauling locomotives, provided that such activities result in a significant reduction of emissions." That eligibility is defined in Section C(3)(A)(xvi) of the Notice of Funding Opportunity ("NOFO"), document 2022-19004. Considering that the locomotives currently used at the terminal have operated for more than 50 years, a procurement of modern replacement locomotives equipped with newer, more energy efficient technology will significantly reduce emissions, provide substantial operational savings, and improve the health of the surrounding community.

Detailed Project Description

Project Background and Challenges

MDOT MPA provides oversight, planning, and administration of the Port of Baltimore. The Port of Baltimore is one the busiest seaports in the nation and offers the deepest harbor in Maryland's Chesapeake Bay. (Refer to Appendix 5 for a Project location map.) In 2020, the Port's public terminals handled 632,307 containers from various industries[1]. With respect to Maryland's economy, the Port of Baltimore generates nearly $3.3 billion in total personal income and supports 15,330 direct jobs and 139,180 jobs connected to Port work. The Port also generates more than $395 million in taxes and $2.6 billion in business income. It serves over 50 ocean carriers making nearly 1,800 annual visits.

Railroads are an essential freight carrier at the Port of Baltimore, with a long railroad history dating back to when most of the piers were built and operated by the Pennsylvania Railroad, the Western Maryland Railway, and the Baltimore and Ohio Railroad. Two "Class I" railroads and one short line currently serve the port. Norfolk Southern and CSX provide service to most of the states east of the Mississippi River and interchange with connecting railroads that serve the western part of the United States, Mexico, and Canada. The Canton Railroad provides switching service to private facilities located in the port area. Connecting with Maryland railroads gives Port customers an opportunity to use one of the most efficient, affordable, and environmentally responsible freight systems for the movement of international cargo.

The Curtis Bay Piers at the Port of Baltimore is strategically located on the U.S. rail network and the Chesapeake Bay. It primarily handles coal from the Northern Appalachian coal region (NAPP) but has also successfully handled coal from other regions as well, including Central Appalachian (CAPP), Illinois Basin (ILB), Southern Appalachian (SAPP), Colorado and Powder

[1] Maryland State Administration

River Basins (PRB). The facility has a rated and demonstrated capacity of 14 million tons of coal throughput annually with room to grow. This location is not only a large export terminal at the Port contributing to the U.S. supply chain, but Curtis Bay is also bustling community housing over 5,237 people[2]. According to the USDOT Transportation Disadvantaged Census Tracts this location is affected by the following disadvantaged indicators: historic community, transportation, health, economy, equity, and environmental stressors[3]. Currently the diesel locomotives running at Curtis Bay Piers operate on an 8-hour shift schedule with volume dictating production operation. However, even when not in production operation, these units rest in idle 24 hours a day, 7 days a week resulting in ~8,000 hours of annual run time for each locomotive. These engines are essential to Port operations, thus replacing them with modern, innovative technology is crucial to lessening the environmental impact.

Addressing Climate Change and Sustainability

MDOT's mission is to be "a customer-driven leader that delivers safe, sustainable, intelligent, and exceptional transportation solutions in order to connect our customers to life's opportunities." To support the health and well-being of the Baltimore community and improve the safety and efficiency of the vital Curtis Bay Piers site, MDOT has identified the need to upgrade the railroad locomotives used in Curtis Bay. Since 2019, the Port has been actively pursuing a program to repower marine engines and upgrade diesel dray trucks and equipment for moving cargo with newer low-emission or zero-emission models. This Project builds on these successful efforts and fulfills several states, federal, and industry objectives to reduce greenhouse gas emissions and address climate change impacts. These objectives include:

State of Maryland's Climate Solutions Now Act. In 2022, the State of Maryland passed the Climate Solutions Now Act,[4] which contains the most aggressive greenhouse gas reduction goals of any state in the U.S. The targets include reducing statewide greenhouse gas emissions by 60% from 2006 levels by 2031 and achieving net-zero emissions by 2045. The legislation updated state emission reduction targets previously established in the Greenhouse Gas Reduction Acts of 2009 and 2016. The 2009 act established a statewide greenhouse gas emission reduction goal of 25% from 2006 levels by 2020, a goal that the state not only fulfilled but surpassed, achieving a 30% reduction.[5] The new targets in the 2022 act were established in response to recent scientific data indicating that more stringent standards are necessary to combat climate change. This legislation will drive rapid emissions reductions in the State and, has the potential to energize the economy and increase the state's global competitiveness as the world also shifts toward a rapid, equitable, and affordable clean energy transition. In response to the new state law, Maryland Department of the Environment ("MDE") will be tasked

[2] US Census Bureau
[3] Transportation Disadvantaged Census Tracts (Historically Disadvantaged Communities)
[4] Maryland General Assembly, Climate Solutions Now Act of 2022
[5] Reducing Greenhouse Gas Emissions in Maryland, September 2022

with developing strategies to reduce greenhouse gas emissions and co-pollutants and build climate equity and resilience within disproportionately affected communities.

The act also includes an environmental justice component that calls for the development of (1) a methodology for identifying communities disproportionately affected by climate impacts; (2) specific strategies to address geographical impact concerns, reduce greenhouse gas emissions and co-pollutants, and build climate equity and resilience within disproportionately affected communities; and (3) goals for the percentage of state funding for greenhouse gas emission reduction measures that should be used to benefit disproportionately affected communities.

Maryland Department of Transportation Sustainability Objectives. This Project is in direct alignment with a variety of Maryland DOT's objectives to "implement initiatives to reduce fossil fuel consumption, mitigate greenhouse gases, and improve air quality." Maryland's Port of Baltimore is actively working to reduce diesel emissions, manage stormwater in a responsible manner, become more energy efficient, and offset environmental impacts from port operations with green Projects that meet stewardship goals and provide community economic and environmental health benefits. In addition, MDOT is also planning for the resilience of the state's transportation system as it responds to the growing impacts of climate change through vulnerability assessments and the incorporation of climate and sea level considerations into its planning processes and construction practices.

Maryland's Air Quality Planning Program and Climate Change Program. MDE administers the state's Air Quality Planning Program,[6] which establishes state implementation plans and regulations to reduce emissions and achieve the National Ambient Air Quality Standards for six "criteria" air pollutants: ground-level ozone, particulate matter, lead, carbon monoxide, nitrogen dioxide, and sulfur dioxide. The program's Planning and Policy Division develops state implementation plans, inventories, and related reports that document how the state will attain and maintain the National Ambient Air Quality Standards and prevent significant deterioration of air quality in areas cleaner than the standards.

MDE also implements a Climate Change Program,[7] which oversees the development and implementation of the state's plan for reducing greenhouse gas emissions and conducts the state's greenhouse gas emissions inventory. This program also ensures the state complies with climate change related state and federal laws. Under the program, MDE staff also support the Maryland Commission on Climate Change, the Carbon Markets and Trees Commission, the Buildings Energy Transition Task Force, the Building Energy Performance Regulations process, and manage Maryland's membership in the Regional Greenhouse Gas Initiative and the U.S. Climate Alliance.

[6] Maryland Department of the Environment, Air Quality Planning Program
[7] Maryland Department of the Environment, Climate Change Program

Air Quality Attainment. This Project aligns with federal requirements for regional transportation conformity of designated nonattainment and maintenance areas (areas of the Baltimore region have been designated by the EPA as nonattainment areas for ozone and sulfur dioxide) by implementing a Project that will not hinder the area from reaching and maintaining its attainment goals.

Executive Order 14008: Tackling the Climate Crisis at Home and Abroad. On January 27, 2021, President Joe Biden issues Executive Order 14008 to address the climate crisis in the U.S. and abroad while creating good-paying union jobs and equitable clean energy future, building modern and sustainable infrastructure, restoring scientific integrity and evidence-based policymaking across the federal government, and re-establishing the President's Council of Advisors on Science and Technology.[8] Section 223 of the order created a government-wide Justice40 Initiative with the goal of delivering 40 percent of the overall benefits of relevant federal investments to disadvantaged communities. and tracks performance toward that goal through the establishment of an Environmental Justice Scorecard. In July 2021, the Chair of the Council on Environmental Quality, the Director of the Office of Management and Budget, and the National Climate Advisor issued Interim Implementation Guidance for the Justice40 Initiative,[9] which identified federal grant programs as a "covered investment" that falls within the scope of the Justice40 initiative. The guidance further identified investments that achieve a reduction of greenhouse gas ("GHG") emissions and local air pollutants in disadvantaged communities as a benefit that generates a positive impact under the initiative.

FRA Industry Climate Challenge. In April 2022, FRA called on U.S. railroad owners, operators, and manufacturers of rail equipment to join the agency's commitment to reach net-zero greenhouse gas emissions in the rail industry and rail transportation by 2050.[10] Achieving this target will contribute to FRA's key goals of building a safe, efficient, and modern transportation system that will expand economic opportunities, create cleaner and safer communities, and help avert the worst effects of climate change.

CSX Environmental, Social, and Governance Objectives. CSX Transportation's 2021 Environmental, Social, and Governance report[11] discusses the objectives and actions taken to establish CSX's environmental leadership as it works to position rail as the most sustainable mode of freight transportation. Since 2007, CSX has established and achieved successive greenhouse gas emission reduction goals. From 2014 through 2021, CSX improved fuel efficiency by 15.34%, an emissions intensity reduction of 15.6%, and piloted alternative fuels and engine enhancements to reduce fuel burn and overall emissions from locomotives. After

[8] White House Fact Sheet: Biden Takes Executive Actions to Tackle the Climate Crisis at Home and Aboard, Create Jobs, and Restore Scientific Integrity Across Federal Government
[9] Executive Office of the President: Interim Implementation Guidance for the Justice40 Initiative
[10] Federal Railroad Administration Announces Climate Challenge to Meet Net-Zero Greenhouse Gas Emissions by 2050
[11] 2021 CSX Transportation Environmental, Social, and Governance Report

achieving its 2020 environmental targets, CSX introduced Science-Based Target Initiative ("SBTi") 2030 goals to guide its climate efforts. These include:

- Reduce carbon intensity by 37.3% against a 2014 baseline.
- Increase the company's use of renewable energy to 50% of the Scope 2 footprint
- Expand efforts to engage the supply chain through evaluation of GHG quantification, ESG goals, and evaluation of risks and opportunities

Project Expected Outcomes and Benefits

By replacing the three older, non-regulated diesel-electric locomotives used at the Curtis Bay Piers terminal with three new zero-exhaust emission battery electric locomotives and one battery charger, the Project will result in enhanced safety, reliability, reduced environmental emissions, and reduced noise pollution. Employees that work at the terminal, shippers served by the Port of Baltimore, and the general population of Baltimore will benefit significantly from the transition to newer zero-exhaust emission locomotives. Annually, this Project would result in the following emissions savings: 1,530 metric tons of CO_2, 71 metric tons of NOx, and 3.43 metric tons of $PM_{2.5}$. Additionally, the locomotive noise will be reduced by approximately 70%.

The Port of Baltimore Strategic Acquisition of Battery Electric Locomotives Project is directly aligned with initiatives and goals established by Project stakeholders discussed above. The Project exceeds the EPA's emission standards stated in 40 CFR Part 1039.

In addition to environmental benefits, the Project provides significant benefits to the communities and rail users it serves in the form of long-term safety, efficiency, and reliability of rail transportation and increased quality of life in the region. It is understood that the Project aligns with the President's greenhouse gas goals, promotes energy efficiency, increases climate resilience, and reduces pollution which will impart significant benefits to the rail users, communities, and regions it serves. The Project's monetized benefits will be fully realized in the historically disadvantaged community where the Port terminal is located, directly supporting a stated FRA objective in the CRISI Program NOFO to fund Projects that target at least 40% of benefits toward low-income or disadvantaged communities, as part of the implementation of Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad" (86 FR 7619).

Project Users & Beneficiaries

Table 2: Project Users & Beneficiaries

Project User	Direct Benefits
Maryland Department of Transportation	Sustains operations and maintains customer access to one of the top 25 ports in the United States, generating continued economic benefits for the state and the region while improving air quality and sustainability.
Maryland Port Administration	Maintain operations and supply chain fluidity at the Port of Baltimore while achieving state and Federal environmental goals.
Local Residents	Community health, well-being, and quality of life will be improved resulting from lower emissions and lower noise levels at the Port terminal. Improving the health and well-being of the surrounding community is a top priority for all Project stakeholders.
CSX Transportation	Increased efficiency; lower operating costs; transition toward greener and cleaner operations; and improved reliability from the acquisition of new locomotives to replace existing older equipment.
Shippers and Industry	Higher reliability when shipping goods, in particular shipments of U.S. exports destined to global markets. Continued use of rail transportation to lower costs, lower emissions, and maintain economic competitiveness.

Project Components

This Project is made up of 3 main components:

1. FLXswitch battery electric locomotives, shown in Figure 1 below;
2. the charger; and
3. the electrical infrastructure to support charging.

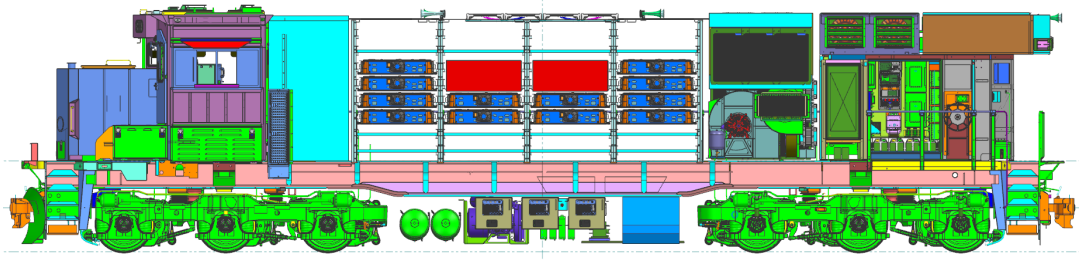

Figure 1: FLXswitch Battery Electric Locomotive

The FLXswitch is an innovative approach to using the latest high density Nickel Manganese Cobalt batteries for energy storage to eliminate fuel consumption and reduce noise pollution in yard operations. The FLXswitch is also a concept for a zero-emissions locomotive that can provide sufficient horsepower to replace diesel equivalent locomotives in a rail yard. Application expertise is critical for this type of technology and led Wabtec to collaborate with General Motors ("GM") to leverage their advanced Ultium Battery Technology for our

ruggedized rail environments. The Ultium Batteries will be manufactured in North America and designed to handle the environmental, space and weight considerations for rail application, while maintaining performance, durability, reliability, maintainability, and safe operation of the locomotive. The specific components and deliverables for this Project are detailed in Appendix 2. Wabtec provided a Proposal for the project components detailed in Appendix 7.

Project Support

In addition to the alignment with the established state rail plan, the proposed Project has pronounced support from political entities, local and regional stakeholders, businesses, and economic development authorities. These letters are attached in Appendices 1 and 4, and include the following: CSX Transportation, and Wabtec Corporation.

Project Performance Measures

Upon Project completion, MDOT will submit reports comparing the Actual Project Performance of the new and or improved asset(s) against the Pre-Project (Baseline) Performance and Expected Post-Project Performance. MDOT will submit the performance measures report to the Regional Manager in accordance with Table 3 below. Refer to Appendix 2 (the Statement of Work): Attachment 4.

Table 3: Performance Measurement

<table>
<tr><th>Performance Measure</th><th>Description of Measure</th><th>Measurement</th><th>Reporting</th></tr>
<tr><td rowspan="3">Replace three diesel-electric locomotives with Wabtec FLXswitch battery electric locomotives</td><td rowspan="3">Replace three diesel-electric locomotives with Wabtec FLXswitch battery electric locomotives</td><td rowspan="2">Pre-Project (Baseline) Performance as of November 1, 2022: Port of Baltimore has older switcher locomotives serving the Curtis Bay Piers. CSX currently owns and operates zero battery electric locomotives at the Port of Baltimore.</td><td>Actual Project Performance After Project Completion: Comparison of actual performance of asset(s) versus the baseline and expected post-Project performance.</td></tr>
<tr><td>Frequency: Annual</td></tr>
<tr><td>Expected Post-Project Performance: Port of Baltimore has three Wabtec FLXswitch battery electric locomotives operational at the Curtis Bay Piers, owned and operated by CSX.</td><td>Duration: For three years after the Project Performance Period end date.</td></tr>
</table>

Project Location

The Project is located at the Port of Baltimore's Curtis Bay Piers in Baltimore, Maryland, a deep-water port terminal located on the west side of Curtis Bay cove. The Port terminal is located in Congressional District 07 near its border with Congressional District 03 (as seen in the inset to the map below). Both districts serve parts of the City of Baltimore. The zero-exhaust emission locomotives to be acquired by the Project will operate approximately within Curtis Bay Piers terminal, however, the locomotives may also perform local operations up to 50 miles away from the facility.

The Curtis Bay neighborhood bordering the Port is a residential community housing over 5,237 people. The Project Location is within a Historically Disadvantaged Community (Census Tract 2505) that is affected by the following disadvantaged indicators: historic community, transportation, health, economy, equity, and environmental stressors. Specific details are provided below in Figure 2 and in Appendix 5. The terminal and its piers are represented by location numbers 37 and 38 in the map below identifying Port of Baltimore facilities.

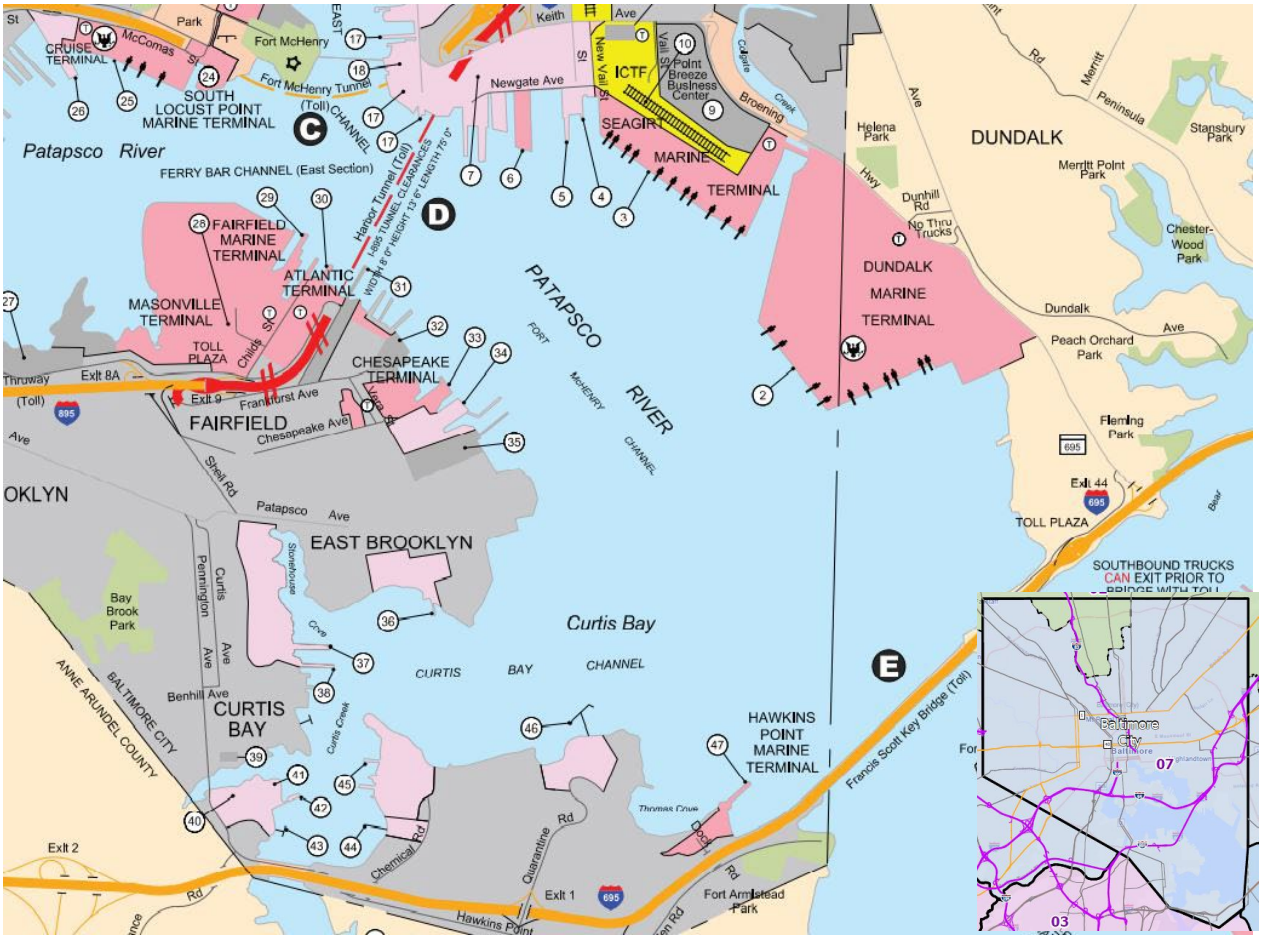

Figure 2: Project Location Map

Evaluation and Selection Criteria

Evaluation Criteria

The Project meets all of the evaluation criteria specified in Section E of the NOFO, as discussed below. The cost effectiveness of the Port of Baltimore Strategic Acquisition of Battery Electric Locomotives Project was measured by conducting a Benefit-Cost Analysis ("BCA") to monetize benefits generated under the benefit categories established by U.S. DOT and identified in the document "Benefit-Cost Analysis Guidance for Discretionary Grant Programs" dated March 2022. Three major types of environmental benefits provided by this Project include reduced NO_x emissions, reduced $PM_{2.5}$ emissions, and reduced CO_2 emissions. Additional savings will be realized from a reduction in operating costs, including the elimination of diesel fuel purchases and the avoidance of a 15-year overhaul of the existing locomotives. Table 4 summarizes the monetized benefits of the Project (in 2020$ discounted at 3% for CO_2 benefits and 7% for all other benefits).

Table 4: Summary of Monetized Benefits at Discount Rate (2020$ in millions)

Benefit	NO_x Savings	$PM_{2.5}$ Savings	CO_2 Savings	Fuel Savings	Engine Overhaul Savings	Residual Value	Total Benefits
Amount	$9.5	$11.1	$1.3	$4.3	$0.1	$1.1	$27.5

The analysis period of the Project extends for a 22-year period that includes 20 years of operation from 2026 through 2045. During the analysis period, each locomotive was estimated to operate an average of 334 days per year. The remaining value of the locomotives' estimated 35-year useful life beyond the BCA-prescribed analysis period is accounted for as Residual Value in the BCA benefits shown above.

Table 5 below presents a summary of key financial metrics, which considers all monetized benefits and costs (capital and operating). The NPV for the Project is $13.648 million, with discounting. The Project will yield $27.5 million in net public benefits, or $1.97 for every dollar spent (with all calculations discounted at 3% for CO_2 benefits and 7% for all other values). This analysis is provided in full as Appendix 3. Please refer to this document for more detailed information.

Table 5: Summary of Key Financial Metrics at Discount Rate (2020$ in millions)

Total Benefits	Total Costs	Net Present Value	Benefit Cost Ratio	Discounted Payback Period
$27.5	$13.9	$13.648	1.976	6.93 years

The Project will replace three existing locomotives with three new locomotives, ensuring that CSX can meet existing and anticipated demand and maintain supply chain fluidity at the Port.

In addition to environmental benefits, the Project provides significant benefits to the communities and rail users it serves in the form of long-term safety, decreased air emissions,

efficiency, reliability of rail transportation, and increased quality of life in the region. It is understood that the Project aligns with the President's GHG goals, promotes energy efficiency, increases climate resilience, and reduces pollution which will impart significant benefits to the rail users, communities, and regions it serves.

The Project's monetized benefits will be fully realized in the historically disadvantaged community where the Port terminal is located, directly supporting a stated FRA objective in the CRISI Program NOFO to fund Projects that target at least 40% of benefits toward low-income or disadvantaged communities, as part of the implementation of Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad" (86 FR 7619).

Technical Merit

Project Components Appropriate to Achieve Outcomes. The Project involves the replacement of three older, non-regulated diesel-electric switching locomotives with three Wabtec FLXswitch battery electric locomotives, and the installation of locomotive charging infrastructure and connections to receive electricity at the charging station. The tasks described in the SOW clearly identified the proposed actions and specific deliverables for successful Project implementation.

Strong Project Readiness. As described previously, the Project meets the eligibility requirements and is ready for implementation following announcement of grant award and contracting. This Project is immediately shovel ready. All necessary planning, preliminary engineering ("PE") and National Environmental Policy Act ("NEPA") have been completed or are underway. A Categorical Exclusion is anticipated under 23 CFR 771.116 (c) 18.

Experienced Personnel. MDOT has extensive experience Project-managing and executing grants like the proposed scope of work in this grant application. This Project will be overseen by the same team of MDOT MPA personnel who are managing the Howard Street Tunnel Infrastructure for Rebuilding American ("INFRA") grant award from FRA, to help ensure consistent and efficient Project delivery. CSX has been operating port terminal facilities in the Baltimore area for over 140 years. Wabtec, as the supplier of this Project, has been a leading U.S.-based rail supplier for over 150 years. With more than 23,000 locomotives in its global installed base, Wabtec moves more than 20% of the world's freight in over 100 countries. Thus, the combined experience through the Project partners sets this Project up for success.

Private Sector Participation. MDOT is committed to funding 50% of the Project cost through private financing. MDOT and CSX will maintain the Project assets during and following Project implementation. Appendix 1 contains a letter of funding commitment from CSX confirming their 50% contribution of the Project cost.

Ability to Complete the Project. MDOT and CSX have the legal, financial, and technical capacity to carry out the Project and the capability and willingness to maintain facilities upon

Project completion. Project activities will be carried out on CSX property at the Port and no additional agreements are required to implement the Project.

MDOT MPA is currently working with FRA and CSX on the Howard Street Tunnel Project, which received a $125 million INFRA grant award from FRA. The Howard Street Tunnel Project will enable the operation of industry-standard, double-stacked intermodal trains along CSX's Interstate 95 rail corridor between Baltimore and Philadelphia by improving clearances at the Howard Street Tunnel in Baltimore and at 22 other locations where obstructions exist. This INFRA-funded Project will enhance productivity at the Port of Baltimore, build additional resiliency into CSX's rail network, and improve freight rail performance and capability in the mid-Atlantic corridor. Refer to the Project Implementation and Management section of this narrative for additional information about each applicant's expertise and experience.

Innovative Project Delivery. This Project would be the first use of zero-exhaust emission battery electric locomotives at an East Coast Port in the United States. As previously stated, the FLXswitch is a zero-emissions locomotive that can provide sufficient horsepower to replace diesel equivalent locomotives in a rail yard. Application expertise is critical for this type of technology and led Wabtec to collaborate with General Motors ("GM") to leverage their advanced Ultium Battery Technology for our ruggedized rail environments. The batteries used for the Project will be manufactured in North America and designed to handle the environmental, space and weight considerations for rail application, while maintaining performance, durability, reliability, maintainability, and safe operation of the locomotive.

Consistent with U.S. DOT Planning Guidance and Documents. The Project directly supports a goal in the 2022 Maryland State Rail Plan to deliver sustainable transportation infrastructure, a plan that was prepared by MDOT consistent with planning and guidance documents set for by U.S. DOT, including those required by law or state rail plans developed under Title 49, United States Code, Chapter 227. The Project also supports sustainability and economic goals established in the Maryland long-range transportation plan. Refer to the Planning Readiness section of this narrative for more information on each plan.

Selection Criteria

Federal Share Not More Than 50 Percent. The proposed Federal share of the total Project costs is 50% ($11,584,317). MDOT will match the CRISI funding with a 50% Non-Federal contribution of $11,584,317 in private sector funding to be provided by CSX. See Appendix 1 for CSX's Letter of Funding Commitment.

Net Benefits Maximized. The Project is cost-effective and will generate $27.5 million in public benefits, or $1.97 in public benefits for every dollar spent (discounted at 3% for CO_2 benefits and 7% for all other values). Table 5 presents a summary of the key financial metrics, which considers all monetized benefits (user as well as non-user) and costs (capital as well as operating and maintenance costs) in addition to the Project's benefits.

Supports U.S. DOT Strategic Goals

The Port of Baltimore Strategic Acquisition of the Battery Electric Locomotives Project satisfies the U.S. DOT Strategic Goals as discussed below:

Safety

The current switchers operating at the Curtis Bay Piers terminal are older, non-regulated diesel-electric locomotives that were manufactured over 50 years ago. By replacing the current locomotives with innovative, newer technology, the locomotives will utilize modern technology designed to support the safety and well-being of all Users. These locomotives will primarily run in the yard supporting switching operation to deliver/receive freight from the Port of Baltimore.

In alignment with this Project, CSX has a focus on safety, service, and efficiency. CSX is expected to maintain a safe and secure network by shareholders, customers, employees, and communities. Protecting the safety of CSX's employees and the communities that reside in the vicinity of operations through the maintenance of effective management systems, training, developing a culture of safety and minimizing disturbances from noise, vibration, and land use.

CSX proudly achieved industry-leading safety performance in 2021, due to a strong safety culture grounded in a shared sense of ownership and accountability. CSX's focus was steadfast on maintaining critical rules compliance while enhancing technologies, training and awareness programs that reinforce positive safety behaviors throughout the organization.

Daily safety performance is tracked by the CSX Public Safety, Health and Environment (PSH&E) Management System and informed by major elements of ISO 14001. In addition to ongoing outreach and awareness campaigns, trainings and rigorous emergency preparedness practices throughout the year, CSX conducts a comprehensive industry risk assessment on an annual basis in partnership with the Association of American Railroads ("AAR").

This Project will have the added benefit of utilizing zero-exhaust emission locomotives which will positively impact CSX employees and the surrounding community; further reducing the cumulative impact of mobile transportation sources. CSX will continue harnessing technology and innovate for safety.

Equitable Economic Strength and Improving Core Assets

Infrastructure Investment and Job Creation. This Project directly aligns with the Infrastructure Investment and Job Creation objective for three key reasons:

1. It drives further investment in the economy through the Port of Baltimore;
2. It directly supports quality domestic manufacturing jobs by working with Wabtec; and
3. It supports the health and well-being of local rail workers in Curtis Bay.

With respect to Maryland's economy, the Port of Baltimore generates nearly $3.3 billion in total personal income and supports 15,330 direct jobs, including jobs with railroads and terminal operators, and 139,180 jobs connected to Port work. According to the Port's latest economic

impact report, the average annual salary of a direct job holder at the Port of Baltimore is 9.5% higher than the average annual wage for employees in the state of Maryland.[12] Thus, the continuous and efficient operations of the Port of Baltimore is essential to job creation.

Secondly, this Project directly supports domestic manufacturing jobs at Wabtec, a global leader and manufacturer of technologically advanced locomotives. Wabtec is collaborating with MDOT to support the delivery of the 3 FLXswitch battery electric locomotives and 1 locomotive charger. CSX will operate and own the FLXswitch battery electric locomotives within its Curtis Bay Piers terminal. Headquartered in Pittsburgh, Wabtec operates in over 50 countries with 25,000 employees worldwide, including over 11,000 in the U.S.

Drawing on over 150 years of experience as a railroad supplier, Wabtec is leading the way in manufacturing of battery electric locomotives. Developing a FLXswitch battery electric locomotive begins with the manufacturing of different locomotive components. The main sites locomotive components will be manufactured include Germantown, Maryland, Erie, Pennsylvania, and a variety of other sites.

Additionally, Wabtec has partnered with GM, to develop the batteries that will be used in the locomotives serving the Port of Baltimore. GM's experience with battery technology and Wabtec's experience with locomotive technology has allowed them to launch a battery electric locomotive that is purposely designed for safe and reliable operation in yard and terminal applications. At GM's site in Grand Blanc, MI, GM produces the battery cells that will end up in MDOT's FLXswitch battery electric locomotives. All these locomotive components, including the battery cells, are delivered to Wabtec's Erie Plant, then assembled into a locomotive. After assembly, the locomotive is painted and tested further. Wabtec's 111-year-old locomotive plant in Erie, a breeding ground for rail innovation, is where the first 100% battery electric heavy-haul locomotive was designed and built. Wabtec currently employs over 2,400 in Erie County. Erie is a hard-working, blue-collar town — one that has strong infrastructure assets including rail, ports, and highways to support industrial bases in the U.S. This Project will directly contribute to supporting good-paying manufacturing jobs both in Erie county and throughout the component sites across the United States. Wabtec's union-based workforce in Erie accounts for over 1,300 employees that play a critical role in supporting this Project. This facility is part of United Electrical, Radio and Machine Workers of America Local 506 and 618. To maintain these good-paying manufacturing jobs, Wabtec complies with the following policies: FAR 52.222-26 Equal Opportunity, 52.222-35 Equal Opportunity for Veterans, and FAR 52.222-36 Equal Opportunity for Workers with Disabilities.

Lastly, in addition to supporting domestic manufacturing jobs and investing in one of the largest economic drivers in Maryland, this Project supports the Curtis Bay Piers workforce. Workforce development is one of CSX's key goals. This past year, CSX expanded total rewards

[12] The 2017 Economic Impact of the Port of Baltimore in Maryland

benefits, expanded training capacity, and increased pay for new conductors in training, which helped contribute to three times as many conductors being hired in 2021 than the previous two years combined. Specifically at the Curtis Bay Piers, CSX works with the local community to build a stronger workforce. Furthermore, as part of the delivery of the FLXswitch locomotives and charger, Wabtec will provide a training package to CSX employees that includes hands on training for CSX's operators and maintainers in the state of Maryland and at the Port.

Support Resilient Supply Chains & Economic Opportunity. This Project will maintain the fluidity of a vital supply chain for U.S. exports while lowering its carbon footprint. Rail is 75% more efficient than trucks so the more you can handle by rail, the more trucks stay off the highway. Additionally, this new modern locomotive is expected to be more efficient than the current 50+ year old locomotives operating at Curtis Bay Piers. Thus, this Project is anticipated to reduce congestion and alleviate bottlenecks in the Port of Baltimore.

As one of the largest Ports on the East Coast, reducing congestion within Baltimore is essential to directly supporting shipments. The Port of Baltimore is closer to the Midwest than any other East Coast port and is centrally located in the Northeast Megaregion, the most densely populated area of the United States. With the expansion of the Panama Canal, larger cargo ships from Asia have begun to call on East Coast ports such as Baltimore. This trend is expected to increase, as growing volumes of cargo from Asia arrive at East Coast ports via the Suez Canal, owing to shifts in sourcing from northern China to Southeast Asia. The Port of Baltimore is one of four eastern U.S. ports with a 50-foot shipping channel and a 50-foot container berth, which allows the Port to accommodate some of the largest container ships in the world. In 2019, the Port was ranked first in the nation for handling automobiles, sugar, and gypsum, and second in exporting coal. In 2018, the Port was ranked 13th in the nation for containers.

The Port of Baltimore is one of only five U.S. ports that rank in the top 25 for all three cargo categories (overall cargo, dry bulk, and containerized), according to U.S. DOT data for the year 2020.[13] The Port of Baltimore is also among the top 20 U.S. foreign trade freight gateways by value of shipments. In 2019, the value of foreign cargo handled at the Port was $58.4 billion.

Additionally, this improves the rail network's reliance on fossil fuels. In extreme weather events, stakeholders are faced with limited power resources often impacting the operations of the rail network. To mitigate these risks, MDOT is seeking a 100% battery powered solution. This locomotive is solely reliant on electricity and Wabtec's Charger is IEEE 519 compliant and has been thoroughly tested through Wabtec's engineering process which increases the resiliency of rail infrastructure.

Equity and Barriers to Opportunity

This Project is ambitious in its aim to transform the Curtis Bay community and more broadly the entire U.S. economy. In addition to the environmental and health benefits of the

[13] 2022 Port Performance Freight Statistics Program: Supply-Chain Feature

locomotives once delivered, this Project will drive sustainable manufacturing practices, economic growth, and community benefit. The City of Baltimore has been designated by the EPA as a nonattainment area for ozone and Baltimore County has been designated as a nonattainment area for Sulfur Dioxide. Recognizing the need to improve air quality in the City, MDOT has partnered with industry stakeholders including Wabtec and CSX to implement this Project, which will demonstrate zero emission rail technology and lower greenhouse gas emissions in a nonattainment area.[14] Understanding the importance of the Curtis Bay community, MDOT seeks support for this Project which will mitigate the safety risks and improve quality of life for the Baltimore area.

The Port draws its employees from the region, thus providing direct benefits to communities in and around Baltimore. As noted in its most recent economic impact report, the Port of Baltimore generates $3.3 billion per year in personal income and in 2017 paid $395 million in state, county, and municipal tax revenues.

This Project supports sustainable, good-paying union jobs in two ways: 1) supporting rail employees at the Curtis Bay Piers and 2) supporting sustainable, good-paying manufacturing jobs at Wabtec's union-based manufacturing facility. Additionally, this Project significantly reduces noise produced by locomotives which will further improve the well-being of Baltimore residents.

First, this Project directly impacts the rail employees operating at CSX's Curtis Bay Pier facility. Railroad operating employees at the Curtis Bay Piers are union members represented by National Conference of Firemen & Oilers ("NCFO"), International Brotherhood of Electrical Workers ("IBEW"), Transportation Communications International Union ("TCU"), International Association of Machinists and Aerospace Workers ("IEM"), and Brotherhood of Maintenance of Way Employees Division ("MOW"). Other cargo-handling activities at the Port of Baltimore are carried out by union workers represented by the International Longshoremen's Association and Steamship Trade Association. MDOT and the MPA support the rights of workers to have the free and fair choice to join a union.

Secondly, this Project supports sustainable manufacturing jobs at Wabtec's Erie facility. Wabtec's union-based workforce in Erie accounts for over 1,300 employees that play a critical role in delivering these battery electric locomotives to MDOT's Port of Baltimore. This facility is part of United Electrical, Radio and Machine Workers of America Local 506 and 618. As part of manufacturing this Project, Small Businesses are a critical component of the Sourcing Process at Wabtec. Wabtec has established a Disadvantaged Business Enterprise ("DBE") Program in accordance with the regulations of the U.S. Department of Transportation ("DOT"), 49 CFR Part 26. Wabtec continues to seek qualified Small Business and Disadvantaged Business Enterprises

[14] EPA Nonattainment and Maintenance Area Dashboard

as potential suppliers in an effort to support its current and future DBE goal on all DOT-assisted Projects.

Additionally, this new locomotive will reduce noise pollution by 70%. The noise pressure level is measured in deci Bel ("dB(A)") with a logarithmic scale.[15] According to a study performed by the European Parliament, noise in the range 65 to 75 dB(A) causes stress to the body. This can lead to arterial hypertension (high blood pressure), cardiovascular disease and myocardial infarction (heart attack). Wabtec recently performed a study comparing the dBA of a Tier 4 diesel electric engine to a Wabtec Battery Electric Locomotive, the result was a 12 dBA reduction in noise. Considering this Project is replacing much older assets the noise reduction will be even greater, resulting in substantial benefits for CSX employees and the broader Curtis Bay community.

MDOT MPA has been an active participant in several Baltimore-area programs that have benefited residents in communities surrounding the Port such as Curtis Bay. Initiatives include participating in ecological programs, including the Green Schools Program. In 2009, MPA opened the Masonville Cove Environmental Education Center, following a shoreline restoration Project in the area, and in 2013 MPA was named the first Urban Wildlife Refuge Partner of the U.S. Fish and Wildlife Service.[16] More recently, MPA has worked with the Maryland Zoo in Baltimore to restore a stream and create a bioretention area for water and provided funding to the state's Department of Natural Resources to assist with oyster restoration efforts in the Chesapeake Bay. MPA has used the sediment dredged from the Port's shipping channels to restore wetlands and rebuild eroding islands, which have become habitats for nesting birds and other wildlife and facilitated a popular spot for recreational boaters.

Climate Change and Sustainability

Sound environmental stewardship and climate strategy are essential to addressing climate change. As the most fuel-efficient mode of land-based freight transportation, rail has a tremendous responsibility and opportunity to be part of the solution. In alignment with DOT's Climate Change and Sustainability objectives, replacing the three older non-regulated diesel-electric switching locomotives with new zero-exhaust emissions battery electric locomotives will eliminate the emissions produced by the locomotives that perform rail switching activities at the Curtis Bay Piers, significantly improving local air quality.

This Project would be the first use of zero-exhaust emission battery electric locomotives at an East Coast Port in the United States. As previously stated, the FLXswitch is a concept for a zero-emissions enabling locomotive that can provide sufficient horsepower to replace diesel equivalent locomotives in a rail yard. In 2021, Wabtec demonstrated the world's first heavy-haul 100-percent battery-electric locomotive – called FLXdrive™. This demonstration successfully reduced fuel consumption by more than 11 percent across the train consist. To

[15] European Parliament, Reducing Railway Noise Pollution Report
[16] Maryland State Government, Maryland at a Glance- Waterways

build upon the success of this demonstration, this Project is crucial to articulate to the broader rail industry how to operate and maintain 100% battery electric locomotives. Annually, this Project would result in the following emissions savings: 1,530 metric tons of CO_2, 71 metric tons of NOx, and 3.43 metric tons of $PM_{2.5}$. Not only are the emissions savings substantial, but this Project also represents a bold step for the industry towards adopting battery electric locomotives within port operations. MDOT plans to use this Project as an example to other ports interested in pursuing this innovative technology.

The Project builds on other sustainability efforts underway at the Port of Baltimore. In February 2022, the Port received $1.8 million in Diesel Emissions Reduction Act ("DERA") grant funding from the Environmental Protection Agency to replace older diesel-powered equipment with newer, cleaner versions in approximately 44 dray trucks and four pieces of cargo-handling equipment. Replacements under the recent DERA Grant are anticipated to result in the lifetime emission reduction of approximately 14 tons of particulate matter (PM2.5), 290 tons of nitrogen oxides, 96 tons of carbon monoxide, and 15 tons of hydrocarbons.[17] In addition to supporting the advancement of zero emissions enabling technologies in the rail industry, CSX maintains a commitment to the environment that underpins business strategy and applies to operations and customer service. CSX sees the correlation between sound environmental practices and business success and seeks ways to bring them closer together. CSX has been diligently working towards its ambitious GHG emission reduction goals, guided by a science-based target to reduce GHG emissions intensity by 37.3% by 2030 against a 2014 emissions baseline. CSX is currently tracking to meet its 2030 emissions target. From 2014 through 2021, CSX has improved fuel efficiency by 15.34% – an emissions intensity reduction of 15.6 percent – which puts CSX 42% of the way toward reaching its goal.

CSX is dedicated to finding and developing solutions that can power the rail industry for the long-haul without compromising the environment. This Project continues CSX emission reduction goals by implementing zero-emission technology. This solution could be expanded in a phased approach to establish zero-emissions for the greater Baltimore service area. This Project helps CSX, MDOT, and all stakeholders transition toward cleaner transportation by utilizing zero-emission locomotives. This incremental reduction will be critical to evaluating all pathways to decarbonize and eliminate emissions form the transportation sector. The Project location helps demonstrate alignment with State and Federal Environmental Justice and Climate Justice initiatives.

Lastly, in alignment with the FRA's objective to recycle infrastructure, Wabtec and GM are currently evaluating various battery pack recycle and disposal options for end-of-life battery replacement intervals on these battery electric locomotives. Wabtec has started conversations

[17] Port of Baltimore Handled Most Cargo Ever in 2019, MDOT

with battery recyclers and will actively work with MDOT and other Project partners to identify a sustainable path for disposition of the battery cells on these locomotives.

Transformation

This rail network is integral to supply chain resiliency. This Project implements a zero-emissions solution in a port location to further align with Maryland, FRA, and CSX energy and climate resilience goals. In alignment with FRA's goal to remove aging assets from the U.S. rail network, this Project directly addresses FRA's objectives. Also, this Project would be the first use of zero-exhaust emission battery electric locomotives at an East Coast Port in the United States.

To further transform the rail network and improve resiliency, the transition to alternative technologies is crucial. Wabtec has been researching and testing different alternative technologies since the early 2000s in order to prepare the industry for adoption. Most recently, in 2021, Wabtec took the bold step of piloting the world's first heavy-haul 100-percent battery-electric locomotive – called FLXdrive™. This demonstration successfully reduced fuel consumption by more than 11 percent across the train consist. To build upon the success of this demonstration and support the industry's transformation of aging assets, this Project is crucial to articulate to the broader rail industry how to operate and maintain 100% battery electric locomotives.

Project Implementation and Management

Applicant Experience

MDOT has an extensive history of successfully implementing a variety of rail Projects. It has the essential technical, administrative, and legal capabilities to successfully deliver this Project. MDOT oversees a multi-billion dollar, six-year capital program.

As a direct recipient of federal funding, MDOT routinely employs Project management processes and procedures necessary to ensure adequate technical, financial, and administrative oversight of large planning and capital Projects, including meting report and other requirements for federal funding.

MDOT and their Project partners including CSX have a long history of managing capital and new-build Projects with funding support from various entities. MDOT has successfully managed the following Projects:

- CSX and other Project partners kicked off a modernization initiative to update Baltimore's Howard Street Tunnel, one of the largest public-private construction partnerships in Maryland's history. To date this Project is successfully ahead of schedule and underbudget.
- National Gateway, a multi-state project to improve the flow of freight between the Mid-Atlantic and the Midwest by clearing freight corridors for double-stack rail service.

The Port of Baltimore's Strategic Acquisition of the Battery Electric Locomotives Project is a shovel-ready Project. Project goals align with the EPA's emissions standards in 40 CFR Part 1039 by reducing pollution and increasing energy efficiency to promote climate resilience. The new Wabtec battery electric locomotives are quiet, which also means they provide less noise in the communities they operate through. They have less of an environmental impact than the existing non-regulated diesel-electric locomotives, making this an excellent way to reduce pollution in the communities in which MDOT operates.

Project Implementation and Contract Management

The Project will be managed through a coordinated process by MDOT, CSX, and Wabtec. The Project is anticipated to be completed by March 31, 2026. If MDOT is awarded funding for this Project, a competitive process for Project completion will begin upon contract award and MDOT will supervise the procurement of labor and material for the Project.

MDOT will be responsible for facilitating the coordination of all activities necessary for implementation of the Project. This includes but is not limited to monitoring and evaluating the Project's progress through regular meetings during the Period of Performance. Key activities include:

- Participate in a Project kickoff meeting with FRA
- Complete necessary steps to hire a qualified contractor to perform required work
- Hold regularly scheduled Project meetings with FRA
- Inspect and approve work as it is completed
- Review and approve invoices as appropriate for completed work
- Perform close-out audit to ensure contractual compliance and issue close-out report
- Submit to FRA all required Project deliverables and documentation on-time and according to schedule, including periodic receipts and invoices
- Comply with all FRA Project reporting requirements, including, but not limited to:
  a. Status of Project by task breakdown and percent complete
  b. Changes and reason for changes in and updated versions of Detailed Project Work Plan, Budget, and Schedule
  c. Description of unanticipated problems and any resolution since the immediately preceding progress report
  d. Summary of work scheduled for the next progress period
- Read and understand the Terms and Conditions of this Agreement
- Notify FRA of changes to this Agreement that require written approval or modification

In addition, CSX routinely employs processes and procedures necessary to ensure adequate technical, financial, and administrative oversight of large planning and capital Projects. This includes management of contractors and consultants, compliance with FRA and other federal grant and reporting requirements, and regular meetings with FRA contract and program staff.

Domestic Preference. Wabtec's 111-year-old locomotive plant in Erie, a breeding ground for rail innovation, is where the FLXswitch battery electric locomotives in this Project will be designed and built. Additionally, the battery packs will be assembled by GM in the U.S. and then sent to Erie to be used for this Project. This Project will directly contribute to supporting good-paying manufacturing jobs both in Erie county and throughout the component sites across the United States. Erie is a hard-working, blue-collar town — one that has strong infrastructure assets including rail, ports, and highways to support industrial bases in the Northeast and Midwest. Wabtec's union-based workforce in Erie accounts for over 1,300 employees that play a critical role in delivering these battery electric locomotives to MDOT's Port of Baltimore. No waivers of Buy America requirements are anticipated for this Project.

Project Planning Work Conducted to Date. CSX and Wabtec have been engaged in planning for this Project since 2021: They have been engaged with MDOT MPA since May 2022. That coordination included a determination of the type and number of locomotives to procure, ensuring that existing and anticipated transportation demand could be met by the Project.

Project Schedule. The Statement of Work contains a Project Schedule. If MDOT is awarded funding for this Project, a competitive process for Project completion will begin upon contract award with a timely award of funding, the locomotives are anticipated for delivery by December 31, 2025, and the Project is anticipated to be completed by March 31, 2026.

Project Reporting. MDOT will confirm with Federal requirements for Project reporting including the preparation of quarterly progress reports, quarterly federal financial reports using Standard Form 425 (SF-425), the annual report, and a final performance report, in conformance with the standard terms and conditions for FRA grant awards including 2 CFR 180.335 and 2 CFR 180.350.

Risk Management. Risks for the implementation of this Project are low and the need for change orders is not anticipated. Train operations and Port terminal operations are not anticipated to be interrupted for extended periods as a result of the Project. MDOT staff will routinely inspect the progress of the installation of charging infrastructure and on-site deployment of the new locomotives to ensure that work is progressing, and the Project is of high quality. MDOT staff will also field-verify that works is completed before releasing the final payment to CSX.

Planning Readiness for Tracks 2 and 3 (Project Development & FD/Construction) Projects

This Project is ready for accelerated implementation immediately after FRA obligation or "shovel ready" as all necessary planning, PE and NEPA requirements have been completed or are underway. The Project is consistent with existing transportation and economic development plans, strategies, or studies throughout the region. The Project is consistent with the goals from

the 2040 Maryland Transportation plan (2019), the State of Maryland's long-range transportation plan.[18] In particular, the Project will support the following goals in the plan:

- Facilitate Economic Opportunity and Reduce Congestion in Maryland through Strategic System Expansion – by improving cargo handling at the Port of Baltimore and the origination and termination of freight in Maryland
- Maintain a High Standard and Modernize Maryland's Multimodal Transportation System – by modernizing transportation infrastructure and assets in Maryland
- Improve the Quality and Efficiency of the Transportation System to Enhance the Customer Experience – by employing the use of new technology and operational improvements to enhance transportation services
- Ensure Environmental Protection and Sensitivity – by implementing a Project that will reduce fossil fuel consumption, mitigate greenhouse gases, and improve air quality

2022 Maryland State Rail Plan

MDOT has developed the 2022 Maryland State Rail Plan, in accordance with federal requirements set forth in the Passenger Rail Investment and Improvement Act of 2008 and the Fixing America's Surface Transportation Act of 2015. Beyond the federal requirements, Maryland's state rail plan outlines the public and private investments, policies, and strategies that will help guide Maryland's support of rail transportation in the future and ensure the efficient, safe, and sustainable movement of freight and passengers by rail. This Project directly supports the goals of the 2022 Maryland State Rail Plan, one of which is, "Environmental Protection and Sensitivity – Deliver sustainable transportation infrastructure improvements that protect and reduce impacts to Maryland's natural, historic, and cultural resources."

Environmental Readiness for Track 3 (FD/Construction)

Funding through the FRA CRISI grant for this Project represents an irretrievable commitment of resources subject to review under NEPA. NEPA review for this Project is underway and anticipates a Categorical Exclusion designation due to no environmental impacts and active construction. Project activities will be performed on CSX right-of-way the definition of a Categorical Exclusion under the following FRA categories (23 CFR 771.116(c)(18)), which reads:

- CE 18 – Acquisition (including purchase or lease), rehabilitation, transfer, or maintenance of vehicles or equipment, including locomotives, passenger coachers, freight cars, trainsets, and construction, maintenance, or inspection equipment, that does not significantly alter the traffic density characteristics of an existing rail line.
- CE 19 – Installation, repair and replacement of equipment and small structures designed to promote transportation safety, security, accessibility, communication, or operational efficiency that take place predominantly within the existing right-of-way.

[18] 2040 Maryland Transportation Plan

As there is currently no commitment on the part of FRA to be involved in the Project, the NEPA process has not formally begun. MDOT will submit an FRA Categorical Exclusion Worksheet (FRA F 217 of 02/2021) and obtain written approval from FRA prior to any construction activities. This worksheet also addresses compliance with other federal agency permit/consultation requirements such as the Endangered Species Act, the National Historic Preservation Act, the Clean Water Act, and Section 4(f) of the US Department of Transportation Act of 1966. Other environmental requirements include compliance with Executive Orders, such as EO 11988 Floodplain Management, EO 11990 Protection of Wetlands and EO 12898 Environmental Justice. Since the Project area would not extend beyond the right-of-way, and the adverse effects on adjacent environmental resources covered by these laws, regulations, and executive orders. MDOT will work with the FRA to complete the Categorical Exclusion Worksheet upon grant approval. An in-progress draft Categorical Exclusion Worksheet is attached in Appendix 6 for reference. MDOT anticipates completion of the NEPA process upon FRA commitment and will work with the FRA to attain this completion prior to Final Design.

DOT Strategic Goals

As discussed in previous sections, the Port of Baltimore Strategic Acquisition of Battery Electric Locomotives Project will support improvements in safety, economic strength and global competitiveness, equity and opportunity, climate change and sustainability, and transformation, consistent with the U.S. DOT's strategic goals.

Safety

Fosters a Safe Transportation System. The Project creates a safer rail system at the Port of Baltimore by replacing 50-year-old, non-regulated diesel-electric locomotives with innovative, newer technology. These new locomotives will utilize modern technology designed to support the safety and well-being of all Users. Additionally, CSX, who achieved an industry-leading safety performance in 2021, will own, operate, and maintain these locomotives with a strong safety culture grounded in a shared sense of ownership and accountability.

Equitable Economic Strength and Improving Core Assets

Maintains U.S. Supply Chain Fluidity. The Project maintains access to efficient, reliable, and competitive freight rail transportation at the Port of Baltimore for U.S. companies engaged in global trade. The Port of Baltimore is one of only five U.S. ports that rank in the top 25 for all three cargo categories (overall cargo, dry bulk, and containerized), and is among the top 20 U.S. foreign trade freight gateways by value of shipments. In 2019, the value of foreign cargo handled at the Port was $58.4 billion. The Project will replace three existing locomotives with three new locomotives, enabling existing and anticipated demand to be met and maintaining supply chain fluidity at the Port terminal.

Equity and Barriers to Opportunity

Supports Economic Growth Opportunities with Good-Paying Jobs. The Port of Baltimore draws its employees from the region and Port activities provide direct benefits to communities

in and around Baltimore. The Port generates nearly $3.3 billion in total personal income and supports 15,330 direct jobs and 139,180 jobs connected to Port work. The average annual salary of a direct job holder at the Port of Baltimore is 9.5% higher than the average annual wage for employees in the state of Maryland. In addition, the Port pays approximately $400 million per year in state, county, and municipal tax revenues. The Project also supports good-paying domestic manufacturing jobs with railroad industry suppliers.

Reduces Environmental Burden in a Disadvantaged Community. The Project's monetized benefits will be fully realized in the historically disadvantaged community where the Port terminal is located. The Project will also contribute to state and national efforts to improve air quality in areas of the Baltimore region that have been designated by the EPA as nonattainment areas for ozone and sulfur dioxide.

Climate Change and Sustainability

Emissions Reductions. By replacing the three older diesel-electric switching locomotives currently used at the terminal with three zero-exhaust emission battery electric locomotives and one battery charger, the Project would result in annual emissions savings of 1,530 metric tons of CO_2, 71 metric tons of NOx, and 3.43 metric tons of $PM_{2.5}$; additionally, locomotive noise will be reduced by 70%. Over a 20-year period, the Project will generate $27.5 million in public benefits (in 2020$ discounted at 3% for CO_2 benefits and 7% for all other benefits).

Supports State/National Climate Change Goals. Contributes to targeted reductions in greenhouse gas emissions stipulated in Maryland's Climate Solutions Now Act as well as state emission reduction regulations and implementation plans established by the MDE, and efforts to improve air quality in a nonattainment zone as well as railroad industry efforts undertaken by FRA and CSX to reduce emissions.

Transformation

Utilizes Zero-Exhaust Emission Battery Electric Locomotives. The Project would be the first use of zero-exhaust emission battery electric locomotives at an East Coast Port in the United States; it furthers the global rail industry efforts to transition to zero-emissions technology.

Promotes Workforce Development and Inclusion, Job Quality, and Labor Rights. MDOT, CSX, and Wabtec all have union-based workforces that will benefit from this Project. All three entities are equal opportunity employers. Wabtec and CSX have workforce training programs. Project activities requiring the use of contractors will be bid and contracted for in conformance with governmental procurement practices. Wabtec has a DBE Program in accordance with U.S. DOT regulations in 49 CFR Part 26 and will continue to seek qualified Small Business and DBEs as potential suppliers in an effort to support its current and future DBE goal on all DOT-assisted Projects. As a recipient of Federal CRISI funding, MDOT and its project partner, CSX, will comply fully with Title VI of the Civil Rights Act of 1964 and implementing regulations (49 CFR 21), the Americans with Disabilities Act of 1990, section 504 of the Rehabilitation Act of 1973, and all other civil rights requirements.