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March 16, 2023

Liane Randolph
Chair
Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: 15-Day Changes to Proposed In-Use Locomotive Regulation

Dear Chair Randolph,

This letter sets forth Sierra Northern Railway's ("Sierra Northern") comments concerning the California Air Resources Board's ("CARB") Proposed In-Use Locomotive Regulation as updated by the proposed 15-day changes made available March 1, 2023 (the "Proposed Regulation"). Sierra Northern supports the comments of the Association of American Railroads, the American Short Line and Regional Railroad Association, and the California Short Line Railroad Association (the "Railroad Association Comments") on the issue of federal preemption, and on all of the other issues addressed by the Railroad Association Comments. Sierra Northern appreciates the opportunity to provide these company-specific comments to CARB.

Regarding the Alternative Fleet Milestone Option ("AFMO") that CARB has proposed, Sierra strongly recommends the addition of an early adopter provision to the AFMO. This early adopter provision would establish an accelerated first milestone in 2025 to facilitate emission reductions up to five years earlier than the Proposed Regulation. Rather than establishing only the 2030 milestone as proposed in the 15-day change, a fleet could opt to meet either a 2025 or 2030 milestone:

- Beginning in 2025, 100 percent of annual fleet usage in California must be from Tier 3 (or cleaner) locomotives (the Sierra recommended early adopter "2025 Milestone"), or,
- Beginning in 2030, at least 50 percent of annual fleet usage in California must be from Tier 4 (or cleaner) locomotives, (the CARB proposed "2030 Milestone").

The three remaining AFMO milestones in the Proposed Regulation would remain unchanged:

- Beginning in 2035, 100 percent of annual fleet usage in California must be from Tier 4 (or cleaner) locomotives.
- Beginning in 2042, 50 percent of annual fleet usage in California must be ZE.
- Beginning in 2047, 100 percent of annual fleet usage in California must be ZE (no exceptions).

Through the integration of the early adopter provision into the Proposed Regulation, CARB would:

- Deliver greater PM2.5 and NOx emission reductions to impacted communities.
- Deliver faster PM2.5 and NOx emission reductions to impacted communities.
- Catalyze a more rapid transition to 100% zero emission locomotives.
- Dramatically reduce the costs of the transition to zero emission locomotives.

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The analysis and modeling contained in this comment will be made available to CARB to facilitate complete review. It is based on the rulemaking record for the Proposed Regulation, documents received from CARB in response to a Public Records Act request, and emissions data pertaining to locomotive tiers developed by the U.S. Environmental Protection Agency. The underlying emission factors, conversion tables, assumed costs, and weighted factors are contained in Exhibit A.

I. Background

Sierra Northern is a subsidiary of Sierra Railroad Company, a privately-owned company that owns and operates short line railroads. Michael Hart, CEO of Sierra Railroad Company, has more than 25 years' experience forming and running environmentally friendly industrial companies. The U.S. Environmental Protection Agency named Mr. Hart an "Environmental Hero" for his work in biodiesel and the Obama White House named Mr. Hart a "Champion of Change" for his work in renewable energy. In the short line railroad industry, Sierra Northern has been a leader, implementing both criteria and greenhouse gas (GHG) pollutant reducing technologies. Sierra Energy, which is also led by Mr. Hart, is a pioneer in developing and deploying waste-to-fuel technologies, and built and now operates a FastOx® gasifier unit that converts trash to diesel fuel or low carbon electricity at U.S. Army Garrison Fort Hunter Liggett, an Army training center east of Monterey, California.[1]

Even before CARB commenced this rulemaking, Sierra Railroad Company directly engaged with CARB staff and leadership in an effort to collaboratively develop and implement an industry-informed, cost-effective, and feasible strategy for reducing GHG and criteria pollutant emissions in the short line railroad industry. To this end, Sierra Railroad Company developed a detailed proposal in 2019 to upgrade its pre-Tier 0 locomotives to Tier 3 and sought modest state funding and CARB support to execute this strategy ("Tier 3 Proposal"). Subsequent to the discussions with Sierra Railroad Company regarding the Tier 3 Proposal, CARB held two days of workshops on October 29th and 30th, 2020, that introduced CARB's Concepts for the In-Use Locomotive Regulation to the industry.[2]

In response to these initial CARB workshops, Sierra Railroad Company submitted an extensive comment to CARB on December 23, 2020, that described the benefits of a Tier 3 strategy. Sierra Railroad Company's Tier 3 Proposal is referenced as "Sierra's Proposal" and discussed as "Alternative 4" in the Initial Statement of Reasons ("ISOR") for this rulemaking.[3] For reference, Sierra Railroad Company's prior comment is attached as Exhibit B. It is important to note that Sierra Railroad Company's Tier 3 Proposal and comment was submitted 21 months prior to CARB's release of the Notice of Public Hearing, Proposed Regulation, and supporting rulemaking documents on September 20, 2022.[4] Thus Sierra Railroad Company's Proposal was not informed by the details of the Proposed Regulation but was instead responsive to the regulatory concepts CARB had released.

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[1] See Peter Keating, "This Company Invented an Actual Magic Want to Turn Your Trash Into Clean Energy," May/June 2022 Issue of Inc. Magazine, at https://www.inc.com/magazine/202205/peter-keating/sierra-energy-gasification-mike-hart.html

[2] See CARB website for presentations and materials, "Locomotives and Railyards: Meetings and Workshops," at https://ww2.arb.ca.gov/our-work/programs/reducing-rail-emissions-california/locomotives-and-railyards-meetings-workshops

[3] See CARB, "Staff Report: Initial Statement of Reasons, Public Hearing to Consider the Proposed In-Use Locomotive Regulation," (September 20, 2022), at p. 212-214, available at https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/locomotive22/isor.pdf

[4] See CARB, "In-Use Locomotive Regulation, Public Hearing Notice and Related Material," (Posted September 20, 2022), at https://ww2.arb.ca.gov/rulemaking/2022/locomotive

In the ISOR, CARB assessed Sierra Railroad Company's Proposal and found it to be inferior to the Proposed Regulation in multiple respects. Now that that Proposed Regulation has been fully developed complete with an AFMO component, it is worthwhile to revisit the ISOR's specific critiques of Sierra Railroad Company's previous proposal and measure these against Sierra Northern's strong recommendation to establish a 2025 Milestone option in the AFMO. This comment and recommendation is directly responsive to the 15-day changes that propose to include an AFMO in the Proposed Regulation.

II. Sierra Northern's Locomotive Strategy

Over the past the two and a half years, Sierra Northern has been deeply engaged in participating in the In-Use Locomotive rulemaking and assessing the Proposed Regulation and its implications for the railroad. As previously discussed, prior to the commencement of the rulemaking, Sierra Railroad Company had already developed a Tier 3 plan to reduce GHG and criteria pollutant emissions from its operations and proposed it to CARB. During the course of this rulemaking, Sierra Northern has emerged as an industry leader in the development of hydrogen locomotives and with its partners has been awarded nearly $4,000,000 by the California Energy Commission ("CEC") to build and test a hydrogen switcher locomotive at its West Sacramento site. Sierra Northern is the technical lead and has partnered with GTI as the formal applicant to the CEC. Other technical partners are Railpower Tech LLC, Ballard Power Systems, Optifuel Systems LLC, UC Davis Institute of Transportation Studies, Valley Vision, Velocity Strategies, Southern California Gas Company and the Sacramento Metropolitan Air Quality Management District.[5]

This active engagement on commercial, technical, and regulatory issues has enabled Sierra Northern to develop a cost-effective strategic transition to ZE locomotives that is more rapid than CARB has proposed in the Proposed Regulation. The key components of this strategy are:

- A rapid phase out of pre-Tier 3 locomotives
- A leapfrog over Tier 4 locomotives which are less fuel efficient than Tier 3's, require additional maintenance, and are not ZE locomotives
- A steady phase in of ZE locomotives that is more rapid than direct regulatory compliance with the Proposed Regulation and achieves 100% ZE locomotives in 2043, four years before the final AFMO 100% ZE locomotive milestone of 2047

To quantitively measure the benefits of its strategy, Sierra Northern engaged Zero Emission Advisors ("ZEA") to provide a comprehensive emissions modeling analysis of Sierra Northern's plan to rapidly transition out of its older locomotives to Tier 3 locomotives, then progressively transition from a Tier 3 fleet to a zero emission ("ZE") fleet of hydrogen locomotives. ZEA is a consulting firm dedicated to helping governments and businesses transform how they use energy and fuel.[6] As revealed by the following emissions analysis, the early adopter 2025 Milestone AFMO option proposed in this comment would enable this transition to occur smoothly with dramatic emissions reductions and cost savings as compared to direct regulatory compliance.

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[5] See Sierra Northern website, "California Energy Commission awards Sierra Northern Railway Team nearly $4,000,000 to build and test Hydrogen Switcher Locomotive," (March 20, 2021), at http://sierranorthern.com/news/articles/california-energy-commission-awards-sierra-northern-railway-team-nearly-4-000-000-to-build-and-test-hydrogen-switcher-locomotive/v

[6] See Zero Emission Advisors website, "ZEA Services Platform," at https://zeroemissionadvisors.com/pages/services

The following analysis is based on the profile of an average California short line (Class 3) railroad consisting of six pre-Tier 0 locomotives, three Tier 3 locomotives, and one Tier 4 locomotive. This short line profile aligns with CARB's analysis of the California's Class 3 railroad inventory. The analysis utilizes fuel usage rates based on Sierra Northern's projected use and is based on the assumption that the Proposed Locomotive Regulation including the proposed idling prohibition becomes effective by January 1, 2024 (collectively, the "Sierra Modeling Scenario").[7]

III. Adding a 2025 Milestone as an AFMO Option Provides Greater and Faster Emissions Reductions and Better Improves Public Health Including in Communities Adjacent to Railyards and Freight Operations

In the ISOR for this proceeding, CARB found a number of deficiencies in Sierra Railroad Company's Plan, referred to as Alternative 4 in the ISOR. As previously noted, Sierra Railroad Company's Plan was developed during the early stages of this proceeding when CARB had not provided any proposed regulatory language but had shared only its concepts for the In-Use Locomotive Regulation. Since that time: CARB has proposed specific regulatory language; Sierra Northern's strategy has been refined to address CARB's long-term goals; CARB released the AFMO structure in the 15-day changes; and Sierra Northern developed the early adopter 2025 Milestone AFMO option. Nonetheless, CARB's ISOR critique of Alternative 4 still provides an appropriate set of metrics for reviewing the 2025 Milestone AFMO option.

CARB found the following deficiencies in Alternative 4:

- It would achieve substantially less emission reductions for PM2.5
- It would achieve substantially less emission reductions for NOx
- It would fail to provide significant public health benefits including to communities adjacent to railyards and freight facilities throughout the state[8]

The graphics below depict the annual and cumulative emission reductions that the proposed 2025 Milestone AFMO option would provide as compared to direct regulatory compliance based on the Sierra Modeling Scenario. As the graphics illustrate, the 2025 Milestone AFMO option provides greater and faster PM and NOx emissions reductions than direct regulatory compliance, brings ZE locomotives onto the tracks faster, and substantially reduces costs for the California short line industry thereby saving California consumers money and expanding their access to goods.

PM10/ PM2.5 Methodology

As CARB is well-aware, the precise emission factor relationship between PM10 and PM2.5 is highly complex and situational. The relationship is vitally important from a health effects

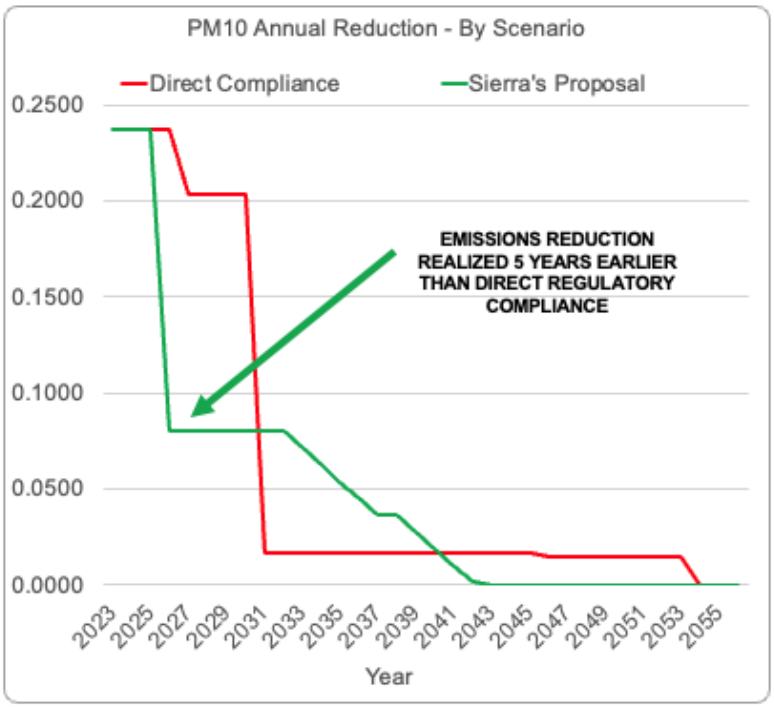
[7] Note that Sierra Northern's projected fuel use per locomotive of 6,500 gallons/year is significantly lower than the estimated average for Class 3 locomotives determined by CARB as is indicated in the attached Exhibit A, Assumptions and Methodology. Note also that CARB's estimate of 22,000 gallons/year is for current fuel use based on limited data and does not take into account fuel savings from the idling provision. To the extent that CARB has concerns that the 2025 AFMO provision could lead to increases in emissions as compared to direct regulatory compliance in fleets with greater fuel usage per locomotive, the agency could impose a parallel provision as exists in the Alternative Compliance Plan §2478.7(b) requiring that a fleet utilizing the 2025 Milestone AFMO option achieve at least as great emission reductions as direct regulatory compliance would provide.

[8] See CARB, "Staff Report: Initial Statement of Reasons, Public Hearing to Consider the Proposed In-Use Locomotive Regulation," (September 20, 2022), at p. 212-214, available at https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/locomotive22/isor.pdf

standpoint with PM2.5 being the pollutant of primary concern.[9] However, the emission standards set by the United States Environmental Protection Agency ("U.S. EPA") are based on PM10 g/bhp-hr.[10] Therefore, this comment is based on emission analyses of PM10 rather than PM2.5, and this is accurately reflected in the following graphics. Given that the average emission factor that CARB[11] and the South Coast Air Quality Management District[12] have established for converting PM10 to PM2.5 for locomotive emissions is approximately .97 for the various tiers, the reduction benefits of a 2025 Milestone option is nearly equivalent in terms of PM2.5 reductions.

PM10 Reductions-Annual

Based on the Sierra Modeling Scenario detailed in Exhibit A, a short line fleet that meets the 2025 Milestone AFMO option as well as CARB-proposed AFMO milestones 2-4 will achieve a dramatic drop in annual emissions in 2025, followed by a plateau 2025-2032, followed by a gradual descent to zero PM10 (and PM2.5) emissions in 2042, then zero emissions in all years after 2042. This emissions profile dramatically outperforms direct regulatory compliance in annual emission PM 10/PM2.5 reductions in all years except 2031-2040.



[9] See CARB website, "Inhalable Particulate Matter and Health (PM2.5 and PM10) at https://ww2.arb.ca.gov/resources/inhalable-particulate-matter-and-health

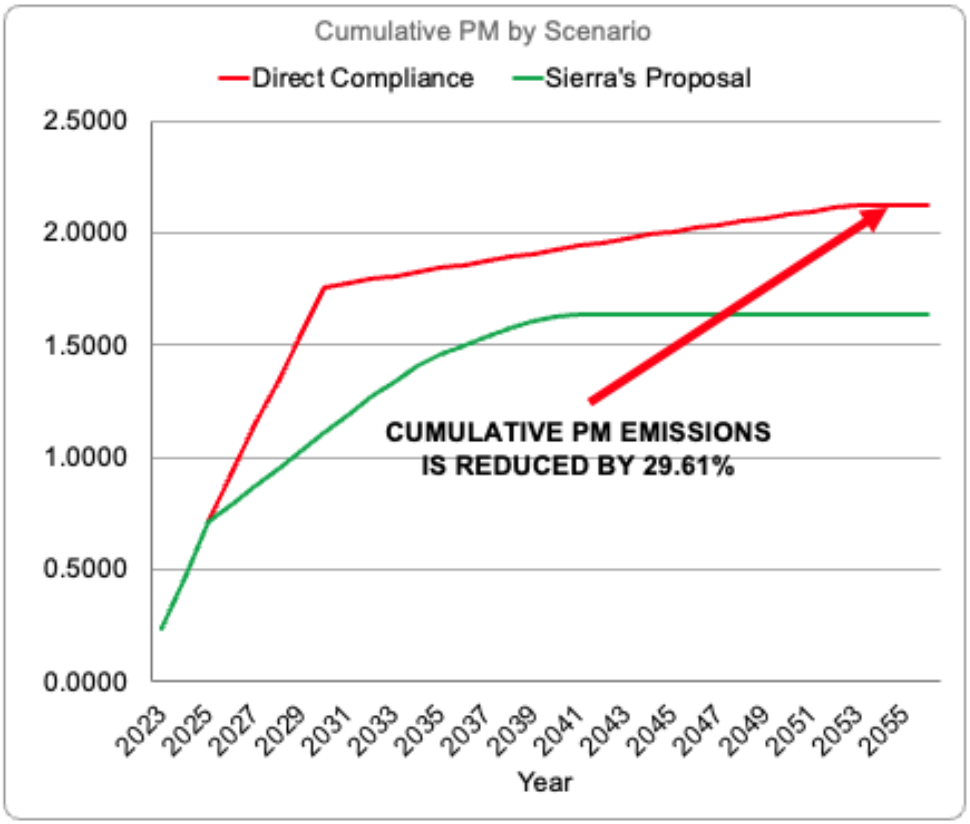
[10] See U.S. EPA, Emission Factors for Locomotives (EPA-420-F-09-025), Office of Transportation and Air Quality, April 2009, at *https://nepis.epa.gov/Exe/ZyPDF.cgi/P100500B.PDF?Dockey=P100500B.PDF*

[11] See CARB, "California Climate Investments Quantification Methodology Emission Factor Database Documentation" at Table 9, "Locomotive Line Haul Emission Factors," at p. 23, at https://ww2.arb.ca.gov/sites/default/files/auction-proceeds/ef_database_documentation.pdf

[12] See South Coast Air Quality Management District, "Final- Methodology to Calculate Particular Matter (PM) 2.5 and PM 2.5 Significance Thresholds," (October 2006), at Appendix A, "Updated CEIDARS Table With PM2.5 Fractions," reference: INTERNAL COMBUSTION- DISTILLATE AND DIESEL- EXCEPT ELECTRIC GENERATION, at p. A-2, available at http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/particulate-matter-(pm)-2.5-significance-thresholds-and-calculation-methodology/final_pm2_5methodology.pdf

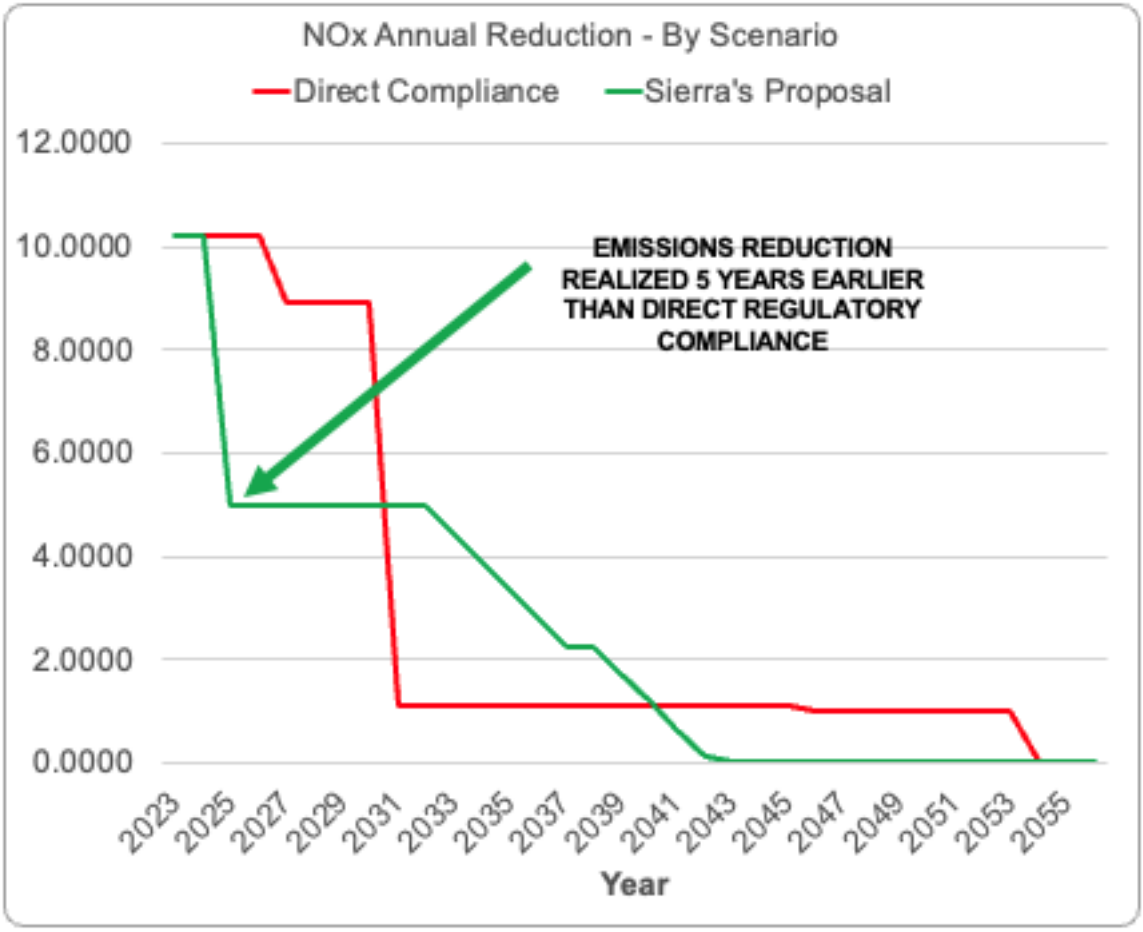
PM10 Cumulative

As a result of the early retirement of pre-Tier 0 locomotives coupled with the early adoption of ZE locomotives, the early adopter Milestone 2025 short line fleet reduces PM10 (and PM2.5) emissions by approximately 30% compared to direct compliance on a cumulative basis.



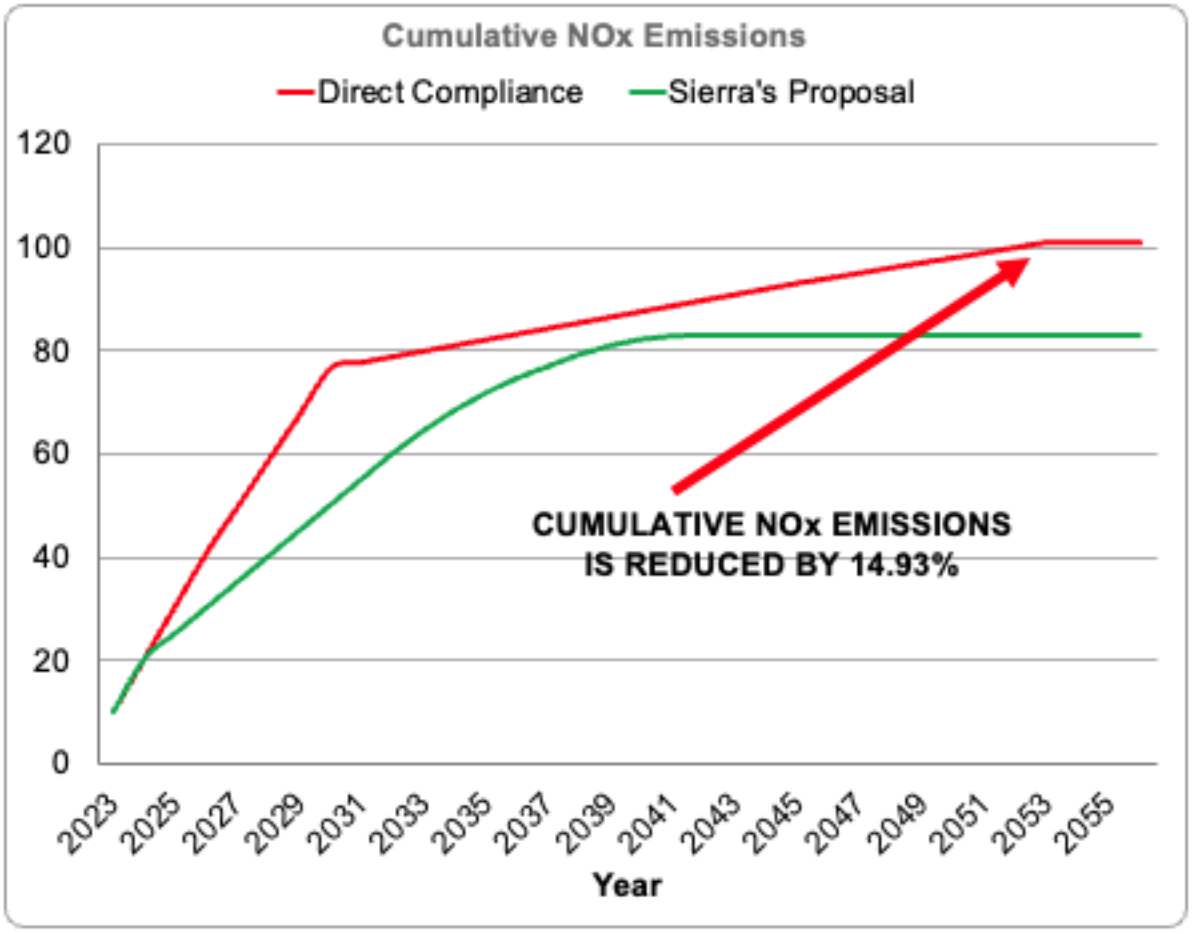
NOx Annual

Similarly, the early adopter 2025 Milestone short line fleet achieves NOx reductions five years earlier than the direct regulatory compliance fleet and drops to zero NOx emissions 12 years prior to the direct compliance fleet.



NOx Cumulative

As is the case regarding the PM10/PM2.5 benefits of this proposal, the early adopter 2025 Milestone fleet delivers superior cumulative NOx emissions beginning 5 years sooner. Throughout the period 2024-2055, the early adopter AFMO fleet consistently outperforms standard regulatory compliance. Overall, the 2025 Milestone option provides approximately 15% greater cumulative NOx reductions due to the early retirement of pre-Tier 0 locomotives and early adoption of ZE locomotives.



Public Health Benefits

The "Health Analysis for the Proposed In-Use Locomotive Regulation" is found at Appendix H of the rulemaking record.[13] It states:

> *"Emissions from diesel-powered locomotives in California contribute to high levels of criteria air pollutants and toxic air contaminants, which leads to adverse health effects including respiratory and cardiac illnesses, hospitalizations and deaths, and lung cancer. Thus, shifting towards cleaner and ZE locomotive technology will lead to substantial public health benefits.*
>
> *For the current Proposed Regulation, staff have quantified a portion of the health benefits (i.e., cardiopulmonary mortality, hospitalizations, and emergency room visits) expected from the Proposed Regulation. In addition, this appendix also discusses the existing scientific literature looking at the health effects from air pollution, and from the diesel emissions associated with rail operations. Altogether, the Proposed Regulation will provide substantial improvements to public health, especially to the communities disproportionately impacted by rail operations."*[14]

As is indicated by the emissions analysis that has been provided, the utilization of an early adopter 2025 Milestone AFMO option will enable reductions of PM 2.5 and NOx emissions to be implemented on a more rapid timetable thus providing health benefits to the public sooner including to communities adjacent to railyards and freight facilities throughout the state. This compliance option will also provide greater cumulative emission reductions of both PM 2.5 and NOx thus providing greater health benefits to the public including to communities adjacent to railyards and freight facilities throughout the state.

Due to the complexity of modeling air quality impacts, public health benefits, and avoided illnesses and deaths, we have not attempted to quantify the public health benefits of these more rapid and more substantial PM 2.5 and NOx reductions. However, the fact that the reductions will occur sooner and will be more substantial is sufficient to establish that the valuable public health benefit including to communities adjacent to railyards and freight facilities throughout the state will be greater as compared to direct regulatory compliance.

[13] CARB, Public Hearing Notice and Related Material (Posted September 20, 2022), Appendix H: Health Analyses for the Proposed In-Use Locomotive Regulation, https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/locomotive22/apph.pdf

[14] Id. at p. 21-22.

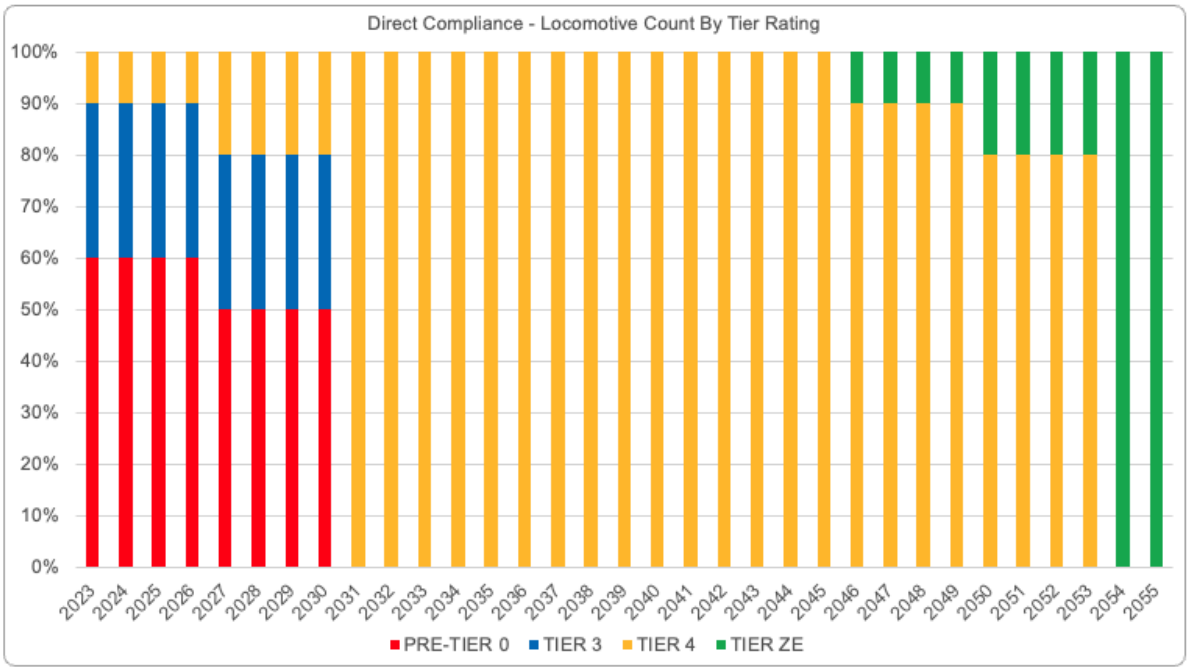
IV. Adding a 2025 Milestone AFMO Option Speeds ZE Transformation and Reduces Costs for the Short Line Industry and California Citizens

Beyond PM and NOx pollution reductions and public benefits, there are two substantial additional benefits to the implementation of an early adopter 2025 AFMO Option:

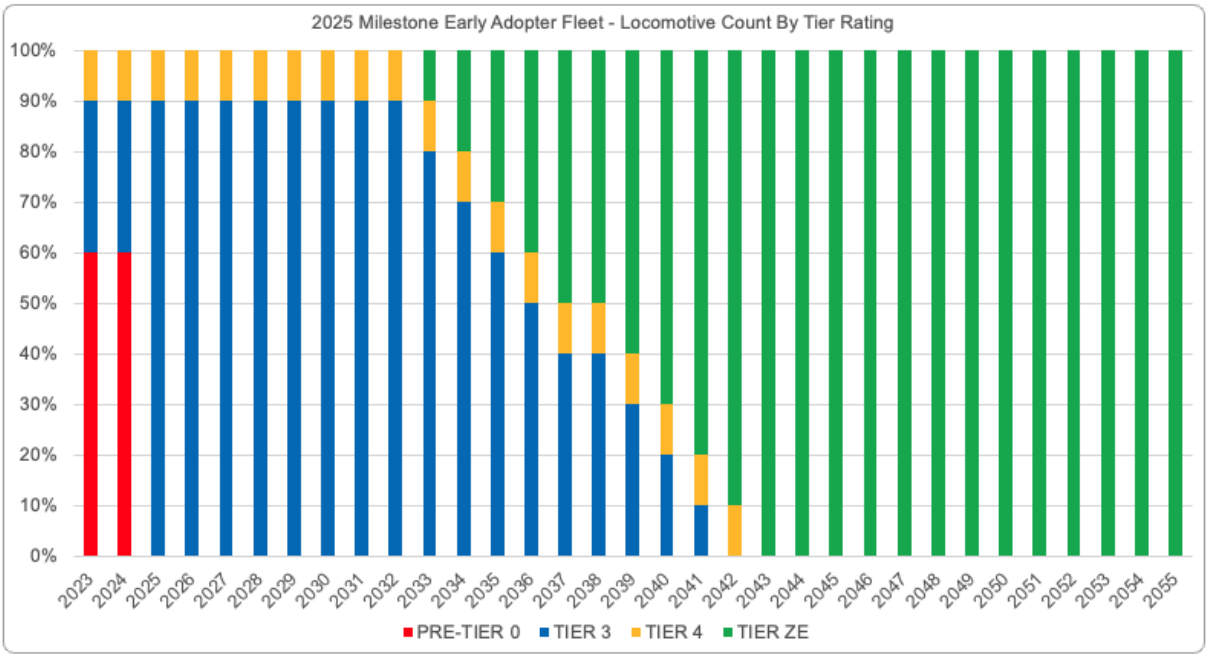
- A More Rapid Transition to Zero Emission Locomotives
- Cost Savings to the Short Line Industry that will reduce cost impacts to California citizens

Fleet Transformation

The following graphic illustrates the transition from the current California short line fleet to the zero-emission fleet of the future based on direct regulatory compliance.



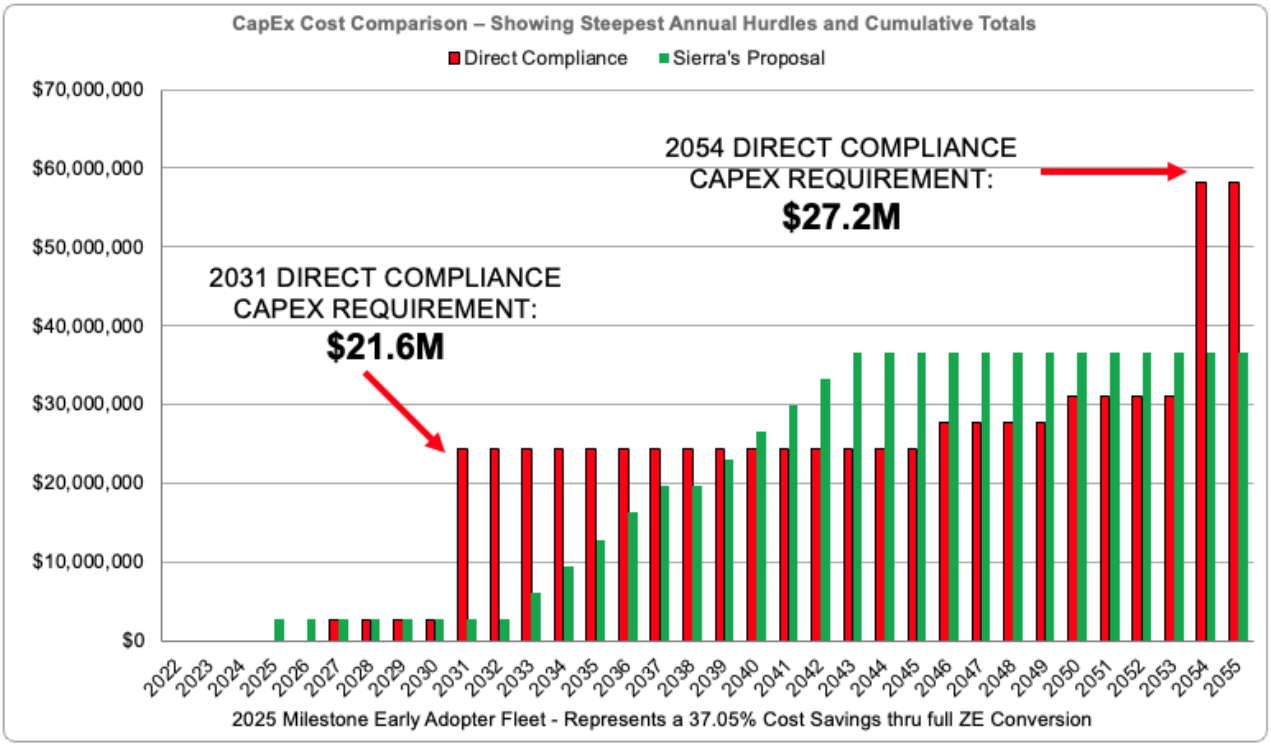
The following graphic illustrates the transition from the current California short line fleet to the zero-emission fleet of the future based on compliance with the revised AFMO with a 2025 Milestone option as proposed by this comment.



Savings to the Short Line Industry and California Citizens

Due to the structure of the Proposed Regulation, direct regulatory compliance will require short line fleets to transition suddenly to Tier 4 requiring substantial capital expenditures, and then again to encounter substantial costs in transitioning to ZE locomotives.

In contrast, the 2025 Milestone option coupled with the CARB-proposed AFMO structure requires modest and steady CapEx expenditures 2025-2032, followed by gradually increasing expenditures 2033-2043. By 2024, the fleet has been completely converted to ZE locomotives. The overall savings is a very substantial 37% (approximately $20,000,000) as compared to direct regulatory compliance.



As previously noted, Sierra Northern's strategy includes the following components:

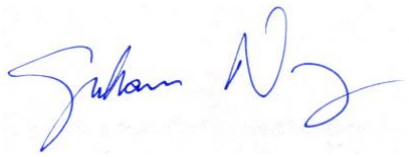
- A rapid phase out of pre-Tier 3 locomotives
- A leapfrog over Tier 4 locomotives which are less fuel efficient than Tier 3's, require additional maintenance, and are not ZE locomotives
- A steady phase in of ZE locomotives that is more rapid than direct regulatory compliance with the Proposed Regulation

To the extent that CARB integrates the early adopter 2025 Milestone AFMO option into the Proposed Regulation, substantial savings will be realized by California short line fleets. In addition to the overall cumulative savings, these fleets will not encounter sudden spikes in capital expenditures that direct regulatory compliance would entail. Since the short line rails deliver all manner of goods and commodities to California's businesses and communities, these more manageable and less volatile costs will similarly protect California citizens from increased inflation and sudden price spikes.

Conclusion

We appreciate the opportunity to submit these comments and remain available for additional engagement regarding the Proposed Regulation and the opportunities that exist to enhance the benefits, and to reduce the costs, to Californians of transitioning California's short line fleet.

Sincerely,



Graham Noyes

Cc: Michael Hart, President and CEO, Sierra Railroad
Kenneth Beard, CEO, Sierra Northern Railway

Exhibit A

CONVERSION FACTORS		
Rate Schedule	**Factor**	**UOM**
CARB Statewide Locomotive Population 2017	160	EA
CARB Statewide Fuel Consumption Short Line	3500000	GAL
CARB 2017 AVG Fuel Consumption Per Locomotive	21875	GAL
Class III Operator Locomotive Population	10	EA
Class III Operator Avg Fuel Consumption Annually	65000	GAL
Class III Operator Avg Fuel Consumption Per Locomotive	6500	GAL

Fuel Consumption Conversion Table		
Locomotive Type	**Rated Horsepower**	**Conversion Factor MWh/Gallon**
Freight Line Haul High Power	4,000+	0.0155
Freight Line Haul Low Power	2301-3999	0.0137
Switcher	Less Than 2300	0.0113
Industrial	All	0.0113
Passender	All	0.0155

Locomotive Assumed Costs					
Classification	**Class I Line Haul**	**Class I Switcher**	**Class III Shortline**	**Passenger**	**Industrial**
Tier 3	$2,500,000		$450,000		
Tier 4	$3,100,000	$2,700,000	$2,700,000	$7,500,000	$2,160,000
Tier 5	$4,000,000				
Zero Emission	$5,250,000	$3,400,000	$3,400,000	$13,000,000	$3,100,000
Zero Emission Infrastructure	$100,000	$300,000	$300,000	$1,500,000	$300,000

Baseline MWhs Per Locomotive Class				
Tier	**Class I Line Haul**	**Class I Switcher**	**Class III Short Line**	**Passenger**
Pre-Tier 0	15	456.9	251.4	1846.5
Tier 0	127.3	456.9	64.3	1242.1
Tier 0+	160.6	456.9	239.4	1617.7
Tier 1	148.2	456.9	239.4	1617.7
Tier 1+	245.6	456.9	239.4	1617.7
Tier 2	194.7	456.9	239.4	1985.3
Tier 2+	399.4	456.9	239.4	1617.7
Tier 3	333.9	456.9	229.3	465.3
Tier 4	351.3	456.9	240.8	1827.7
ZE	351.3	456.9	240.8	1827.7

Exhibit A

Tier Rating	PM10	HC	NOx	CO	BPH-hr/Gal	TOG (1.44*HC)	ROG (1.21*HC)
Pre-Tier 0	0.32	0.48	13	1.28	15.2	0.6912	0.5808
Tier 0	0.32	0.48	8.6	1.28	15.2	0.6912	0.5808
Tier 0+	0.2	0.3	7.2	1.28	15.2	0.432	0.363
Tier 1	0.32	0.47	6.7	1.28	15.2	0.6768	0.5687
Tier 1+	0.2	0.29	6.7	1.28	15.2	0.4176	0.3509
Tier 2	0.18	0.26	4.95	1.28	15.2	0.3744	0.3146
Tier 2+	0.08	0.13	4.95	1.28	15.2	0.1872	0.1573
Tier 3	0.08	0.13	4.95	1.28	15.2	0.1872	0.1573
Tier 4	0.015	0.04	1	1.28	15.2	0.0576	0.0484
Tier 5	0	0	0	0	0	0	0
Tier ZE	0	0	0	0	0	0	0

NOYES LAW
CORPORATION
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December 23, 2020

Richard Corey
Executive Officer

Steve Cliff
Deputy Executive Officer

Sydney Vergis
Mobile Source Control Division Chief

Air Resources Board
1001 I Street
Sacramento, CA 95812

RE: Sierra Railroad Company's Comments Concerning the California Air Resources Board's Locomotive Regulatory Plans, including Sierra's Proposed Alternative Shortline Locomotive Emission Reduction Proposal

Dear Richard, Steve, and Sydney,

This letter sets forth Sierra Railroad Company's ("Sierra") comments concerning the California Air Resources Board's ("CARB") recently announced plan to reduce shortline locomotive emissions (the "Plan"). This letter also sets forth Sierra's proposal of an alternate concept (the "Proposal") which Sierra believes likely to provide greater criteria pollutant emission reductions – more quickly, at less cost, and with fewer obstacles to implementation – than CARB's Plan. The letter includes an 11 locomotive analysis comparing the Sierra Proposal with the CARB Plan. The analysis demonstrates that for this particular fleet of shortline locomotives the Sierra Proposal would achieve greater cumulative NOx and PM10 emission reductions than the CARB Plan through 2050 at less than one-tenth of the cost.

Please note that Sierra's comments are focused solely on California's shortline railroad industry and do not address other railroad sectors.

Summary of Conclusion

Due to the benefit of early and complete fleet conversion, the Sierra Proposal outperforms the CARB Plan by achieving reductions of PM10 and NOx emissions in the 2020s that the CARB Plan cannot deliver until 2050. In one-third the timeframe and at one-tenth the cost, the Sierra Proposal is superior to the CARB Plan and should be the way forward for CARB and the State, serving as a model for the country as a whole.

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Overview

Michael Hart, Sierra's CEO, is a longstanding environmentalist with more than 25 years' experience forming and operating environmentally-friendly companies. These companies include Sierra Northern Railway, a shortline freight railroad; Mendocino Railway, a shortline freight and tourist railroad that, among other things, operates the world-famous Skunk Train; and Sierra Energy Corporation, a world leader in converting non-recyclable wastes into *carbon-negative* fuels for the railroad industry and others.

Though federal preemption and minimal federal locomotive emissions standards have granted the national railroad industry relative immunity from emissions regulation, Mr. Hart has nevertheless sought to make Sierra a leader in reducing railroad criteria-pollutants and GHG-pollutants through innovative clean-energy technologies and projects. In 2011 and 2012, Sierra Northern Railway secured funding via the San Joaquin Valley Air Pollution Control District's ("Valley Air District") Technology Advancement Program, and via an Environmental Protection Agency Target Air Shed Grant from the Sacramento Air Quality Management District, to repower two locomotives with Tier 4 engines. While this funding was much appreciated, each of the funding applications required almost a full year of work and the $2 million cost of each Tier 4 engine meant that the number of fundable projects and the criteria- and GHG-pollutant reductions that could be achieved were very limited. Most recently, Mr. Hart's efforts led the California Energy Commission to issue a grant to Sierra, along with Shell, to construct and demonstrate a zero-emission hydrogen locomotive at the Port of West Sacramento.[1] As a result of his efforts, the United States Environmental Protection Agency ("EPA") named Mr. Hart an "Environmental Hero," and President Obama name him a "Champion of Change."

Mr. Hart continued to believe there had to be a better way to reduce locomotive emissions, and a method to do so on a larger scale. Mr. Hart discovered a better way in 2018 when he learned that Union Pacific Railroad ("UP"), a Class 1 railroad, was scrapping a large number of its Tier 3 locomotives as part of an upgrade to Tier 4 locomotives. Mr. Hart realized that the Tier 3 locomotives were still perfectly functional and, if transferred to shortlines, would reduce shortline PM_{10} emissions by 75% and NO_x emissions by 62% when compared with Pre-Tier 0 locomotives.[2]

Unfortunately, Mr. Hart discovered this opportunity at the last minute, after the Tier 3 locomotives had already begun to be scrapped. Without time to discuss this opportunity with CARB or local air districts before the locomotives were destroyed and the opportunity would be lost forever, Mr. Hart took the risk of purchasing 11 of UP's Tier 3 locomotives in the hope that he could work out an after-the-fact agreement with California's air quality officials, thereby preserving an all-too-rare opportunity to reduce locomotive criteria- and GHG-pollutants.

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[1] See GFO-20-604 - Hydrogen Fuel Cell Demonstrations in Rail and Marine Applications at Ports (H2RAM). The Sacramento Metropolitan Air Quality Management District has partnered in this effort, contributing $500,000 to the project.

[2] These NOx and PM reductions are based on the information presented by CARB at the 2020 Locomotive Emissions Inventory Workshop, at slide 6 regarding the emission factors of the various Tiers. The presentation is available at https://ww2.arb.ca.gov/sites/default/files/2020-09/CARBlocoinvwebinar2020.pdf Note that these emission factors do not distinguish between switcher and line-haul locomotives, as do the more precise emission factors included in the Carl Moyer Program Guidelines and also referenced in this comment letter and Exhibit B.

While CARB has consistently praised the cost-effectiveness and emissions reduction potential of Sierra's Proposal, CARB has asserted that Mr. Hart's proactive approach in saving the locomotives from destruction before acquiring public funding approval precludes CARB funding support. CARB's position has confounded Sierra, not only because Sierra cannot without public assistance afford to keep and retrofit the locomotives for Class 3 use, meaning these environmentally-friendly locomotives will have to be scrapped, but also because Sierra's Proposal seems virtually identical to CARB's own concept presented during direct outreach to the railroad industry in December 2019, which would have enabled shortline railroads to reduce their emissions by acquiring retired Tier 3 locomotives from Class 1 railroads.[3] CARB's refusal to fund Sierra's Proposal is all the more confusing given that CARB's Air Quality Planning and Science Division predicted that long locomotive lifespans will result in no improvement in shortline emissions before at least 2050 at the locomotive emissions inventory workshop held on September 3, 2020.[4]

However, CARB seems to have abandoned its Tier 3 acquisition plan and to have shifted to a far more complicated Plan that would require California's railroads to contribute money to segregated accounts out of which the railroads would purchase Tier 4 and Tier 5 locomotives to replace their existing, less environmentally-friendly, locomotives. CARB's Plan has significant problems. First, courts have consistently found such state regulation of railroads to be federally preempted. Second, the Plan would burden railroads with a prohibitively expensive tax that is likely to bankrupt every California shortline, undermining or outright destroying the State's port and rail transportation systems while at the same time dramatically increasing truck emissions and putting immense pressure on California's aging road and bridge infrastructure.[5]

Another problem with CARB's Plan is its cost to value proposition. As CARB recognized in its October 30, 2020 Regulatory Plans Workshop, a single Tier 4 line-haul locomotive costs approximately $3,000,000.[6] Even if a shortline could afford to purchase such an expensive locomotive every few years, it would take decades before any shortline could replace all its existing locomotives with Tier 4 locomotives. Sierra's Proposal, by comparison, would cost 90% less (about $300,000 per Tier 3 upgrade) while still reducing shortline PM_{10} emissions by 75% and NO_x emissions by 62%, thereby providing a much faster path to improving California's air quality.

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[3] CARB and South Coast AQMD, "Plans to Reduce Emissions from Locomotives and Railyards, at slide 16, see https://ww2.arb.ca.gov/sites/default/files/classic//railyard/docs/12092019_%20ADA%20Version%20to%20Post.pdf

[4] CARB, *2020 Locomotive Emissions Inventory*, Presentation for Public Workshop prepared by Air Quality Planning & Science Division (September 3, 2020), at https://ww2.arb.ca.gov/sites/default/files/2020-09/CARBlocoinvwebinar2020.pdf, slides 40 and 41.

[5] See attached Exhibit A, *Sierra Railroad's Response to Notice of Preparation of Draft Substitute Environmental Document, In-Use Locomotive Regulation*, dated November 25, 2020, to Rebecca Fancher of the California Environmental Quality Act ("CEQA") Unit. The Sierra response describes the potentially profound impacts of CARB's Plan on California's infrastructure and environment. See also CEQA Notice at https://files.ceqanet.opr.ca.gov/265550-2/attachment/_TwJkx8raCDhIpxY-t_2nYf9jcJG7ZG7b5PhqdwrV6KYowMj0RlkK9iAFcn_0AyAbp9tCx5BvBCqTSOL0 .

[6] CARB, *Plans for In-Use Locomotive Regulation Workshop, Day 2* (October 30, 2020), slide 39 at https://ww2.arb.ca.gov/sites/default/files/2020-12/2020.10.28%20841AM%20Workshop%20Slides%20Day%202%20-%20Remediated.pdf

If CARB helped California shortlines fund locomotive upgrades in this manner, shortlines could afford to quickly upgrade their entire locomotive fleets, rather than upgrading just one locomotive every few years.

Because of the compelling emission reduction benefits and the minimal risks or obstacles to implementation presented by Sierra's Proposal, the remainder of this letter addresses that Proposal by specifically responding to CARB's objections, explaining why the Valley Air District has expressed qualified support for Sierra's Proposal, and reviewing CARB's findings concerning California's shortline emissions inventory. This letter also examines how CARB's own findings and technical analysis corroborate the value of Sierra's Proposal by presenting a case study that uses established CARB methodologies to compare the costs and benefits of CARB's Plan with those of Sierra's Proposal.

Sierra's Proposal

As noted above, Mr. Hart learned in 2018 that UP was scrapping a fleet of Tier 3 locomotives. Mr. Hart realized those locomotives could be used to upgrade 11 of Sierra Northern Railway's Pre-Tier 0 locomotives, reducing shortline PM_{10} emissions by 75% and NO_x emissions by 62%, for approximately 10% of the cost to upgrade to Tier 4 locomotives. This immediately impactful locomotive emission reduction strategy would substantially decrease statewide criteria- and GHG-pollution at a drastically lower cost/ton than any other plan Mr. Hart was aware of. As UP had already begun scrapping its locomotives, Mr. Hart understood that all the locomotives would be destroyed before he could complete what was certain to be at least a yearlong process in seeking funding from CARB. Mr. Hart thus took the financial risk of buying the 11 locomotives on spec to preserve the opportunity. Since that time, Sierra has dedicated substantial internal and external resources in an effort to secure funding for its Proposal.

CARB staff, management, and Governing Board members have consistently praised the cost-effectiveness and attractiveness of Sierra's Proposal, as well as its potential to deliver immediate and substantial criteria pollutant reductions in one of the State's toughest industrial sectors. The latent value of Sierra's Proposal to the people of California is demonstrated by comparing the cost-effectiveness of its proposed 11-locomotive upgrade to a single Tier 4 locomotive upgrade using the Carl Moyer Program ("CMP") established methodology (as shown in Table 1 below).[7]

[7] Roxana Bekemohammadi of Manticore Advocacy, LLC developed the calculations underlying this table. The first column is based on the specific information pertaining to Sierra's Proposal regarding fuel consumption and other CMP factors. These calculations have been discussed and reviewed with Ken Bhatti of the Air Resources Board, with each of the three involved air districts considered separately. On a per locomotive basis, the analysis yielded a cost-effectiveness figure of $3,078 for Valley Air District, $11,389 for Sacramento APCD, and $4,071 for Mendocino APCD (see Exhibit B-1) based on an average fuel usage of 3,100 gallons/year. The Table 1 chart consolidates the entire Proposal involving 11 locomotives and compares it to a single Tier 4 upgrade. Note that the emission factors used by CARB and Ms. Bekemohammadi were based not on line-haul but on switcher locomotives. For comparison purposes, the line-haul emission factors have also been used to calculate cost-effectiveness (see Exhibit B-2) yielding similar results but this analysis has not been discussed and reviewed by CARB. Sierra is fully available to further engage with CARB on the relative cost-effectiveness of the Sierra Proposal.

Table 1

	Sierra Proposed	Tier 4 Locomotive Upgrade
Number of Locomotives	11	1 (San Joaquin)
Total Project Cost	$3,850,000	$2,850,000
Cost Effectiveness (dollars/weighted ton)	$18,228.73	$116,791.16
Max Funding (85% funding)	$3,272,500	$2,422,500
NOx Emission Reductions (tons/year)	13.50	1.44
ROG Emission Reductions (tons/year)	0.50	0.09
PM Emission Reductions (tons/year)	0.34	0.03

Because of the remarkably cost-effective reductions delivered by Sierra's Proposal, the Valley Air District (the San Joaquin Valley Air Pollution Control District where Sierra had planned to replace six of its Pre-Tier 0 locomotives with Tier 3 locomotives) has confirmed its willingness to work with Sierra, CARB, and the EPA to secure funding for Sierra's Proposal. Notably, Sierra's Proposal is just the first step Sierra has taken to upgrade its entire fleet to Tier 3 locomotives. In addition to the 11 locomotives at issue here, Sierra has secured another 13 Tier 3 locomotives that could be similarly deployed as future replacements, demonstrating the viability and scalability of the Proposal and the need for a dedicated and streamlined program that enables Class 3 railroads to take advantage of decommissioned Tier 3 locomotives designated for scrap as they become available in the market.

CARB's Assessment of Sierra's Proposal's CMP Eligibility

CARB has generously engaged in several discussions with Sierra as to Sierra's Proposal but has consistently concluded these discussions with statements such as, "It is a great proposal that would provide emission reductions far more cost-effectively than other locomotive proposals, but it is not eligible for CMP funding." CARB has given various reasons for this alleged ineligibility, and those reasons have generally referenced the fact that Sierra has already purchased the locomotives and asserted that CMP guidelines limit funding to Tier 4 locomotives.

Ms. Bekemohammadi also developed the Tier 4 column which has previously been provided to CARB. The cost for the Tier 4 locomotive for modeling purposes was $2,850,000, slightly lower than the $3,000,000 cost CARB used as its Tier 4 estimate in its Regulatory Plans workshop. The fuel usage for the single Tier 4 was set based on the highest use locomotive in the Sierra fleet, with a fuel consumption of 17,785 gallons/year. Thus the Tier 4 cost-effectiveness analysis utilized the highest possible fuel consumption rate to improve the relative cost-effectiveness of the Tier 4. The cost-effectiveness of $116,791 per weighted ton for Tier 4, is well in excess of the $30,000/ton limit for locomotives established by CMP Guidelines.

While CARB's firmly-established discretionary authority to approve CMP funding proposals on a case-by-case basis should overcome the above non-statutory eligibility issues,[8] the more serious eligibility issue CARB has raised pertains to whether the emission reductions provided by Sierra's Proposal would be creditable under the California State Implementation Plan ("SIP-creditable").[9] This issue has been framed in several ways, including whether the resulting reductions would be surplus or, more colloquially, whether these reductions would be "anyways" or "business as usual" reductions.

Sierra's regulatory counsel on October 12, 2020 provided CARB's Deputy Executive Officer Steve Cliff with a regulatory analysis examining the relevant legal standards for SIP creditability established by CMP Guidelines and California statutes.[10] This analysis also examined the EPA's most-detailed legal analysis of SIP creditability (which addressed the Valley Air District's Rule 9610 and California's SIP). Sierra's regulatory analysis concluded that Sierra's Proposal meets all the standards for SIP-creditability established applicable EPA tests. CARB, unfortunately, has thus far declined to provide any substantive response to Sierra's regulatory analysis. Mr. Cliff was unable to attend the meeting with Sierra's regulatory counsel on October 12th, and CARB was instead represented by Division Chief Sydney Vergis. Ms. Vergis conceded that Sierra was proposing a great project but advised that she did not see any viable path forward for the project to receive funding.

Following this meeting, Sierra's regulatory counsel and the Valley Air District's incentives group (led up by Todd DeYoung, Director of Strategies and Incentives) further discussed Sierra's Proposal and the SIP-creditability issue at a virtual meeting on November 3rd. Mr. DeYoung advised that the Valley Air District is enthusiastic about Sierra's Proposal because it has the potential to provide criteria pollutant reductions at a level of cost-effectiveness "**that we don't see very often and that is never available for locomotive proposals**." Mr. DeYoung also made clear, however, that the Valley Air District would condition its support for Sierra's Proposal on EPA preapproval of the Proposal's SIP-creditability. Mr. DeYoung advised that, in practice, the EPA routinely denies SIP-creditability to projects that do not conform to CMP Guidelines.

Sierra is prepared to seek such EPA preapproval. However, Sierra believes that it would have a better chance of obtaining it if Sierra had CARB's support for its Proposal, particularly if that support came as part of an overall blueprint for rapidly reducing GHG- and criteria-pollutant emissions in California's railroad industry. Given that the incoming federal administration has stated its priority focus on criteria pollutant emission reductions and maintaining and creating American jobs and infrastructure, Sierra's Proposal presents CARB with an opportunity to break

[8] CARB, *The Carl Moyer Program Guidelines*, (2017 Revisions), Volume 1, Chapter 2 (General Criteria), at CC: "ARB may approve, on a case-by-case basis, projects that vary from the requirements of these Guidelines or do not meet all eligibility criteria in the Guidelines. Projects with case-by-case approvals must provide permanent, surplus, quantifiable, enforceable, cost-effective emission reduction benefits in California for the full contract term.(…)"

[9] The Valley Air District has qualified its support for Sierra's Proposal by emphasizing the importance of obtaining EPA confirmation that upgrading Sierra's locomotives to Tier 3 level would be SIP creditable before the project is funded.

[10] See attached Exhibit C, Noyes Law Corporation, *Regulatory Analysis of Surplus and State Implementation Plan Creditable Emissions under the Carl Moyer Program Statutes and Federal Law* (October 12, 2020).

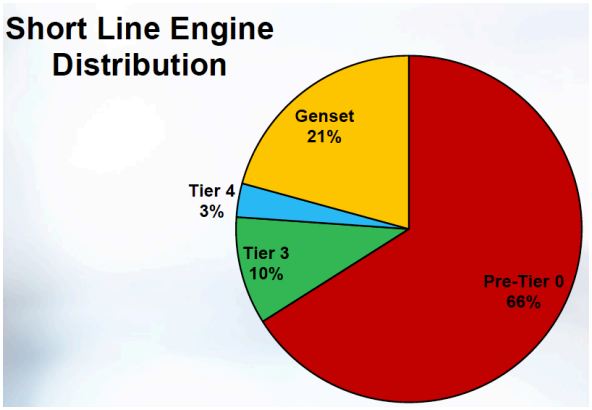
the federal logjam in reducing locomotive emissions that has existed since CARB filed its April 2017 "Petition for Rulemaking: Seeking Amendment of the Locomotive Emission Standards."[11]

The Current Trajectory of Shortline Locomotive Emissions

One of the most perplexing aspects of CARB's skepticism toward Sierra's Proposal is that it appears to run counter to CARB's assessment of the future of shortline emissions in California. While CARB has not released any public report concerning its predictions as future locomotive emissions, CARB's Air Quality Planning and Science Division addressed the State's locomotive emissions inventory in a September 3, 2020 public workshop.[12] That workshop included the following acknowledgements concerning the nature of the shortline industry and locomotive upgrades:

- Regarding Growth: "Assumed to be constant- no available future plans."
- Regarding Turnover:
  - "Assumed no turnover- companies do not make long-range business plans."
  - "Average age is 43 years old."
  - "(Engines have been bought, sold, leased over and over again)."[13]

That workshop also displayed California's shortline locomotive engine tier distribution as follows:[14]



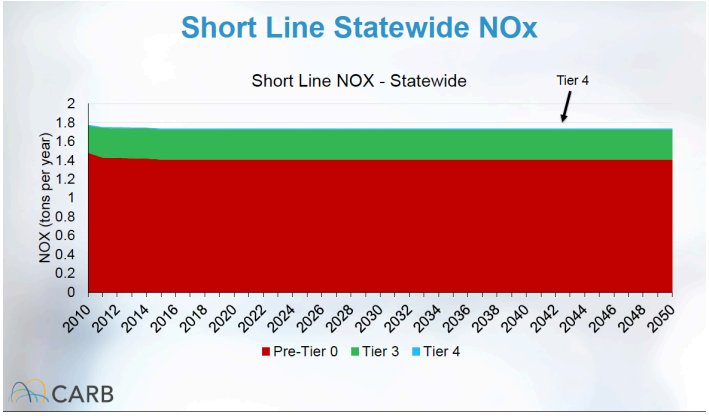
[11] CARB, Petition for EPA Rulemaking to Adopt More Stringent Emission Standards for Locomotives. See https://ww2.arb.ca.gov/resources/documents/petition-rulemaking-seeking-amendment-locomotive-emission-standards

[12] The Workshop Presentation and Workshop Announcement for the September 2020 Public Workshop for Locomotive Emission Inventory are available at https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-meetings-workshops.

[13] CARB Website, *2020 Locomotive Emissions Inventory*, Presentation for Public Workshop prepared by Air Quality Planning & Science Division (September 3, 2020), at https://ww2.arb.ca.gov/sites/default/files/2020-09/CARBlocoinvwebinar2020.pdf, slide 40.

[14] *Id*., at slide 41.

Likely because of this, the workshop reported California's shortline NO_x emissions as almost completely static over the past 10 years, and predicted that NO_x emissions would continue to remain static for at least 30 more years to come:[15]



Sierra believes that CARB correctly forecast that: (i) no Pre-Tier 0 locomotives are likely to be retired in California over the next 30 years and (ii) no existing locomotives are likely to be replaced with Tier 3 or Tier 4 locomotives. Sierra's fleet of Pre-Tier 0 locomotives are of course included within the scope of CARB's forecast. Sierra's Proposal to retire 11 Pre-Tier 0 locomotives and to replace them with 11 Tier 3 locomotives would not constitute "business as usual" but would constitute surplus emission reductions that should properly be classified as SIP-creditable, especially given that if no governmental funding is found, these 11 Tier 3 locomotives will have to be scrapped.

CARB's Locomotive Regulatory Plans

On October 30, 2020, during a two-day workshop, CARB unveiled its locomotive regulation Plan, revealing that it planned to regulate locomotive emissions through a system of mandatory contributions, a *de facto* tax per locomotive coupled with a State mandate that all shortline companies first replace existing locomotives with Tier 4 locomotives (at an estimated cost of $3,000,000 per locomotive), and then later with Tier 5 locomotives (a category that does not currently exist and at a price that will not be known until Tier 5's are commercially available). CARB's legal representative at the workshop, Rhead Enion, assured the workshop audience that CARB has the authority to enact such regulations, but declined to provide any legal authority for this position.

Federal Pre-Emption of State Regulatory Authority

Federal pre-emption of railroad operations has rendered railroads largely immune from state environmental regulation. In fact, the Interstate Commerce Commission Termination Act ("ICCTA") was passed specifically "with the purpose of expanding federal jurisdiction and

[15] *Id*., at slide 42.

preemption of railroad regulation."[16] This pre-emption generally provides the United States Surface Transportation Board ("STB") with "exclusive" jurisdiction over "transportation by rail carriers."[17] This jurisdiction is quite broad given that the ICCTA defines "transportation" to include any "property, facility, instrumentality, or equipment of any kind related to the movement of passengers or property, or both, by rail" as well as "services related to that movement."[18] This broad jurisdiction of the STB has led to an extensive and consistent body of case law that holds that state environmental regulation of railroads is categorically pre-empted.[19] The reality of this federal pre-emption is why CARB's locomotive criteria pollutant reduction goals require a market- and incentive-based solution, rather than a more "command and control" regulatory solution.

The Importance of Shortline Rail to California

CARB's Plan would have significantly adverse consequences for Sierra's ability to remain in business, without providing correspondingly incremental and cost-efficient improvements to California's air quality above those that could be achieved via Sierra's Proposal. The impact on Sierra's fleet is representative of the impact on California's shortline industry as a whole. As illustrated by the attached California railroad map, shortline locomotives begin their journeys at a long-haul railroad termination juncture.[20] Shortlines deliver freight between this point and local businesses, both ways, connecting California businesses with the rest of the nation and the world (via ports).

Sierra's three rail lines serves multiple California industries including food, chemicals, building products, animal feed, and transportation. For example, Sierra helps California farmers and producers export California rice and tomato products to locations throughout the US. Sierra also helps supply California's mountain communities with propane, California's dairy farmers with animal feed, and California's construction industry with lumber, and other California businesses with needed chemicals, limestone, and plastics. In addition to the freight services it provides to California's businesses, Sierra is also a key player in California's tourism industry, attracting foreign and domestic tourists to its world-famous excursion, dinner, and special event trains in three separate tourist markets.

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[16] *Or. Coast Scenic R.R., LLC v. Or. Dep't of State Lands*, 841 F.3d 1069, 1072 (9th Cir. 2016).

[17] 49 U.S.C. § 10501(b).

[18] *Id*., § 10102(9); see also *Or. Coast Scenic R.R*., 841 F.3d at 1073.

[19] *Friends of Eel River v. North Coast R.R*., 399 P.2d 37, 60 (Cal. 2017) (holding that "state environmental permitting or preclearance regulation that would have the effect of halting a private railroad Proposal pending environmental compliance would be categorically preempted"); see also *North San Diego County Transit Dev. Bd.—Petition for Declaratory Order*, 2002 WL 1924265 (STB 2002) (holding that the Coastal Act was preempted by ICCTA as applied to rail Proposals).

[20] See Exhibit D, Association of American Railroads, *Freight Railroads in California*, (2017). See https://www.aar.org/wp-content/uploads/2019/01/AAR-California-State-Fact-Sheet.pdf

Case Study: CARB's Plan vs. Sierra's Proposal

The following analysis reviews how CARB's Plan would apply to the 11 Pre-Tier 0 locomotives that would under Sierra's Proposal be upgraded to Tier 3 locomotives. This analysis is based on the travel-miles and fuel-use metrics set forth in Sierra's grant proposal to CARB. The locomotive tier emission factors and cost-effectiveness calculations used are CARB's own. Sierra's complete assumptions and calculations are described in the attached Exhibit B.

The CARB Regulatory Plans presented at the October 30, 2020, workshop included a "Spending Account Range Example." ("Spending Range")[21] The Spending Range for a Pre-Tier 0 locomotive is based on the annual use of the train measured in megawatt hours (MWhr) per year, and ranges from $900-$1,500. This analysis uses the midpoint of that Spending Range, $1,200 per MWhr. Based on total historical fuel usage of 34,100 gallons per year, Sierra's 11 locomotives perform 426.25 MWhr of work per year.[22] Applying the $1,200 per MWhr figure to the Sierra fleet would therefore result in a mandatory contribution of $511,500, by Sierra to the spending account annually. Under the CARB Plan, Sierra would be required to begin contributing to its spending account in 2024 based on its Annual Activity Report for 2023. Based on CARB's cost assumption of $4M for a Freight line-haul Tier 5 locomotive, Sierra would have enough in its spending account to purchase its first Tier 5 locomotive after eight years in 2032.[23]

According to CARB's Regulation Implementation Timeline, this pace of upgrades would be inadequate to address CARB's goals. CARB has proposed implementing a useful life limit in 2030, banning all locomotives below Tier 2.[24] Thus, after paying a total $511,500 for seven years from 2024-2030, Sierra would have $3,580,500 in its spending account. This would be sufficient for a single Tier 4 locomotive only after Sierra contributed an additional $419,500. For the remainder of this fleet, Sierra would be faced with a sudden mandate to purchase ten Tier 4 locomotives, at a total cost of at least $30,000,000, or ten Tier 5 locomotives, at a total cost of at least $40,000,000. Yet these 11 locomotives constitute just a portion of Sierra's overall locomotive fleet. Sierra would have to find an additional $45,000,000 to upgrade its additional 15 locomotives to Tier 4 or an additional $60,000,000 to upgrade to Tier 5.

The case study of upgrading 11 Pre-Tier 0 shortline locomotives to Tier 3 demonstrates that Sierra's Proposal outperforms the CARB Plan in delivering emission reductions to California.

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[21] CARB, *Plans for In-Use Locomotive Regulation Workshop, Day 2* (October 30, 2020), slide 48 at https://ww2.arb.ca.gov/sites/default/files/2020-12/2020.10.28%20841AM%20Workshop%20Slides%20Day%202%20-%20Remediated.pdf

[22] The fuel usage is converted to MWhr equivalent by using a conversion factor of 0.0125 MWhr per gallon.

[23] CARB, *Plans for In-Use Locomotive Regulation Workshop, Day 2* (October 30, 2020), slide 39 at https://ww2.arb.ca.gov/sites/default/files/2020-12/2020.10.28%20841AM%20Workshop%20Slides%20Day%202%20-%20Remediated.pdf .

[24] *Id*., at slide 55.

Due to its speed of implementation, Sierra's Proposal enables significant near-term emission reductions of criteria pollutants compared to CARB's Plan. With a modest level of funding support, Sierra would be able to immediately integrate 11 Tier 3 engines into its fleet in 2021, which will result NOx, ROG, and PM10 emission reductions in the 2020's. Due to its necessarily delayed implementation, the CARB Plan will not "catch up" to the Sierra Proposal and deliver comparable reductions to California until 2050.

NOx Scenario Analysis: The cumulative NOx emissions from the 11 Sierra locomotives analyzed in this case study are compared using the CARB Plan scenario vs. the Sierra Proposal scenario in Figure 1 below.

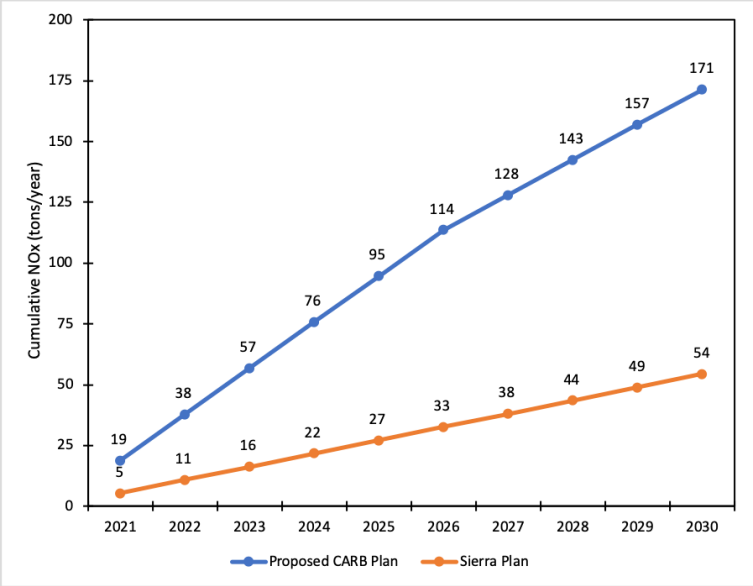


Figure 1. Cumulative NOx Emissions for CARB Plan vs. Sierra Proposal

Applying the CARB Plan scenario, if Sierra were to acquire 11 zero emission locomotives to replace its Pre-Tier 0 engines in 2031, the cumulative NOx emissions for the 11 locomotive fleet would remain steady at 170 tons after 2031. Under the Sierra Proposal, the 11 Tier 3 locomotives would not emit a cumulative 170 tons of NOx until 2051. Thus the near- and mid-term NOx reductions delivered by the Sierra's Proposal outperform the CARB Plan in achieving the criteria pollutant emission reduction goals of the State.

ROG Scenario Analysis: While not as dramatically favorable as the NOx analysis, the Sierra Proposal also performs well in terms of delivering near-term ROG emission reductions. The Sierra Proposal scenario would result in a cumulative 11 tons of ROG emissions by the 11 locomotives by 2036. Using the CARB Plan scenario, Sierra would reach 11 tons of ROG emissions by 2030 then plateau. Therefore, the CARB Plan would not "catch up" and begin to reduce ROG emissions until 2036, whereas the Sierra Proposal would result in reduced cumulative ROG emissions for a fifteen-year period.

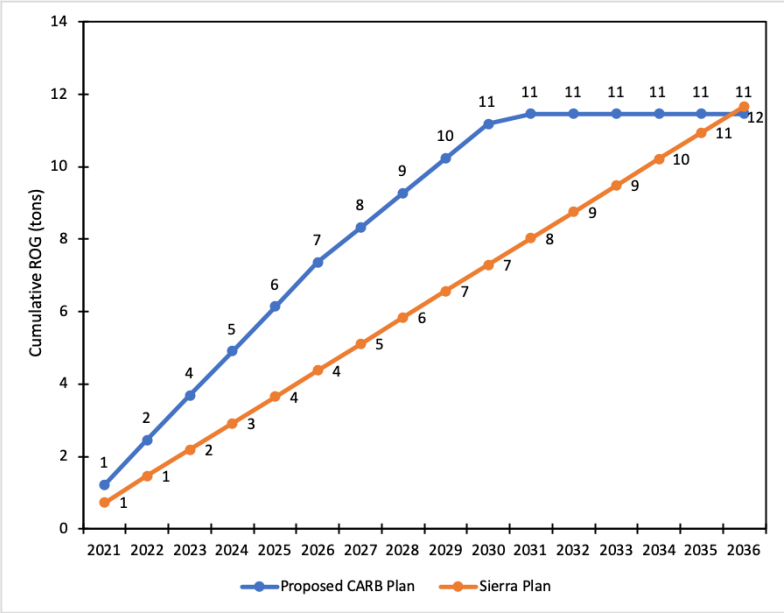


Figure 2. Cumulative ROG emissions of the CARB Plan and Sierra Proposal

PM10 Scenario Analysis: As was the case for NOx, the Sierra Proposal significantly outperforms the CARB Plan on particulate matter ("PM10") reductions for decades. During the 2020's, the CARB Plan would result in four tons of PM10 emissions compared to the single ton of PM 10 emissions under the Sierra Proposal. Even with complete fleet turnover to zero emission locomotives in 2031, the CARB Plan would not achieve parity with the Sierra Proposal until 2060 in terms of cumulative PM10 emissions.

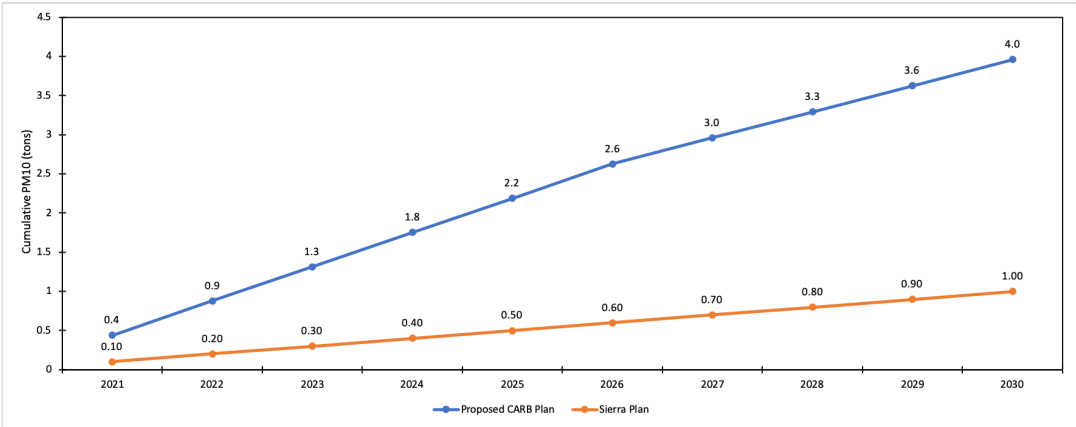


Figure 3. PM10 emissions of the CARB and Sierra plans from 2021 to 2030.

Cost Analysis: The Sierra Proposal would deliver substantial near-term NOx and PM10 reductions at a cost of $300,000 per locomotive for a total replacement cost for 11 locomotives of $3.3M. The CARB Plan would deliver NOx and PM10 reductions starting decades later at a cost of $44M for the 11 locomotives.

The Sierra Proposal Offers Multiple Advantages Compared to CARB's Plan

CARB's Plan differs markedly from CARB's prior regulatory approaches to the railroad industry and also CARB's current approach to the trucking industry.[25] CARB does not propose to offer railroads any assistance, either through the CMP or any similar programs. CARB's mandatory savings accounts are instead funded entirely by the small-margin businesses being targeted. Due to the extremely high cost of replacing a single locomotive in an industry dominated by Pre-Tier 0 locomotives, CARB's mandatory savings accounts will achieve very minimal fleet turnover even if successfully implemented. This incremental fleet turnover will persist until 2030, when CARB's imposition of a useful life "command and control" measure will likely force most or all of the State's shortline railroads out of business altogether, effectively picking a winner in freight transport. CARB may indeed be anticipating this outcome, as is suggested by the Draft Truck vs. Train Emissions Analysis that CARB has released.[26]

In comparison, Sierra's Proposal:

- Leverages one part of CARB's Plan to create a reliable supply of Tier 3 locomotives as Class 1 railroads upgrade their own locomotive stock.
- Involves a transaction between Class 1 and Class 3 railroads, supported by CMP funds, creating an incentive, rather than a tax, for Class 3 railroads to upgrade their locomotive fleets.
- Facilitates faster fleet turnover, while immediately, beginning this coming year, reducing California's shortline locomotive PM_{10} emissions by 75% and NO_x emissions by 62% compared to Pre-Tier 0.
- Provides emission reductions that are an order of magnitude more cost-effective than under CARB's Plan.
- Recognizes that because shortline railroads travel relatively short distances, massive locomotive investments are not economically feasible.
- Protects California's environment and economy.

Conclusion

Sierra shares CARB's goal of reducing locomotive emissions in California. In fact, this is a goal Sierra has worked toward for more than 25 years. But being a shortline railroad owner and operator, Sierra is deeply familiar with the problems facing shortlines, problems that include small profit-margins that do not allow for expensive equipment upgrades, especially when their existing equipment has a functional life that spans many more decades.

Sierra believes its Proposal will accomplish all of CARB's goals in a much faster and more effective manner than the CARB Plan. Even CARB appears to have understood this given that CARB's concept in 2019 of replacing pre-Tier 0's with Tier 3 locomotives made available when

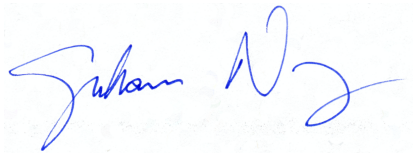
[25] See e.g. CARB, Proposed Fiscal Year 2020-2021 Funding Plan for Clean Transportation Incentives, Clean Truck and Bus Vouchers (HVIP), at 19-30 proposing an allocation of $25M for clean truck and bus vouchers, available at https://ww2.arb.ca.gov/sites/default/files/2020-11/proposed_fy2020-21_fundingplan.pdf

[26] CARB, Draft Truck vs. Train Emissions Analysis, https://ww2.arb.ca.gov/resources/fact-sheets/draft-truck-vs-train-emissions-analysis

Class 1 locomotives were upgraded was virtually identical to the Sierra Proposal. Sierra thus respectfully requests that CARB take a fresh look at the benefits provided by the Sierra Proposal (and CARB's former regulatory concept) as well as the problems that would likely be created under CARB's current Plan. These serious problems include a risk that the CARB plan will be found to be federally preempted after years of litigation, thereby costing California years of air quality improvement; and a risk of eradicating the shortline industry and causing an array of unintended environmental and economic consequences as further discussed in Sierra's CEQA letter.[27]

Regardless of CARB's future plans, Sierra asks CARB to support Sierra's effort to obtain EPA approval of the Sierra Proposal, allowing Sierra in the interim to replace 11 of its Pre-Tier 0 locomotives with Tier 3 locomotives that will, as to each upgraded locomotive, immediately reduce Sierra's PM_{10} emissions by 75% and its NO_x emissions by 62%, greatly improving California's air quality. Sierra cannot conceive of a better "win-win" for Sierra, CARB, and the people of this State. Nor can Sierra conceive of a worse "lose-lose" than forcing Sierra to send these cleaner-burning locomotives to be scrapped simply because Sierra lacks the financial ability to keep them without government help.

Sincerely,



Graham Noyes

Cc: Michael Hart, Sierra Railroad Company

[27] See Exhibit A, Sierra Railroad, Response to Notice of Preparation of Draft Substitute Environmental Document, In-Use Locomotive Regulation, dated November 25, 2020, to Rebecca Fancher of the CEQA Unit. CEQA Notice at https://files.ceqanet.opr.ca.gov/265550-2/attachment/_TwJkx8raCDhIpxY-t_2nYf9jcJG7ZG7b5PhqdwrV6KYowMj0RlkK9iAFcn_0AyAbp9tCx5BvBCqTSOL0

EXHIBIT A

NOYES LAW CORPORATION
FUEL & CARBON LAW

November 25, 2020

Rebecca Fancher
California Environmental Quality Act Unit
Air Resources Board
1001 I Street
Sacramento, CA 95812
Via email to ceqa.unit@arb.ca.gov

RE: Sierra Railroad's Response to Notice of Preparation of Draft Substitute Environmental Document, In-Use Locomotive Regulation

Dear Ms. Fancher,

This letter responds to the Notice of Preparation relating to the proposed In-Use Locomotive Regulation ("NOP") and is submitted on behalf of Sierra Railroad Company ("Sierra Railroad"). Sierra Railroad owns and operates shortline freight and tourist railroads. Its subsidiaries include Sierra Northern Railway (a freight railroad) and Mendocino Railway (a tourist railroad which operates the Skunk Train and the Sacramento River Fox Train).

At the outset, Sierra Railroad would encourage the California Air Resources Board ("CARB") to rescind the NOP, engage with the railroad industry regarding feasible means to achieve CARB's air quality objectives, and develop a viable emission reduction proposal. Based on extensive precedent establishing federal preemption in the railroad sector, the proposed In-Use Locomotive Regulation ("Proposed Regulation") appears to be a federally proscribed regulatory action. Assuming that CARB is successful in overcoming this precedent in court, the Proposed Regulation would bankrupt California's shortline railroad ("Class 3") industry, substantially disrupt California's line-haul railroad ("Class 1") industry, place tens of thousands of additional trucks on California's roads and in California's ports and railyards, and eliminate thousands of California jobs. In the public workshop, CARB estimated the cost for locomotive replacement to Tier 4 level to be $3,000,000 per locomotive.[1] Sierra Railroad's fleet includes 14 Pre-Tier 0 locomotives. The Proposed Regulation would therefore impose a $42,000,000 compliance obligation on the company. As is the case for most small companies, such a substantial expense would force Sierra Railroad and its subsidiaries out of business.

Specific to the shortline railroad industry, Sierra Railroad anticipates that constructive engagement with the industry would enable CARB to recognize the benefit of upgrading the current Class 3 locomotive inventory from the current predominance of Pre-Tier 0 locomotives to Tier 3 locomotives over a scheduled period. According to CARB's 2020 Locomotive Emissions Inventory, 66% of California's shortline locomotive inventory are Pre-Tier 0 locomotives.[2] Upgrading these

[1] CARB Concepts for In-Use Locomotive Regulatioin Workshop, Day 2 (October 30), presentation at slide 39, https://ww2.arb.ca.gov/sites/default/files/2020-11/2020.10.28%20841AM%20Workshop%20Slides%20Day%202%20-%20Remediated.pdf

[2] CARB Air Quality Planning and Science Division, 2020 Locomotive Emissions Inventory Public Workshop (September 3, 2020), presentation at slide 41, at https://ww2.arb.ca.gov/sites/default/files/2020-09/CARBlocoinvwebinar2020.pdf

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locomotives to Tier 3 provides a 75% PM10 reduction and a 62% NO_x reduction at a cost of approximately $300,000 per locomotive, a tenth of CARB's estimated $3,000,000 per locomotive cost to upgrade to a Tier 4 locomotive. While the additional $2,700,000 in expenditures would yield 30% more NO_x reduction and 20% more PM10 reduction, this extremely expensive air quality benefit is insufficient to offset the adverse air quality and other environmental impacts of massively increasing truck traffic within the State, expanding and repairing California's road system to handle that additional truck traffic, increasing truck congestion at California ports and railyards, closing shortline railyards, diverting port traffic away from California, and suffering a myriad of other negative environmental consequences that would be triggered by the Proposed Regulation.

Due to the massively detrimental and irreversible environmental impacts that are the foreseeable results of the Proposed Regulation, Sierra Railroad objects to CARB's proposed preparation of an Environmental Analysis as legally inadequate under CEQA. The foreseeable result of the Proposed Regulation is that it will fundamentally alter the patterns of freight and truck transport in the western United States, with the potential to divert global shipping away from California's ports. The Proposed Regulation therefore requires the development of a comprehensive environmental impact report under CEQA. In addition, given the dominant role of the federal government in regulating the railroad industry and railyards, the Proposed Regulation also triggers compliance obligations under the National Environmental Policy Act.

Tier 3 Replacement Provides a Reasonable Alternative

Upgrading California's short-line railroad industry to Tier 3 locomotives utilizing state incentive funds such as the Carl Moyer program is a reasonable alternative under CEQA. CARB has thus far declined to consider this alternative despite Sierra Railroad's extensive engagement with the agency on this issue. While the full details of Sierra Railroad's recommendations to CARB are outside the scope of this response to the NOP, the following summary demonstrates that replacement of Pre-Tier 0 locomotives with Tier 3 locomotives is a feasible, reasonable, highly environmentally beneficial, and far less burdensome alternative than the Proposed Regulation.

Michael Hart, CEO of Sierra Railroad, is a longstanding environmentalist who has more than 25 years of experience forming and operating environmentally-friendly industrial companies. Mr. Hart has made Sierra Railroad a leader in reducing both criteria-pollutants and GHG-pollutants through innovative clean-energy technologies, including the development and deployment of waste-to-fuel technologies such as Sierra Energy Corporation, another company owned by Sierra Railroad that is a world leader in converting non-recyclable wastes into *carbon-negative* fuels for use in the railroad industry and elsewhere. Mr. Hart's environmental efforts have not only earned him an "Environmental Hero" award from the United States Environmental Protection Agency ("EPA") but resulted in President Obama naming him a "Champion of Change."

In 2018, Mr. Hart discovered a cost-effective and scalable method to reduce criteria-pollutant and GHG-pollutants from California's shortline rail industry. He found that there are occasional windows of opportunity to purchase used Tier 3 locomotives from Class 1 railroads like UP and BNSF when those long-haul railroads upgrade to Tier 4 locomotives and retire their Tier 3 locomotives from service. In these situations, Tier 3 locomotives can be purchased at a relative bargain because:

- the locomotives take up track space and quickly become a nuisance;
- there is a limited used-locomotive market with few buyers;
- there is no regulatory requirement for shortlines to replace their aging pre-Tier 0 locomotives;

- there is no commercial reason for shortlines to buy Tier 3 locomotives which require costly repairs and retrofitting to be made fit for purpose and are substantially more expensive to maintain;
- regulatory requirements often require the Tier 3 locomotives to be sold when replaced; and,
- as a result of these factors and the amount of metal on a locomotive, the scrappage market value for the Tier 3 locomotive usually exceeds the value in the used locomotive market.

Since late 2018, Mr. Hart has been actively engaged in outreach to CARB to convince the agency that Sierra Railroad has identified a path to a cleaner locomotive future that is fully aligned with California's criteria-pollutant and GHG-pollutant reduction goals and that this strategy can be executed with a modest level of state support. This process has thus far been fruitless and frustrating, with CARB staff and management consistently praising the proposed approach for its cost-effectiveness and pollution reduction potential while just as consistently advising that the state is unwilling to fund the replacement of Pre-Tier 0 locomotives with Tier 3 locomotives.

The reasonableness and viability of this proposed alternative is clearly illustrated by comparing the cost-effectiveness and emission reductions that result from replacing 11 Pre-Tier 0 locomotives with 11 Tier 3 locomotives as compared to the cost and emission reductions provided by replacing a single Tier 4 locomotive.[3] The cost-effectiveness methodology established by the Carl Moyer Program is used in this analysis. A key factor that renders it so cost-ineffective to deploy Tier 4 locomotives in the shortline railroad industry is the relatively small number of miles traveled by these locomotives when compared to the line-haul industry.

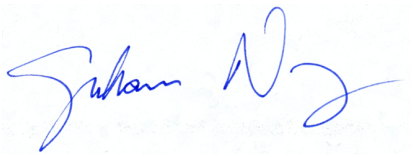
	Proposed Project	Tier 4 Locomotive
Number of Locomotives	11	1 (San Joaquin)
Total Cost of Project	$3,850,000	$2,850,000
Cost Effectiveness (Dollars per weighted ton)	$18,228.73	$116,791.16
Max Funding (85% funding)	$3,272,500	$2,422,500
NOx Emission Reductions (tons per year)	13.50	1.44
ROG Emission Reductions (tons per year)	0.50	0.09
PM Emission Reductions (tons per year)	0.34	0.03

[3] This analysis was done using an estimate of $2,850,000 as the Tier 4 acquisition cost which is lower than the $3,000,000 cost that CARB provided as an estimate at the In-Use Locomotive Regulation Workshop.

Conclusion

Sierra Railroad appreciates the opportunity to provide a response to the NOP. Sierra Railroad is fully supportive of CARB's objectives to reduce criteria and GHG-pollutants in the shortline industry. Sierra Railroad seeks to work with CARB to identify a "win-win" solution for the state that achieves these goals while also maintaining the jobs and economic value that the shortline industry delivers to the State.

Sincerely,



Graham Noyes

Cc: Michael Hart, Sierra Railroad Company

Exhibit B-1

Sierra Rail Carl Moyer Calculations- Switcher Factors

Calculation Inputs

	San Joaquin (per locomotive)	Sacramento (per locomotive)	Mendocino (per locomotive)
Number of Locomotives	6	3	3
Cost (per locomotive)	$350,000	$350,000	$350,000
Total Cost of Project	$2,100,000	$1,050,000	$1,050,000
Cumulative Fuel Consumption (gallons/year)	34,100	9,217	25,786
NOx Emission Factor (g/bhp-hr)	4.7	4.7	4.7
ROG Emission Factor (g/bhp-hr)	0.63	0.63	0.63
PM Emission Factor (g/bhp-hr)	0.086	0.086	0.086
CRF	0.106	0.106	0.106
Operation	100%	100%	100%

Calculation Results

	San Joaquin (per locomotive)	Sacramento (per locomotive)	Mendocino (per locomotive)
Cost Effectiveness (Dollars per weighted ton)	$3,078.35	$11,388.92	$4,070.88
Max Funding (85% funding)	$297,500	$297,500	$297,500
NOx Emission Reductions (tons per year)	6.66	1.80	5.04
ROG Emission Reductions (tons per year)	0.25	0.07	0.19
PM Emission Reductions (tons per year)	0.17	0.05	0.13

Exhibit B-2

Sierra Rail Carl Moyer Calculations – Linehaul Factors

Calculation Inputs

	San Joaquin (per locomotive)	Sacramento (per locomotive)	Mendocino (per locomotive)
Number of Locomotives	6	3	3
Cost (per locomotive)	$350,000	$350,000	$350,000
Total Cost of Project	$2,100,000	$1,050,000	$1,050,000
Cumulative Fuel Consumption (gallons/year)	34,100	9,217	25,786
NOx Emission Factor (g/bhp-hr)	5.17	5.17	5.17
ROG Emission Factor (g/bhp-hr)	0.32	0.32	0.32
PM Emission Factor (g/bhp-hr)	0.086	0.086	0.086
CRF	0.106	0.106	0.106
Operation	100%	100%	100%

Calculation Results

	San Joaquin (per locomotive)	Sacramento (per locomotive)	Mendocino (per locomotive)
Cost Effectiveness (Dollars per weighted ton)	$4,219.78	$15,611.87	$5,580.34
Max Funding (85% funding)	$297,500	$297,500	$297,500
NOx Emission Reductions (tons per year)	4.03	1.09	3.05
ROG Emission Reductions (toms per year)	0.109	0.029	0.0821
PM Emission Reductions (tons per year)	0.17	0.05	0.13

EXHIBIT C

NOYES LAW CORPORATION
FUEL & CARBON LAW

REGULATORY ANALYSIS

October 12, 2020

TO: DEPUTY EXECUTIVE OFFICER STEVE CLIFF
ACTING DIVISION CHIEF SYDNEY VERGIS
ASSISTANT DIVISION CHIEF MIKE CARTER
BRANCH CHIEF SCOTT ROWLAND
CALIFORNIA AIR RESOURCES BOARD

FROM: GRAHAM NOYES, REGULATORY COUNSEL FOR SIERRA RAILROAD

RE: Definition of Surplus and State Implementation Plan Creditable Emissions under the Carl Moyer Program Statutes and Federal Law

Background Summary: Michael Hart is a longstanding environmentalist who has more than 25 years of experience forming and operating environmentally-friendly industrial companies. One of his companies, Sierra Railroad Company ("Sierra"), owns and operates shortline freight and tourist railroads. Its subsidiaries include Sierra Northern Railway (a freight railroad) and Mendocino Railway (a tourist railroad which operates the Skunk Train and the Sacramento River Fox Train). Though the railroad industry has long been relatively immune from pollution regulation, Mr. Hart has made Sierra a leader in reducing both criteria-pollutants and GHG-pollutants through innovative clean-energy technologies, including the development and deployment of waste-to-fuel technologies such as Sierra Energy Corporation, another company owned by Sierra that is a world leader in converting non-recyclable wastes into *carbon-negative* fuels for use in the railroad industry and elsewhere. Mr. Hart's environmental efforts have not only earned him an "Environmental Hero" award from the United States Environmental Protection Agency ("EPA") but resulted in President Obama naming him a "Champion of Change."

Toward the end of 2018, Mr. Hart learned that Union Pacific Railroad was about to scrap a fleet of Tier III locomotives. Though Sierra's 11 Pre-Tier 0 locomotives were perfectly functional and met all of Sierra's needs, such that Sierra had no plans to, and no need to, upgrade its existing Pre-Tier 0 locomotives, Mr. Hart realized that the Tier III locomotives that were about to be destroyed produced far fewer emissions than Sierra's Pre-Tier 0 locomotives. Mr. Hart also realized that the cost to replace Sierra's existing Pre-Tier 0 locomotives with these Tier III locomotives would be incredibly cost-effective compared with other emissions reduction

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projects, being less costly than upgrading just two pre-Tier 0 locomotives to Tier IV. Indeed based on a Carl Moyer Program cost-effectiveness analysis, the emission reductions provided by upgrading Sierra's 11 Pre-Tier 0 locomotives to Tier III would result in a 90% reduction in total costs to the state of California as compared to a Tier IV upgrade.[1] Knowing from experience that it would take time to work out any details with the State of California for a grant to purchase and upgrade Sierra's locomotives (the "Project"), but realizing that any delay would result in the destruction of the Tier III locomotives and the loss of an opportunity to improve California's air quality at a fraction of the normal cost to do so, Mr. Hart purchased the locomotives and began discussions with the State as to how to fund his preservative purchase and the work needed to render the locomotives usable in California.

Mr. Hart has for the past 18 months been in discussions with the California Air Resources Board ("CARB") as to using the Carl Moyer Program ("CMP") to fund his acquisition costs for the 11 locomotives, as well as the retrofit costs necessary to put the locomotives into service. Based on a July 10, 2020 discussion with CARB, and subsequent discussions with Scott Rowland, Sierra has been advised that the primary impediment to CMP funding is the question of whether emission reductions from the Project meet federal and state requirements for "surplus" emission reductions (this issue has also been phrased in terms of whether the Project's emission reductions are creditable under the State Implementation Plan, or, in other words, "SIP creditable"). This regulatory analysis addresses these issues and the relevant authority, concluding that this Project does indeed meet "surplus" emission reduction requirements and that the resulting emission reductions are SIP creditable.

LEGAL ANALYSIS

Applicable CMP Guidelines:

The Program Overview to the CMP Guidelines (the "Guidelines") state:

> Although the Moyer Program has grown in scope, it retains its primary objective of obtaining cost-effective and surplus emission reductions to be credited toward California's legally-enforceable obligations in the State Implementation Plan ("SIP")- California's road map for attaining health-based national ambient air quality standards.[2]

The Guidelines further state:

> Emission reductions funded through the Moyer Program must be permanent, surplus, quantifiable, and enforceable in order to meet the underlying statutory provisions and be SIP-creditable. To

[1] Note that while Ken Bhatti of CARB's locomotive CMP group has reviewed the cost-effectiveness of the Sierra Project and recognized it as highly cost-effective, the Tier 4 calculations have not yet been reviewed by CARB staff.
[2] Carl Moyer Program Guidelines (2017 Revisions), at Chapter 1 ("Program Overview"), at p. 1-1.

> ensure that projects are surplus to regulations, funded projects must not be required by any federal, State or local rule or regulation.[3]

As to the question of SIP creditability, the Guidelines state:

> The State Board and the air districts shall take all appropriate and necessary actions to ensure that all covered emission reductions achieved from a Moyer Program project are creditable in the State Implementation Plans (SIP) and are enforceable, surplus, quantifiable and permanent (H&SC § 44286(g)).[4]

California Health and Safety Code §44286(g) provides:

> The state board and the districts shall take all appropriate and necessary actions to ensure that emissions reductions achieved through the program are credited by the United States Environmental Protection Agency to the appropriate emission reduction objectives in the state implementation plan.[5]

The applicable questions are thus: (1) whether the emissions reductions that would be created by the Project are required by any Federal, State, or Local Rule or Regulation, and (2) whether those emissions reductions are SIP creditable by EPA?

CMP Funding is Permitted as Project Emissions Reductions are not Required by Federal, State, or Local Rules or Regulations:

As noted above, CMP funding is only permitted if the emission reductions created by a project are not required by federal, state, or local rules or regulations.

As relevant here, railroads have been largely immune from environmental regulation, especially state regulation, as state regulation of railroads is generally pre-empted by federal law.[6] This preemption means that the United States Surface Transportation Board ("STB") has "exclusive" jurisdiction over "transportation by rail carriers."[7] And the ICCTA defines "transportation" broadly to include any "property, facility, instrumentality, or equipment of any kind related to the movement of passengers or property, or both, by rail," as well as "services related to that movement."[8] This, and the STB's exclusive jurisdiction over railroads, means that state and local environmental permitting are categorically preempted.[9]

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[3] Id. at p. 1-2. Chapter 2 (General Criteria) of the Guidelines repeats this same requirement, stating: "Covered emission reductions obtained through Moyer Program projects must not be required by any federal, State or local rule or regulation, memorandum of agreement, memorandum of understanding, settlement agreement, mitigation requirement, or other legal mandate." Id. at p. 2-1.

[4] Id. at p. 2-2.

[5] Ca. H&SC § 44286(g).

[6] The Interstate Commerce Commission Termination Act ("ICCTA") was passed "with the purpose of expanding federal jurisdiction and preemption of railroad regulation." *Or. Coast Scenic R.R., LLC v. Or. Dep't of State Lands*, 841 F.3d 1069, 1072 (9th Cir. 2016).

[7] 49 U.S.C. § 10501(b).

[8] Id. § 10102(9); see also *Or. Coast Scenic R.R.*, 841 F.3d at 1073.

[9] *Friends of Eel River v. North Coast R.R.*, 399 P.2d 37, 60 (Cal. 2017) (holding that "state environmental permitting or preclearance regulation that would have the effect of halting a private railroad project pending environmental

As state and local environmental rules and regulations are preempted, and as no federal rule or regulation requires Sierra to reduce the emissions produced by its Pre-Tier 0 locomotives, CARB staff, management, and leadership have properly acknowledged in discussions with Sierra that this Project's emission reductions are not required by any federal, state, or local rule or regulation, any memorandum of agreement or understanding, any settlement agreement, any mitigation requirement, or any other legal mandate. This requirement for CMP funding is thus met and the question turns to whether the Project's emissions reductions are SIP creditable.

CMP Funding is Permitted as Project Emission Reductions are SIP Creditable by EPA:

The EPA has issued multiple guidance documents to clarify what projects are SIP-creditable. As relevant here, this question turns on whether the relevant emissions reductions qualify as "surplus" emissions reductions and meet other relevant EPA criteria pertaining to SIP creditability.[10]

The EPA's 1997 Guidance on Incorporating Voluntary Mobile Source Emission Reductions in State Implementation Plans ("EPA SIP Guidance") defines "surplus" as follows:

> The VMEP emission reductions may not be substituted for mandatory, required emission reductions. States may submit to EPA for approval any program that will result in emission reductions in addition to those already credited in a relevant attainment or maintenance plan, or used for purposes of SIP demonstrations such as conformity, rate of progress, or emission credit trading programs.[11]

The EPA's definition of "surplus" thus matches the CMP's requirement that project emissions reductions not be required by any law or regulation. And – as shown above – the emission reductions from Sierra's Project already meet that requirement, these emission reductions qualify as "surplus" under the EPA's definition and are thus SIP creditable.

However, in its discussions with Sierra, CARB staff have noted that the EPA has urged states when determining whether project emissions reductions are "surplus" to "consider factors that may affect emission reductions and their surplus status over time, including changing patterns of

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compliance would be categorically preempted"); see also *North San Diego County Transit Dev. Bd.—Petition for Declaratory Order*, 2002 WL 1924265 (STB 2002) (holding that the Coastal Act was preempted by ICCTA as applied to rail projects).

[10] *See, e.g.,* ''Guidance on Incorporating Voluntary Mobile Source Emission Reduction Programs in State Implementation Plans (SIPs),'' EPA, Office of Air and Radiation, October 24, 1997 (hereafter ''1997 VMEP'') at 6; ''Improving Air Quality with Economic Incentive Programs,'' EPA, Office of Air and Radiation, January 2001 (hereafter ''2001 EIP Guidance'') at 35; ''Incorporating Emerging and Voluntary Measures in a State Implementation Plan,'' EPA, Office of Air and Radiation, September 2004 (hereafter ''2004 Emerging and Voluntary Measures Guidance'') at 3; and ''Diesel Retrofits: Quantifying and Using Their Emission Benefits in SIPs and Conformity,'' EPA, Office of Transportation and Air Quality, February 2014 (hereafter ''2014 Diesel Retrofits Guidance'') at 27.

[11] 1997 VMEP at p. 6, available at https://www.epa.gov/sites/production/files/2016-05/documents/vmep-gud.pdf (last viewed August 26, 2020).

operations or use, vehicle deterioration factors, equipment useful life, and government emission standards."[12] CARB staff have pointed to legal authority pertaining to the San Joaquin Unified Air Pollution Control District wherein EPA has explained that:

> As we explained in the Proposal TSD, in future SIP submittals developed pursuant to Rule 9610, we expect the State and/or District will demonstrate: (1) How the ''project life'' for each funded project relied on for SIP credit takes into account the remaining useful life of the vehicle, engine, or equipment being replaced, and (2) how the State and/or District ensure that the emission reductions relied on for SIP credit are in excess of the reductions attributed to normal fleet turnover and other assumptions built into future year emissions inventories (i.e., that the same emission reductions are not ''double counted'').[13]

Based upon this guidance from the EPA, CARB staff have questioned whether Sierra would not have replaced its Pre-Tier 0 locomotives anyway, in the normal course of its business?

The answer to CARB's question is that Sierra has no business reason to replace its Pre-Tier 0 locomotives as those locomotives have a remaining useful life of at least 30 years, a fact that CARB has publicly acknowledged. For example, CARB's Air Quality Planning and Science Division held a September 3, 2020 public workshop on the state's 2020 locomotive emissions inventory, that addressed the state's shortline railroad industry.[14] While CARB has not publicly released any written report concerning CARB's Air Quality Planning and Science Division's findings, its presentation at the workshop contained the following acknowledgements about shortline locomotives:

- Regarding Growth: "Assumed to be constant- no available future plans."
- Regarding Turnover:
  - "Assumed no turnover- companies do not make long-range business plans."
  - "Average age is 43 years old."
  - "(Engines have been bought, sold, leased over and over again)."[15]

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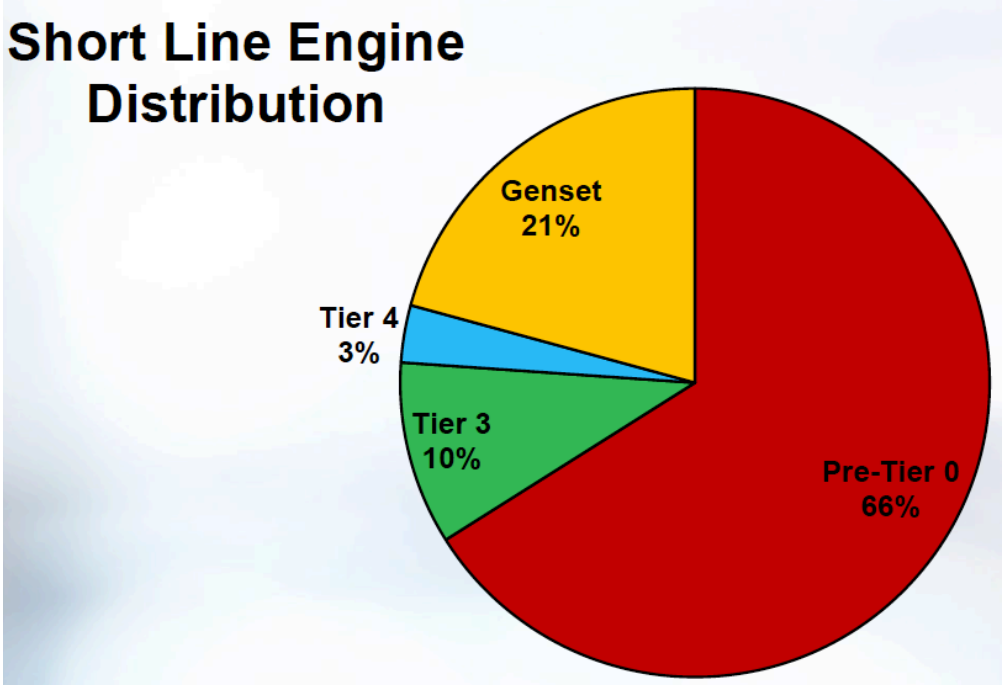
[12] See EPA, Revisions to the California State Implementation Plan; San Joaquin Valley Unified Air Pollution Control District; Quantification of Emission Reductions From Incentive Programs, 80 Fed. Reg. 19020 (April 9, 2015) (hereafter "EPA Final Rule on SJV APCD Rule 9610"), at 19024.

[13] Id.

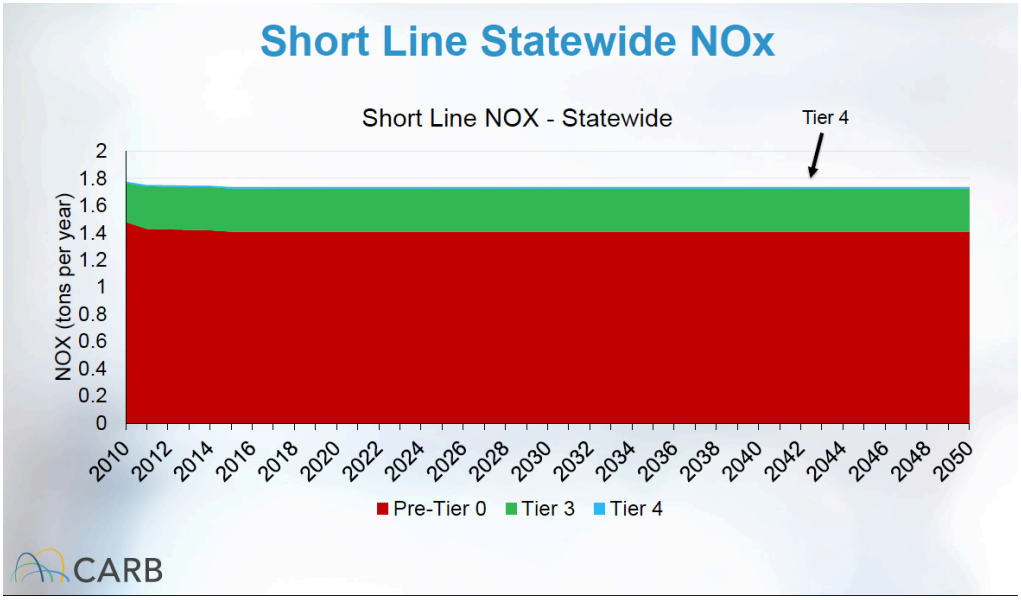
[14] The Workshop Presentation and Workshop Announcement for the September 2020 Public Workshop for Locomotive Emission Inventory are available at https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-meetings-workshops .

[15] CARB Website, "2020 Locomotive Emissions Inventory," Presentation for Public Workshop prepared by Air Quality Planning & Science Division (September 3, 2020), at https://ww2.arb.ca.gov/sites/default/files/2020-09/CARBlocoinvwebinar2020.pdf , slide 40.

The presentation developed by CARB's Air Quality Planning and Science Division displayed California's shortline railroads' locomotive tier distribution as follows:[16]



As a result of this, CARB's Air Quality Planning and Science Division presented California shortline NOx emissions as completely static over the past 10 years, predicting that these emissions would remain static for 30 years to come:[17]



[16] Id., at slide 41.
[17] Id., at slide 42.

Based upon these slides from CARB's Air Quality Planning and Science Division, CARB has correctly determined that no Pre-Tier 0 locomotives are likely to be retired in California over the next three decades. Sierra's fleet of Pre-Tier 0 locomotives are, of course, within the scope of CARB's forecast.

Given that CARB has itself determined that Sierra's Pre-Tier 0 locomotives have a useful life of at least 30 more years, and given that Sierra's CEO has stated that Sierra has not had, and does not have, any plans to replace these locomotives absent CMP funding of this Project, it should be evident that the EPA's "surplus" test has been satisfied, that the emissions reductions expected from this Project will not be double-counted, and that this Project is SIP creditable.

Conclusion:

As set forth in this regulatory analysis, and consistent with CARB's recent analysis of the shortline industry, nothing precludes using Carl Moyer Program dollars to fund Sierra's proposed Project to replace 11 Pre-Tier 0 locomotives – which are perfectly functional and adequate for Sierra's needs for at least 30 more years – with 11 Tier III locomotives.

In addition to the legal merits of this Project, the environmental merits make this Project incredibly attractive as it would reduce pollutant emissions in California by $4,860 ton. Due to the ever-increasing costs of achieving criteria pollutant reductions, this would make the Project among the most cost-effective locomotive projects undertaken in the past decade, and compares very favorably to a single Tier IV Class 3 project, estimated to cost $116,791 per ton. This Project would also be replicable in California's shortline industry which currently includes 102 pre-Tier 0 locomotives.[18]

Sierra incurred financial cost and risk by acting to save the 11 Tier III locomotives in question from scrap almost two years ago in the hopes of finding a path forward for supporting their conversion to shortline use. Should CARB not be able to find a way forward to fund this project, Sierra will have to send the Tier III locomotives back to be scrapped, as Sierra cannot afford to competitively disadvantage itself in the market by replacing its perfectly usable Pre-Tier 0 locomotives with these Tier III locomotives solely because of better emissions performance. This outcome would effectively force Sierra to continue to use its existing Pre-Tier 0 locomotives, and the substantial opportunity for emission reductions in the San Joaquin Valley, Mendocino, and Sacramento air districts would be lost.

[18] Information regarding California's shortline locomotive fleet was provided by July Schiffman of CARB's Off-Road Diesel Analysis Section by email on October 8th and 9th, 2020. Ms. Schiffman advised that there are 127 locomotives and 32 Genset engines in the fleet. Of the locomotives, 5 are Tier IV, 17 are Tier III, and 102 are pre-Tier 0. Of the Gensets, 3 are Tier IV and 29 are Tier III.

EXHIBIT D

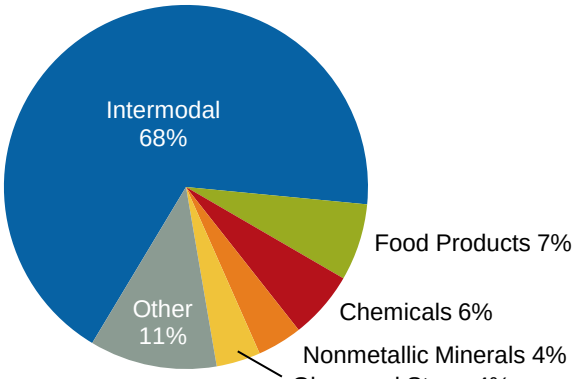
ASSOCIATION OF AMERICAN RAILROADS

Freight Railroads in California

Rail Fast Facts For 2017

Operations	Number of freight railroads	25
	Freight railroad mileage	4,828
Employment and Earnings	Number of freight rail employees	8,153
	Average wages & benefits per freight rail employee	$123,400
Railroad Retirement	Number of railroad retirement beneficiaries	25,593
	Railroad retirement benefits paid	$572 million
Economic Impact	Nationwide, in 2017, major U.S. railroads supported approximately 1.1 million jobs (about eight jobs for every railroad job), nearly $219.5 billion in annual economic activity, $71 billion in wages and almost $26 billion in tax revenues.	
Fuel Efficiency	In 2017, America's railroads moved a ton of freight an average of 479 miles on one gallon of fuel. That's like going from Los Angeles to Tucson, AZ. On average, railroads are four times more fuel efficient than trucks. Moving freight by rail instead of truck reduces greenhouse gas emissions by on average 75 percent.	
Cutting Highway Gridlock	One train can carry as much freight as several hundred trucks. It would have taken approximately 9.0 million additional trucks to handle the 162.0 million tons of freight that originated in, terminated in, or moved through California by rail in 2017.	

Rail Traffic Originated in 2017 — Total Tons: 60.8 million — Total Carloads: 3,517,800

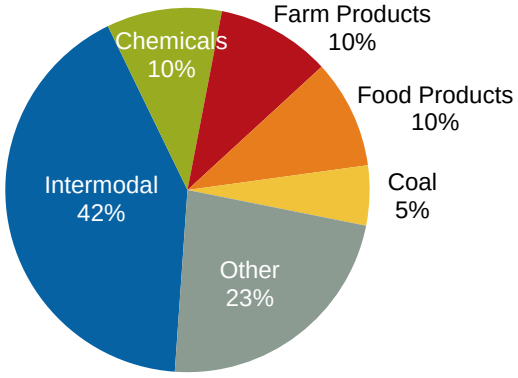


(Percentages based on tonnage)

Commodity	Tons	Carloads
Intermodal	41,286,000	3,242,200
Food Products	4,163,000	53,000
Chemicals	3,651,000	37,300
Nonmetallic Minerals	2,428,000	40,600
Glass and Stone	2,386,000	21,900
Other	6,880,000	122,700

Source: AAR Analysis of STB Waybills

Rail Traffic Terminated in 2017 — Total Tons: 104.2 million — Total Carloads: 3,630,000



(Percentages based on tonnage)

Commodity	Tons	Carloads
Intermodal	43,431,000	2,863,500
Chemicals	10,662,000	112,000
Farm Products	10,562,000	103,300
Food Products	10,056,000	106,400
Coal	5,540,000	47,800
Other	23,928,000	397,000

Source: AAR Analysis of STB Waybills

ASSOCIATION OF AMERICAN RAILROADS

Freight Railroads in California

	Miles Operated In California in 2017
Class I Railroads	
BNSF Railway Company	2,169
Union Pacific Railroad Co.	3,291
	5,460
Regional Railroads	
(none)	
Local Railroads	
Arizona & California Railroad Co.	91
Central Oregon & Pacific Railroad	65
Goose Lake Railway, LLC	38

Map is based on the 2018 National Transportation Atlas Database published by the U.S. DOT, Bureau of Transportation Statistics.

California 2017 Totals	Number of Freight Railroads	Miles Operated Excluding Trackage Rights	Miles Operated Including Trackage Rights
Class I	2	3,663	5,460
Regional	0	0	0
Local	15	862	1,062
Switching & Terminal	8	303	381
Total	25	4,828	6,903

	Miles Operated In California in 2017
Local Railroads, cont.	
Northwestern Pacific Railroad	62
Pacific Sun Railroad, LLC	67
Sacramento Valley Railroad	9
San Diego & Imperial Valley Railroad	43
San Joaquin Valley Railroad Co.	492
Santa Cruz and Monterey Bay Railway Co.	32
Santa Maria Valley Railroad	14
Sierra Northern Railway	75
Stockton Terminal & Eastern Railroad	25
Trona Railway Co.	31
Ventura County Railroad Company	13
West Isle Line, Inc.	5
	1,062
Switching & Terminal Railroads	
California Northern Railroad	283
Modesto & Empire Traction Co.	5
Napa Valley Railroad Co.	21
Pacific Harbor Line, Inc.	51
Quincy Railroad	3
Richmond Pacific Railroad Corp.	11
San Francisco Bay Railroad	5
West Oakland Pacific Railroad	2
	381

Class I Railroad: A railroad with 2017 operating revenues of at least $447.6 million. **Regional Railroad:** A non-Class I line-haul railroad that has annual revenues of at least $40 million, or that operates at least 350 miles of road and revenues of at least $20 million. **Local Railroad:** A railroad which is neither a Class I nor a Regional Railroad, and which is engaged primarily in line-haul service. **Switching & Terminal Railroad:** A non-Class I railroad engaged primarily in switching and/or terminal services for other railroads.