



November 7, 2022

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The Honorable Liane Randolph
Chair, California Air Resources Board
1001 I Street
Sacramento, CA 95811

RE: Proposed In-Use Locomotive Regulation

Dear Chair Randolph:

On behalf of the Peninsula Corridor Joint Powers Board (Caltrain), I would like to provide our comments on the Proposed In-Use Locomotive Regulation. Caltrain is supportive of the state's air quality goals and has been moving forward with ambitious plans to reach a zero-emissions (ZE) future. However, we have significant concerns with the timing, structure and requirements of the proposed regulation and hope the California Air Resources Board (CARB) can take these into account to reach a path forward that can work for passenger rail agencies. These concerns align with the feedback previously provided to the Transportation and Toxics Division in letters sent in 2021 and 2022, meetings with staff and efforts by our fellow passenger rail agencies throughout the development of the proposed regulation.

Caltrain is currently engaged in the transformational Peninsula Corridor Electrification Project that is modernizing a nearly 160-year-old commuter rail line. This project will replace 75 percent of our diesel fleet with high-performance zero-emissions electric multiple unit (EMU) trains. When this work is complete, Caltrain will be the state's first electrified commuter rail system, spanning 51 miles between San Francisco and San Jose. We support the state's push toward a zero-emissions future and we are eager to continue our partnership with CARB toward this shared goal.

The Electrification Project is well underway, with all foundations and over 90 percent of poles installed, 10 out of 10 power facilities under construction, and the first segment energized. Four electric trains have arrived on property and 131 of 133 electric train cars are in manufacturing. The Project is nearing the finish line but faces a \$410 million funding gap which must be addressed if the work is to be completed on time for passenger service in fall of 2024. This situation, in part due to and combined with other impacts of the COVID-19 pandemic, has Caltrain facing a fiscal cliff in June of 2023, near the time this regulation would take effect. If additional resources cannot be secured to fill the project's significant funding gap, Caltrain will likely face impacts to operating budgets and service levels. The proposed regulation will compound these impacts to the financial health of the agency if not modified to allow achievable emissions improvements.

While Caltrain's long term service vision assumes a blended service with California High-Speed Rail Authority from San Francisco to Gilroy, the section of track between Tamien Station in San Jose and Gilroy Station is owned by the Union Pacific Railroad and the timeline for the electrification of this corridor is uncertain.

In order to continue to serve communities between Tamien and Gilroy, Caltrain must continue to operate diesel service until such time that funding, manufacture and federal safety certification can be achieved for ZE equipment that can be placed into service. At 2025 service levels, this would require five new trainsets.

Caltrain is pursuing a request to the California State Transportation Agency for funding of a pilot project for one battery-equipped electric multiple unit (BEMU), which could charge along Caltrain's electrified territory and then run battery-powered service to Gilroy. If funded, this option would take three to five years to come into service due to the need for design review and test approval by the Federal Railroad Administration (FRA) in addition to normal manufacturing timelines and special consideration for procuring ZE parts that do not currently have a supply chain. Procuring a BEMU not based on Caltrain's existing EMU would take significantly longer due to the entire train set requiring FRA review and approval already complete for the Caltrain EMU. There is no ZE equipment yet approved for use in the United States for railroads regulated by FRA and the first customer of each type will bear the burden of a procurement process of up to ten years. There are limited funding opportunities for additional ZE trainsets. Caltrain will be looking to state and federal funds once the technology is proven, even as it currently pursues Federal Transit Administration (FTA) replacement grants for more EMU trainsets.

Zero-emission locomotive technologies discussed in Appendix F of the proposed regulation are also not yet commercially available and may not comply with federal Buy America requirements, making them unattainable for California passenger rail agencies. Caltrain could potentially purchase ZE locomotives and extend the use of aged coaches for Gilroy service if funds sufficient for BEMU train sets were not available if more time and funding were made available for the transition. As currently conceived, the regulation requires either replacing older locomotive equipment by 2030 or foregoing credit for ZE vehicle use. Either path requires significant investment or sequestering of desperately needed operating funds before 2030, and ZE equipment may not be commercially available by that time. As written and given current technology, the proposed regulation could incentivize Caltrain to apply for grants to purchase Tier IV locomotives to address the schedule demands, which would lock in diesel service for the required useful life of 25 years when instead, with time, effort, and thoughtful state intervention, we could be the first full zero-emission rail vehicle fleet in the state.

The ZEV rail technology, market readiness and resource availability needs must be reviewed and assessed by CARB in a way that takes into account federal requirements and constraints, funding limitations, public agency purchasing rules and requirements, and public sector financial planning requirements and timelines. Please refer to the attached Appendix A which gives a detailed analysis of the technology readiness analysis contained in the regulation's Appendix F.

The following are specific concerns with the proposed regulation:

Spending Account Requirements (Section 2478.4(a)-(e)): Beginning, July 1, 2024, the proposed regulation would require all locomotive operators, including intercity passenger and commuter rail agencies, to annually deposit funding in a trust account (or "Spending Account") at a level based on the emissions generated by their locomotive fleet. These funds and any interest generated must be used for: the purchase, lease, or rental of Tier 4 or cleaner locomotives, or for the remanufacture or repower to Tier IV or cleaner locomotives (through 2030); the purchase, lease, or rental of ZE locomotives, ZE capable locomotives, ZE rail equipment, or to repower to ZE locomotives or ZE capable locomotives; or supporting infrastructure.

For Caltrain, this would mean encumbering tens of millions of dollars into a Spending Account that would be unavailable for rail operations, state of good repair improvements, or leveraging federal investment in rolling stock and capital projects, despite existing plans to replace 75 percent of our fleet with ZEV EMUs. Caltrain does not have flexible funds that could account for this level of financial disruption and would be forced to impact operating budgets, reduce service, or in the worst case, shut down entirely. This requirement in creating a new financial liability could impact the agency's credit rating, which would be problematic for the financing that may be needed simply to comply with the regulation and continue to run service.

There is no funding attached to this regulation and thus, passenger rail agencies will have no assistance or recourse to comply. Further, the proposed regulation and its Spending Account requirements are premised on the assumption that ZE rail vehicles that could work for Caltrain's situation are commercially available and ready for use by passenger rail agencies, which is simply not the case. To be clear, there are currently no FRA-approved off-wire zero-emission locomotive or multiple units commercially available for passenger rail use in the United States.

Caltrain is requesting that passenger rail agencies not be subject to the spending account provisions of the proposed regulation. While staff have indicated that the Alternative Compliance Plan (ACP) section of the regulation was created to be a path for passenger rail agencies, it is not at all clear given the text that approval of an ACP could be achieved. Furthermore, it is not clear that approval would be retroactive and negate the requirement to sequester funds for any timing gap between application and approval.

ZE Credit System (Section 2478.4(f)): The proposed regulation would implement a ZE credit system for the Spending Account, whereby the operations of zero-emission locomotives, zero-emission rail equipment, or use of wayside power by locomotive operators, including intercity passenger and commuter rail agencies, in California would result in the generation of credits that would reduce a locomotive operator's annual deposits into their Spending Account. This system would be in effect through December 31, 2029, with all ZE credits expiring on January 1, 2030.

When Caltrain's EMUs go into service, the credits from the ZEV EMUs will, for a short time, cancel out the remaining diesel locomotives. However, Caltrain still expects to need these diesel locomotives for the area of service that is not electrified after 2030. With the credits expiring, Caltrain will again face tens of millions of dollars needed to be encumbered to comply with the proposed regulation, but the air quality benefits of its ZEV fleet will be unchanged. Though we would like to replace our remaining diesel fleet, this will depend on the receipt of competitive grant funding, which is not guaranteed and would again require an extended lead time.

Caltrain is requesting that credits for ZE rail vehicles do not expire.

Engine Life (Section 2478.5(a)): The proposed regulation would prohibit use of locomotives more than 23 years old, beginning in 2030. This is at odds with FTA requirements that vehicles must have a useful life of 25 years. This 25-year minimum useful life refers to total time in normal transit service, not time spent stockpiled or otherwise unavailable for regular use in transit service. If an agency removes an FTA financed vehicle from service sooner than 25 years, the agency is legally obligated to repay the FTA an amount equal to the FTA share of the vehicle's remaining value. Further, rail vehicles are ineligible for replacement formula funds prior to the end of their useful life. Thus, all passenger rail agencies who receive FTA funding for rail vehicles plan their

budgets, financials, and procurements based on a useful life of 25 years. Moreover, agencies can only sell vehicles prior to the end of their useful life if given federal approval to do so, which would likely not accept sending emissions to other states as a valid reason for early disposal, where FTA rules require demonstration of federal interest.

Caltrain is requesting the proposed regulation align with the federal requirement of a 25-year useful life for rail vehicles.

Technology Assessment (Section 2478.5 (b)(1)): The proposed regulation would require any switch, industrial, or passenger locomotive with an original engine build date of 2030 or newer to operate in a ZE configuration at all times in California, beginning January 1, 2030. This means that locomotives could be used as cab cars, and Caltrain has sufficient cab cars providing passenger seating so this is not a benefit to our operation.

By December 1, 2027, CARB staff would be required to publish a verification that progress has been made in five years to determine if locomotives are on target to meet the 2030 ZE configuration deadline. However, this will be too late to be helpful to passenger rail agencies that would be required, beginning on July 1, 2024, to deposit funding into a Spending Account.

If, in 2027, the technology assessment ultimately finds that zero-emission locomotive and multiple unit technologies have not progressed sufficiently to maintain the regulation's compliance deadlines, CARB will have undermined rail service by requiring the redirection of limited funding that could have been used for operations and other capital investments to the Spending Account over 3.5 years for little to no movement on the deployment of zero-emission locomotive and multiple unit technologies. There is a serious cost to agencies like Caltrain of encumbering funding, especially at the levels that would be required for compliance in the proposed regulation even if ultimately, the deadlines are moved back.

Temporary Waiver (Section 2478.6(a)): The proposed regulation would allow locomotive operators, including intercity passenger and commuter rail agencies, to exercise a temporary operating waiver option. If a locomotive operator plans to operate a locomotive that would be considered prohibited pursuant to section 2478.5, the locomotive operator has the option to submit a request to the Executive Officer to temporarily operate the locomotive in California. The temporary operating waiver request may be approved, provided certain specified requirements are satisfied. While this is useful flexibility, we are concerned that the temporary operating waiver does not include relief for lack of funding, commercial availability, or FRA approval, which are significant barriers for public agencies.

Alternative Compliance Plan (Section 2487.7 (a) and Section 2487.10): The proposed regulation permits locomotive operators, including intercity passenger and commuter rail agencies, to submit an alternative compliance plan (ACP) instead of complying with the Spending Account requirements in Section 2478.4 and/or the In-Use Operational requirements in 2478.5. While Caltrain and other passenger rail agencies in the state urged CARB staff to create an alternative to the proposed regulation's Spending Account requirements, the proposed structure and requirements of the ACP are still problematic for agencies.

The following are specific issues and complications with the proposed ACP structure and requirements:

- An approved ACP would be valid for a five year "verification" period. In that period, a locomotive operator would be required to demonstrate emissions reductions equivalent to compliance with Section 2478.4 and/or Section 2478.5 through use of cleaner equipment. In practice, this requirement would

charge locomotive operators with absorbing financial costs and operational impacts similar to compliance with Section 2478.4 and/or Section 2478.5.

- The proposed ACP would require users to document lower emissions for PM, NOx and GHG. These measurements are expensive and administratively burdensome, and GHG is not defined to the extent the regulation defines PM and NOx.
- The proposed ACP would require usage data for each locomotive in a locomotive operator's fleet. This data may not be available for older equipment that has been through engine rebuild.
- The proposed ACP would require applications to be submitted six months before their effective date. As the proposed regulation would take effect in 2023 and the first deposit to the Spending Account would be due in July 2024, agencies submitting an ACP would need to have all of the funding for 2023 readily available to deposit in the case that their ACP was not accepted, which they wouldn't know until about the same time as the deposit became due. This submittal process would create uncertainty for Caltrain and other agencies that would impact operations and capital planning. Further, this level of uncertainty and the tens of millions of dollars at stake could impact our agency's credit rating at a time when Caltrain is facing severe fiscal pressure and recovering from low ridership during the pandemic. Given the extreme financial hardship of an ACP rejection, Caltrain would be unlikely to finalize operational and capital plans if acceptance of an ACP is outstanding.
- The proposed regulation requires locomotive operators exercising an approved ACP to annually report several data points including:
 - The locomotive operator/company name; a detailed explanation of the progress of the ACP for the prior calendar year;
 - A detailed accounting of the reductions achieved pursuant to the ACP for the prior calendar year;
 - A detailed explanation as to how the reductions achieved by the ACP in the prior year were real, quantifiable, verifiable, and enforceable;
 - The location(s) of the emissions reductions that were achieved by the ACP in the prior calendar year;
 - A detailed accounting of the emissions reductions that would have been achieved pursuant to section 2478.4 and/or 2478.5; and,
 - Any other information identified in the Executive Order as necessary for evaluating whether the locomotive operator has complied with section 2478.7 requirements and ACP requirements.

For publicly funded passenger railroads, reporting this data annually is certain to be onerous and costly, and will have a negative impact on overall agency budgets.

Caltrain requests that the ACP simplify emissions data and reporting requirements to workable estimates rather than the complicated requirements currently included. This would include not requiring locomotive operators to report usage data for each locomotive including, in some cases, usage by air district, because for older locomotives like those operated by Caltrain, this data is not available.

Caltrain also requests that agencies have at least 12 months in between the decision to approve or reject an ACP and the time of first Spending Account deposit in order to reduce financial planning uncertainty and avoid unintended impacts to agencies' credit ratings and overall fiscal health.

Caltrain requests that the ACP timeframe of five years is extended to be commensurate with the realities of public funding and procurement processes, technology availability, and other barriers and timing constraints.

Caltrain requests that if GHGs are going to be a part of the regulation, then passenger rail agencies receive credit for reduced vehicle miles traveled as a result of rail service. If GHGs are not meant to be included in the regulation, we request that they be removed from the proposed regulation.

Idling Requirements (Section 2478.8): The proposed regulation prohibits idling for more than 30 minutes with exceptions for various scenarios that do not include typical reasons passenger services may idle to ensure the safety of the public.

Caltrain requests that passenger rail agencies be exempt from idling requirements or that typical scenarios for passenger rail vehicle idling be included as exceptions.

Proposed Solutions:

Market Assessment

Caltrain requests that CARB initiate and complete an independent and peer-reviewed market and technology assessment, as called for by the California Transit Association, before implementing the proposed regulation or any alternative regulation. This market assessment should be conducted with input from industry stakeholders and all relevant state and federal departments and agencies, and should address the following issues:

1. The commercial availability of ZE locomotive and multiple unit technologies and fuels in the United States, with consideration to all applicable federal laws and regulations;
2. The deployment status of ZE locomotive and multiple unit technologies in the United States;
3. The capital and operational costs, performance, and reliability of ZE locomotive and multiple unit technologies and requisite infrastructure on the United States market, including the compared costs of locomotives and related technologies now versus estimated future costs;
4. The availability of state and federal funding opportunities to address the costs of deploying and operating ZE passenger locomotive and multiple unit technologies and requisite infrastructure;
5. The barriers to adoption of ZE locomotive technologies, including the availability of battery storage and regularity of required maintenance on locomotive batteries; and,
6. The status of intercity passenger and commuter rail service in California.

This market and technology assessment is intended to inform: the timelines for compliance by intercity passenger and commuter rail agencies with the proposed regulation or any alternative regulation; amendments to the proposed regulation or any alternative regulation to address assessment findings; and funding strategies to support the deployment of zero-emission locomotive technologies and requisite infrastructure.

This market and technology assessment would be more expansive than the 2022 assessment included in Appendix F of the Initial Statement of Reasons. That earlier assessment reflects only supplier marketing

statements and public transit plans and fails to highlight that much of the technology reviewed is unavailable in the United States as it has not been approved by the FRA for use by intercity passenger and commuter rail agencies and does not meet federal Buy America requirements. Additionally, this market and technology assessment is distinct from the assessment scheduled for 2027 in the proposed regulation in that it aims to proactively identify and address the barriers associated with transitioning to ZE locomotives before agencies are required to take preparatory steps for technology deployments that may later prove to be infeasible.

Pilot Projects

Caltrain requests that CARB and the state invest in demonstration and pilot projects that deliver near-term benefits to communities while helping to enable the broader industry transition to ZEV, as called for by the California Transit Association. Caltrain is interested in running a pilot of BEMU operations provided funding for a BEMU and demonstration project is secured prior to our option expiring in August of 2023. Caltrain is available to work with CARB to move forward on enabling sufficient funding, providing ample time to commence the transition to ZE locomotive technologies, consideration of barriers and adequate alternatives, and creating a path forward that works for passenger rail agencies while furthering the goals of a zero-emissions future.

Thank you for the opportunity to comment on the Proposed In-Use Locomotive Regulation. Caltrain is available to meet with CARB staff to discuss these comments and looks forward to working together with CARB to address these concerns. Please contact Devon Ryan, Government and Community Affairs Officer, ryand@samtrans.com, (650) 730-6172, for any questions regarding this letter.

Sincerely,



Michelle Bouchard
Executive Director

cc: Members, California Air Resources Board
Dr. Steven Cliff, Executive Officer, California Air Resources Board
Heather Arias, Chief, Transportation and Toxics Division, California Air Resources Board
Jamie Callahan, Chief of Staff, Office of Chairwoman Liane Randolph, California Air Resources Board
Peninsula Corridor Joint Powers Board of Directors

Appendix A: Comments on the Proposed Regulation's Appendix F

Technology Feasibility Assessment for the Proposed In Use Locomotive Regulation (Appendix F)

Purpose and Quality of the Technology Feasibility Assessment:

- The CARB In-use Locomotive Regulation provides a Technology Feasibility Assessment, but notes that the purpose of this document is only to “discuss” various technologies that may be used to meet the requirements of the proposed regulation. It is not, by its own account, a full assessment as it relates to the feasibility of complying proposed requirements.
- CARB’s Technology Feasibility Assessment does not include assessment or analysis to determine if zero-emission (ZE) passenger rail technology is or will be available within the proposed timeframe of the regulation.
- Because the Technology Feasibility Assessment is incomplete, it does not provide meaningful input for consideration in the Standardized Regulatory Impact Analysis (SRIA). This means the SRIA’s basis for conclusions on related passenger rail impacts is incomplete and makes the SRIA insufficient with respect to CARB’s responsibilities under the California Administrative Procedures Act.

Market Analysis and Assessment of Commercial Availability:

- The proposed regulation relies on the existence of freight test programs, and in particular, the availability of low horsepower switcher locomotives as the basis for presuming passenger rail equipment needs can be met. This is in conflict with the fact that passenger rail equipment is a specialized, low volume market. Critical to the feasibility of its proposed regulation, CARB has not explored the fact that there are no production ready ZE passenger rail technologies that are commercially available beyond prototypes, except those that require full electrification of the railroad.
- The proposed regulation notes that ZE solutions would need to be sized based on the operational needs of each railroad, but does not provide analysis as to how current passenger operations can be met by ZE technology. This is a fundamental oversight. While there exists a potential path for short distance, low frequency operations, no known ZE solutions for the majority of commuter and intercity passenger rail operations currently exists, outside of electrification. Further, it is unclear if any such solutions will be available within the next 10 years to meet the needs of today's operations. A sensitivity analysis should have been performed to assess the expected range of development for a solution that can meet the needs of most long-distance and higher capacity commuter and intercity passenger operations.
- Though the proposed regulation seems to rely on the assumption that battery or hydrogen tenders could be used to bridge the significant range and energy capacity gap, no analysis is provided as to its availability, or operational feasibility. There are no existing tender designs for passenger use.
- The proposed regulation does not provide a market analysis to examine the potential for manufacturers to bring ZE platform solutions to the U.S. market. Any substantive fleet replacement would require commercial availability of a product line. There would need to be a sustained market beyond California to justify investment in a production line and supply chain that could meet U.S. regulatory and Buy America requirements.

Regulatory Issues:

- While CARB understands that locomotives operating on the general railroad system must comply with federal requirements and regulations, the proposed regulation does not address the regulatory impact of the provisions of the proposed order. There is no acknowledgement of the additional safety measures, including fire safety, that are required for passenger equipment nor the reliance of passenger rail agencies on federal funding with domestic content requirements.

- In 2013, the Federal Railroad Administration (FRA) published a letter to the railroad industry outlining process for the regulatory approval of railroad motive power that uses “alternative fuel” sources, to include battery-electric and hydrogen technologies. The process outlined underscores the fact that there is not enough market demand to drive the need for standards to address these technologies at this time, as the current and projected applications are focused on pilot and prototype projects. Because of this, each product must go through an organic approval process with FRA that is highly dependent on the specific design and application of a given technology. On average, this process has taken about three years for each project, but does not account for the fact that FRA has a limited capacity of subject matter expertise to devote to such projects, and an increase in demand could lead to longer timelines associated with approval, particularly for passenger operations which represent a higher safety risk. The proposed regulation does not address this process in its analysis and no letter or formal communication from the FRA is included in the proposed regulation acknowledging the proposed regulation’s timeline.
- Both battery and hydrogen multiple-unit (MU) prototypes are identified as potential solutions for passenger rail operations based on pilot programs in Europe. There is no analysis, however, as to whether or not manufacturers of these products would be willing to develop variants of these platforms for the U.S. market. Currently, no manufacturer has committed to bringing a ZE platform to the US market beyond a prototype phase except those that require full electrification of the railroad.
- While the concept of tenders is mentioned as a means to achieve range and capacity for ZE technology that otherwise cannot be met for the foreseeable future, no analysis of the availability or practicality of tender equipment for passenger use is included in the proposed regulation. Any new design would need to be developed in concert with FRA, to include incorporation crashworthiness requirements and fire safety considerations. It would likely take three to five years to go from concept to prototype for a new tender design that could be developed for commercial production. Further, FRA has noted that liquid hydrogen tenders are not being considered as a viable option for passenger rail, due to significant safety concerns.
- In order to implement ZE technology, most passenger railroads will depend heavily on federal funding sources. These funding sources have domestic content requirements such as Buy America, and similar programs that must be complied with. Since there is no domestic production of ZE rail technology for passenger use except those that require full electrification of the railroad, there exists no current supply chain that could be proven to meet domestic content requirements. Prototypes, and even eventual production models will likely require a domestic content waiver which could take several months to obtain.

Cost Estimates:

- Though the proposed regulation notes the cost of current passenger locomotives, the cost of ZE technology is not identified nor is there information on how passenger railroads would pay for the substantial capital cost increase over current options. Passenger equipment must provide additional functionality and comply with more requirements than freight equipment (e.g., fire safety requirements, Buy America, etc.). This additional complexity drives up the cost of equipment and requires additional engineering and production time to fulfil orders. A battery-equipped electric multiple unit for a pilot project with Caltrain would likely cost \$60 million just for one train and five would be needed to provide a comparable service level to existing diesel from San Jose to Gilroy. This is significantly higher than diesel locomotives.
- The proposed regulation does not acknowledge that both battery-electric and hydrogen technology would require the replacement of its battery and fuel cell systems multiple times within the normal expected economic life of a locomotive. Some manufacturers estimate that the current generation systems would require replacement within six to eight years. This represents a significant overhaul cost

that will occur multiple times within the life of the unit in addition to the disposal of a significant portion of the locomotive's internal systems every six to ten years.

- The Technology Feasibility Assessment asserts that the maintenance of ZE technology will be lower than current diesel-electric technologies but provides no information or data for the regulated community to consider. While it is true that the costs associated with reciprocating engines would be eliminated, a large portion of rail equipment maintenance costs are tied with required tests and inspections, particularly as it relates to pneumatic braking systems. Further, both battery-electric and hydrogen technologies require sophisticated cooling, control, and monitoring systems which will require associated inspection, testing and maintenance. These costs were not analyzed and compared against the savings from current reciprocating engine options.

Infrastructure Analysis:

- While the need for additional infrastructure is identified within the Technology Feasibility Assessment, there is no analysis of how this additional requirement will impact the short- and long-term implementation of ZE technology. Analysis of the cost, timeframe, or regulatory process required to implement such support infrastructure is not included in the proposed regulation. This represents a major challenge for passenger railroad's attempting implementation of ZE technology, because agencies cannot control the pricing, availability and regulatory standards of this infrastructure.
- No agreed upon standards for interface of charging or hydrogen fueling infrastructure for rail-bound vehicles currently exists. The proposed regulation provides no assessment of the timeline associated with the development of necessary standards that would be required to promote interoperability of ZE technology over the general railroad network which will be critical to its adoption beyond the prototype phase.
- The proposed regulation does not include assessment of the short- or long-term ability of utilities or hydrogen suppliers to provide 100 percent reliable energy to passenger railroads, particularly if demand continues to grow, driven by continued demand from the auto and transit sectors.