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Before the Surface Transportation Board

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Finance Docket No. 36873

UNION PACIFIC CORPORATION AND UNION PACIFIC RAILROAD COMPANY – CONTROL – NORFOLK SOUTHERN CORPORATION AND NORFOLK SOUTHERN RAILWAY COMPANY

Comments By: Air Alliance Houston, Camden for Clean Air, Central California Asthma Collaborative, Clean Water Action NJ, Climate Reality Project Pittsburgh & SWPA, Duwamish River Community Coalition, East Yard Communities for Environmental Justice, Environmental

and Climate Justice Committee, NJ State Conference – NAACP, Environmental Justice Health Alliance for Chemical Policy Reform (EJHA), Fenceline Watch - TX EJ Org, Greater Frenchtown Neighborhood Revitalization, Illinois Environmental Council, Ironbound Community Corporation, Little Village Environmental Justice Organization, Mobile Environmental Justice Action Coalition, Moving Forward Network, Native Sun Community Power Development, Natural Resource Defense Council, Neighbors for Environmental Justice, New Jersey Environmental Justice Alliance, Pilsen Environmental Rights and Reform Organization (P.E.R.R.O.), Protect Penn-Trafford, Public Rail Now, Rail Watch, Railroad Workers United, Respiratory Health Association, ReThink Energy Florida, RiSE4EJ, Katherine Garcia - Clean Transportation for All Campaign Director - Sierra Club, Solutionary Rail, South Ward Environmental Alliance, Sustainable Jersey City, Tallahassee Food Network, Texas Environmental Justice Advocacy Services, The Sacramento Environmental Justice Coalition, Three Rivers Waterkeeper, Tishman Environment and Design Center, Truckers Movement for Justice, United Electrical, Radio & Machine Workers of America, Urban & Environmental Policy Institute, Occidental College, Warehouse Workers for Justice, Waterspirit, West Long Beach Association, West Oakland Environmental Indicators Project; **in Opposition to the Proposed Union Pacific / Norfolk Southern Railroad Merger**

Union Pacific (UP) and Norfolk Southern (NS) are two of the remaining six Class I freight railroads operating in the United States. These two companies now seek approval from the Surface Transportation Board (Board) to merge into a powerful single coast-to-coast corporate entity, bringing the number of Class I freight railroads down to just five. Instead of moving towards a cleaner future, railroad companies like UP and NS have pursued a business model of reducing Operating Ratios (ORs) by any means. UP's growing profits have primarily come not from greater shipping volume or the attraction of new customers from truck to rail via service improvements, but from increased price-per-carload.[1] When shipped carloads decrease, UP can still boast in quarterly reports that their operating revenue continues to grow, and ORs continue to decrease, thanks to "core pricing gains" (as well as increased "car miles per employee," which allow the company to make more profit with fewer workers).[2] The market power these companies are seeking will allow them to more aggressively pursue this model, which allows the applicants to make more money while providing the same or less service. If approved, the merged company would become a private monopoly that would be more difficult to regulate, and more likely to take safety or environmental risks. The merger could also put pressure on the few remaining Class I railroads to pursue mergers themselves in order to compete, causing a chain reaction that the Board must seriously consider.[3]

In order for the applicants to succeed in their application for merger, the Board must find that the proposed transaction would be consistent with the public interest.[4] The applicants have

[1] Union Pacific, *Union Pacific Reports Third Quarter 2026 Results* (Oct. 22, 2026), https://investor.unionpacific.com/static-files/6f16f7a4-3c9f-496a-8eb2-17944d5d6c65 (reporting a 3% increase in year-to-date carloads but a 10% increase in freight revenue, driven primarily by revenue per car).

[2] Union Pacific, *Union Pacific Reports First Quarter 2026 Results* (Apr. 23, 2026), https://investor.unionpacific.com/static-files/b39a3327-88e9-408d-a2ff-7f31744a08e0 ("Operating revenue of $6.2 billion grew 3% driven by core pricing gains, fuel surcharge revenue, and business mix partially offset by 1% fewer carloads and lower other revenue").

[3] 49 C.F.R. 1180.1(i).

[4] 49 U.S.C. 11324(c).

not made that showing. Their proposal would not be beneficial to workers, customers, trackside communities, or the general public. In particular, the applicants have not sufficiently addressed environmental risks and they overstate environmental benefits.

With planned changes to rail and yard traffic across the full span of the continental United States, a holistic understanding of the public's interest must include rigorous environmental and safety review. The Board has acknowledged "the potentially significant impact that the Transaction may have on the quality of the human environment" and the necessity of preparing an Environmental Impact Statement (EIS) and soliciting robust public comment as required under the National Environmental Policy Act (NEPA).[5] NEPA is meant "to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man."[6] Per federal regulations, NEPA "requires the Board to take environmental considerations into account in railroad consolidation cases", and the Board "must consider significant potential beneficial and adverse environmental impacts in deciding whether to approve a transaction as proposed, deny the proposal, or approve it with conditions, including appropriate environmental mitigation conditions addressing concerns raised by the parties."[7] Impacts experienced by communities living near diesel rail infrastructure are numerous: diesel emissions reduce local air quality and harm health; emergency vehicles are blocked by ever-longer trains at grade crossings;[8] blocked crossings are known to force children to take more dangerous routes to school;[9] stadium-style lights beam into neighboring homes at all hours of the night; homes rumble from the vibration of passing trains; trains blare their horns unexpectedly and at jarring levels, which poses a health risk to exposed communities, along with worsening quality of life.[10]

The applicant railroad companies have not credibly made the case that they will invest in the improvements and safeguards that would serve the public interest or that could begin to justify the market power they are seeking out. Concrete details on the environmental impacts of the proposal remain scarce. Air quality impacts at a place-by-place level are as-yet unclear. Safety plans are vaguely stated, despite the applicants' troubling safety records and plans for increased shipping of hazardous materials. And planned investments in newer, cleaner, and safer zero-emission technologies and improved infrastructure are minimal, if present at all.

The failure to adequately address safety and environmental issues early in the application process is all the more consequential given the Board's new environmental review procedures, which eliminate the public comment opportunity after a full Draft EIS is prepared by the Office of Environmental Analysis (OEA). Public involvement in the NEPA process promotes more

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[5] FD 36873 (Decision ID No. 21), concurrence at 9 (May 26, 2026).

[6] 42 U.S.C. 4321.

[7] 49 C.F.R. 1180.1(f)(1).

[8] National Academies of Sciences, Engineering, and Medicine, *Long Freight Trains: Ensuring Safe Operations, Mitigating Adverse Impacts*, National Academies Press (2024), https://doi.org/10.17226/27807.

[9] Sanders, Topher & Schwartz, Dan, *As Rail Profits Soar, Blocked Crossings Force Kids to Crawl Under Trains to Get to School*, ProPublica, Apr. 26, 2023, https://www.propublica.org/article/trains-crossing-blocked-kids-norfolk-southern.

[10] Baumgaertner, Emily, et al, *Noise Could Take Years Off Your Life. Here's How*, N.Y. Times, June 9, 2023, https://www.nytimes.com/interactive/2023/06/09/health/noise-exposure-health-impacts.html.

thorough and reasoned considerations in agency decision-making.[11] The public is an invaluable resource in determining the public interest, and to this date they have not been able to adequately weigh in on the merger because of the lack of transparency from UP and NS. Yet under the procedures the Board has outlined for this transaction, the public will never be able to weigh in on the information that would appear in a Draft EIS. The consequence is that numerous environmental issues have not been resolved during this public comment period on the merits of the proposal. The merits of the proposal—the public interest in its approval—cannot be made so distinct from these environmental questions. Under the Board's current regulations, the Board "will withhold a decision, stay the effective date of an exemption, or impose appropriate conditions upon any authority granted" when there are unresolved environmental questions.[12] In other words, the existence of environmental review does not remove environmental questions from the evaluation of the merits of the transaction; rather, it shows that environmental questions are a necessary component of the merits evaluation.

As Board Member Kloster stated in a recent concurring opinion, there has been "a lack of transparency and depth in the application" and the applicants "do not offer a very robust plan" for how they intend to "mitigate potential harms."[13] We agree. The environmental, public health, and safety impacts of such a significant merger remain largely unknown. For these reasons and those detailed further below, we therefore urge the Board to find that the proposed merger is not in the public interest and to **reject** this application.

Date: November 18, 2026

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[11] Stava, Ashley, et al., *Quantifying the substantive influence of public comment on United States federal environmental decisions under NEPA.* Env't Rsch. Letters 20 (June 2025), https://dx.doi.org/10.1088/1748-9326/addee5.

[12] 49 C.F.R. 1105.10(f).

[13] FD 36873 (Decision ID No. 37), concurrence at 5 (Sept. 18, 2026).

Union Pacific (UP) and Norfolk Southern (NS) are two of the remaining six Class I freight railroads operating in the United States. These two companies now seek approval from the Surface Transportation Board (Board) to merge into a powerful single coast-to-coast corporate entity, bringing the number of Class I freight railroads down to just five. Instead of moving towards a cleaner future, railroad companies like UP and NS have pursued a business model of reducing Operating Ratios (ORs) by any means. UP's growing profits have primarily come not from greater shipping volume or the attraction of new customers from truck to rail via service improvements, but from increased price-per-carload.[14] When shipped carloads decrease, UP can still boast in quarterly reports that their operating revenue continues to grow, and ORs continue to decrease, thanks to "core pricing gains" (as well as increased "car miles per employee," which allow the company to make more profit with fewer workers).[15] The market power these companies are seeking will allow them to more aggressively pursue this model, which allows the applicants to make more money while providing the same or less service. If approved, the merged company would become a private monopoly that would be more difficult to regulate, and more likely to take safety or environmental risks. The merger could also put pressure on the few remaining Class I railroads to pursue mergers themselves in order to compete, causing a chain reaction that the Board must seriously consider.[16]

In order for the applicants to succeed in their application for merger, the Board must find that the proposed transaction would be consistent with the public interest.[17] The applicants have not made that showing. Their proposal would not be beneficial to workers, customers, trackside communities, or the general public. In particular, the applicants have not sufficiently addressed environmental risks and they overstate environmental benefits.

With planned changes to rail and yard traffic across the full span of the continental United States, a holistic understanding of the public's interest must include rigorous environmental and safety review. The Board has acknowledged "the potentially significant impact that the Transaction may have on the quality of the human environment" and the necessity of preparing an Environmental Impact Statement (EIS) and soliciting robust public comment as required under the National Environmental Policy Act (NEPA).[18] NEPA is meant "to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man."[19] Per federal regulations, NEPA "requires the Board to take environmental considerations into account in railroad consolidation cases", and the Board "must consider significant potential beneficial and adverse environmental impacts in deciding whether to approve a transaction as proposed, deny the proposal, or approve it with conditions, including appropriate environmental mitigation conditions addressing concerns

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[14] Union Pacific, *Union Pacific Reports Third Quarter 2026 Results* (Oct. 22, 2026), https://investor.unionpacific.com/static-files/6f16f7a4-3c9f-496a-8eb2-17944d5d6c65 (reporting a 3% increase in year-to-date carloads but a 10% increase in freight revenue, driven primarily by revenue per car).

[15] Union Pacific, *Union Pacific Reports First Quarter 2026 Results* (Apr. 23, 2026), https://investor.unionpacific.com/static-files/b39a3327-88e9-408d-a2ff-7f31744a08e0 ("Operating revenue of $6.2 billion grew 3% driven by core pricing gains, fuel surcharge revenue, and business mix partially offset by 1% fewer carloads and lower other revenue").

[16] 49 C.F.R. 1180.1(i).

[17] 49 U.S.C. 11324(c).

[18] FD 36873 (Decision ID No. 21), concurrence at 9 (May 26, 2026).

[19] 42 U.S.C. 4321.

raised by the parties."[20] Impacts experienced by communities living near diesel rail infrastructure are numerous: diesel emissions reduce local air quality and harm health; emergency vehicles are blocked by ever-longer trains at grade crossings;[21] blocked crossings are known to force children to take more dangerous routes to school;[22] stadium-style lights beam into neighboring homes at all hours of the night; homes rumble from the vibration of passing trains; trains blare their horns unexpectedly and at jarring levels, which poses a health risk to exposed communities, along with worsening quality of life.[23]

The applicant railroad companies have not credibly made the case that they will invest in the improvements and safeguards that would serve the public interest or that could begin to justify the market power they are seeking out. Concrete details on the environmental impacts of the proposal remain scarce. Air quality impacts at a place-by-place level are as-yet unclear. Safety plans are vaguely stated, despite the applicants' troubling safety records and plans for increased shipping of hazardous materials. And planned investments in newer, cleaner, and safer zero-emission technologies and improved infrastructure are minimal, if present at all.

The failure to adequately address safety and environmental issues early in the application process is all the more consequential given the Board's new environmental review procedures, which eliminate the public comment opportunity after a full Draft EIS is prepared by the Office of Environmental Analysis (OEA). Public involvement in the NEPA process promotes more thorough and reasoned considerations in agency decision-making.[24] The public is an invaluable resource in determining the public interest, and to this date they have not been able to adequately weigh in on the merger because of the lack of transparency from UP and NS. Yet under the procedures the Board has outlined for this transaction, the public will never be able to weigh in on the information that would appear in a Draft EIS. The consequence is that numerous environmental issues have not been resolved during this public comment period on the merits of the proposal. The merits of the proposal—the public interest in its approval—cannot be made so distinct from these environmental questions. Under the Board's current regulations, the Board "will withhold a decision, stay the effective date of an exemption, or impose appropriate conditions upon any authority granted" when there are unresolved environmental questions.[25] In other words, the existence of environmental review does not remove environmental questions from the evaluation of the merits of the transaction; rather, it shows that environmental questions are a necessary component of the merits evaluation.

As Board Member Kloster stated in a recent concurring opinion, there has been "a lack of transparency and depth in the application" and the applicants "do not offer a very robust plan"

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[20] 49 C.F.R. 1180.1(f)(1).

[21] National Academies of Sciences, Engineering, and Medicine, *Long Freight Trains: Ensuring Safe Operations, Mitigating Adverse Impacts*, National Academies Press (2024), https://doi.org/10.17226/27807.

[22] Sanders, Topher & Schwartz, Dan, *As Rail Profits Soar, Blocked Crossings Force Kids to Crawl Under Trains to Get to School*, ProPublica, Apr. 26, 2023, https://www.propublica.org/article/trains-crossing-blocked-kids-norfolk-southern.

[23] Baumgaertner, Emily, et al, *Noise Could Take Years Off Your Life. Here's How*, N.Y. Times, June 9, 2023, https://www.nytimes.com/interactive/2023/06/09/health/noise-exposure-health-impacts.html.

[24] Stava, Ashley, et al., *Quantifying the substantive influence of public comment on United States federal environmental decisions under NEPA.* Env't Rsch. Letters 20 (June 2025), https://dx.doi.org/10.1088/1748-9326/addee5.

[25] 49 C.F.R. 1105.10(f).

for how they intend to "mitigate potential harms."[26] We agree. The environmental, public health, and safety impacts of such a significant merger remain largely unknown. For these reasons and those detailed further below, we therefore urge the Board to find that the proposed merger is not in the public interest and to **reject** this application.

I. THE PREDICTED AIR QUALITY IMPACTS OF THE PROPOSED MERGER HAVE NOT BEEN RIGOROUSLY EVALUATED AND KEY QUESTIONS REMAIN UNRESOLVED.

A. Diesel-burning activity carries public health risks that are important to evaluate, especially in environmental justice communities, but the applicants have not produced detailed and localized air quality estimates on which the public could weigh in.

The United States freight network is largely dependent on diesel-fueled engines. When burned, the diesel from these vehicles forms ambient oxides of nitrogen (NOx) and particulate matter (PM) — and in particular fine particulate matter with a diameter below 2.5 micrometers (PM2.5). Emissions of these two pollutants from non-road diesel vehicles were estimated to be responsible for over 4,000 premature deaths in the United States in 2011, costing over $33 billion in a single year.[27] As diesel locomotives pass through a community, or as diesel truck traffic increases near a yard due to operational and routing changes, the NOx and PM2.5 that are released harm exposed community members through respiratory and cardiovascular effects, cancer, and even premature mortality.[28] Even short-term exposures to these local pollutants at levels below the National Ambient Air Quality Standards (NAAQS) have been linked to increases in daily deaths.[29] The proposal's anticipated change to both locomotive and truck activity therefore carries important human health implications that demand thorough evaluation. In order to track areas with significant predicted air quality impacts, Board regulations require applicants to report all rail segments and rail yards where predicted increases to traffic exceed Board thresholds.[30]

Of special importance is the impact that the proposed merger would have on already-overburdened communities. Without analysis of the existing burdens an impacted community faces, the merger is poised to exacerbate environmental injustices without addressing which mitigation measures, if any, would be most effective in reducing harm. Train emissions already have unequal impacts that are more concentrated in more vulnerable populations. Research has shown that, relative to other sources of diesel-related PM, "[i]n terms of justice . . . increasing train emissions would worsen conditions; reducing train emissions would improve conditions."[31] That is not to say that increased train activity is inherently worse from a justice perspective; but

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[26] FD 36873 (Decision ID No. 37), concurrence at 5 (Sept. 18, 2026).

[27] Goodkind, A. L. et al., *Fine-scale damage estimates of particulate matter air pollution reveal opportunities for location-specific mitigation of emissions*. Supplementary Information Appendix. Proc. Natl Acad. Sci. 116, 8775–8780 (Apr. 2019), https://doi.org/10.1073/pnas.1816102116.

[28] See, e.g. U.S. EPA., EPA/600/R-19/188, 2019, *Integrated Science Assessment (ISA) for Particulate Matter* (Dec. 2019); U.S. EPA., EPA/600/R-15/068, 2016, *Integrated Science Assessment (ISA) for Oxides of Nitrogen – Health Criteria* (Jan. 2016).

[29] Schwartz, Joel et al., *A National Multicity Analysis of the Causal Effect of Local Pollution, NO2, and PM2.5 on Mortality*. Env't Health Perspectives vol. 126, 8 (Aug. 2018), https://dx.doi.org/10.1289/EHP2732.

[30] 49 C.F.R. 1105.7(e)(5).

[31] Marshall, Julian et al., *Prioritizing Environmental Justice and Equality: Diesel Emissions in Southern California*. Env't Sci. Tech. 48(7), 4063-4068 (Apr. 2014), https://doi.org/10.1021/es405167f.

it does demand a degree of care and consideration of distributional impacts that applicants have not demonstrated. EPA research has shown that the burden of air pollution nationwide is disproportionately concentrated among Black, Hispanic, and low-income communities.[32] And although income is a relevant determinant, "race often emerges as a stronger predictor of pollution disparities."[33] Furthermore, because health factors are also associated with structural inequities, the *sensitivity* to pollution is higher in those same populations such that additional PM2.5 exposure is more lethal among those groups.[34] Proximity to high-emission railyards is associated with an increase in childhood asthma-related emergency room visits, especially among low-income and minority populations.[35]

> *"In the Duwamish Valley, community members are already disproportionately and cumulatively exposed to dangerous air pollution and diesel particulate matter from multiple sources, including the movement of goods from Ports, industrial activities, rail, and rail yards. In our community, we have the highest rates of childhood asthma hospitalizations and an 8-year life expectancy difference compared to the county average. This merger represents a dangerous misstep that will further impact the air quality and health of Frontline communities across the nation, including the Duwamish Valley."*[36] Mia Ayala-Marshall, Clean Air Program Manager, Duwamish River Community Coalition

In order to understand environmental justice impacts (and environmental health impacts in general), it would be necessary to conduct place-by-place analyses that consider merger-related impacts in the context of existing conditions. As an example, the California Air Resources Board (CARB) has conducted Health Risk Assessments for the community impacted by a railyard in San Bernardino.[37] The assessment considered sources of diesel emissions within the railyard (including line haul locomotives, switchers, and trucks) but also those outside the railyard. Among those emissions within the railyard, approximately half came from sources other than locomotives. Off-site mobile sources—i.e., diesel trucks on the nearby freeway and local streets, also contributed just as much PM emissions as the locomotives. The magnitude of these various contributors to diesel pollution demonstrates the degree to which a holistic local analysis is necessary to characterize the risks created by a proposal (and therefore, the measures needed to mitigate those risks). CARB used dispersion modeling to estimate overall pollutant exposures and therefore cancer risks among the exposed population. The aggregate of these burdens meant that over three hundred thousand residents were exposed to a lifetime cancer risk of ten per

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[32] Mikati, Ihab et al., *Disparities in distribution of particulate matter emission sources by race and poverty status*, Am. J. of Pub. Health 108(4), 480-485 (Apr. 2018), https://doi.org/10.2105/ajph.2017.304297.

[33] Marshall, Julian, *Advancing Methods and Models that Promote Equity in Ambient Air Quality*, Ann. Rev. of Pub. Health 47, 283-303 (2026), https://doi.org/10.1146/annurev-publhealth-091824-125106.

[34] Di, Qian et al. *Air pollution and mortality in the Medicare population*. New England J. of Med. vol. 376, no. 26, 2513-2522 (2017), https://doi.org/10.1056/NEJMoa1702747.

[35] Spencer-Hwang, R. et al. *Association of major California freight railyards and asthma-related pediatric emergency department hospital visits*. Preventative Med. Rep. 13, 73-79 (2019), https://doi.org/10.1016/j.pmedr.2018.11.001.

[36] The italicized testimonials were submitted in writing to be included in these written comments in response to the Surface Transportation Board's, Union Pacific Corporation and Union Pacific Railroad Company - Control - Norfolk Southern Corporation and Norfolk Southern Railway Company, Finance Docket No. 36873 (November 18, 2026)

[37] Castaneda, Hector et al., *Health Risk Assessment for the BNSF San Bernardino Railyard*, Cal. Env't Prot. Agency Air Res. Bd. (June 11, 2008), https://ww2.arb.ca.gov/sites/default/files/classic/railyard/hra/bnsf_sb_final.pdf.

million, and nearly forty thousand residents were exposed to a lifetime cancer risk of one hundred per million. Now, just a few miles away at UP's Inland Empire yard, applicants propose a plan that would increase truck traffic from less than two hundred to more than eight hundred per day.[38] They do not discuss mitigation measures or even indicate that their proposal could exacerbate environmental injustice in an already overexposed community.

> *"If approved, the merger between railroad giants Union Pacific and Norfolk Southern will have devastating impacts for the Chicagoland region. Neighborhoods across Chicago's South and West sides already deal with freight pollution impacts on a daily basis, which include thousands of diesel trucks on our streets, increased air pollution and its health impacts, never-ending noise pollution, growing truck traffic, and major pedestrian safety concerns. In addition, the railroad industry has operated some of the most polluting locomotive engines right through our neighborhoods, contributing to the persistent and historical harms our communities continue to face. The merger would bring hundreds more diesel-powered trucks to our streets, and it would also bring more pollution with it, driving up the cost burdens associated with asthma-related treatment and visits to the hospital. Most of our community members don't even know this merger is happening! These companies have nothing to inform residents about the impacts of this proposal. We demand in-person and virtual public meetings in Chicago where community members can learn more about this merger and directly voice their concerns to government officials who have decision-making power in this case. Our communities deserve to breathe with dignity, and our quality of life should not be compromised for railroad companies whose sole purpose behind this merger is to increase profits."*[39]
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> - Melanie Minuche, Senior Policy Analyst, Little Village Environmental Justice Organization

Prior major mergers allowed the public to comment on air quality impacts after the publication of a completed Draft EIS. The public took advantage: in the last major Class I railroad merger, which resulted in the formation of Canadian Pacific Kansas City railroad (CPKC) in 2023, the Board received hundreds of public comments after the publication of the Draft EIS. The public will have no such opportunity in this transaction. The Board has chosen to characterize the Draft EIS publication and comment period as "unnecessary," stating that "assessment of the environmental effects of the Transaction will be better informed through a broad public inquiry at the scoping stage rather than a formal comment period on a complete Draft EIS."[40] Given this elimination of any opportunity for public inquiry at a more developed stage of the environmental review, it is important that detailed and localized air quality information be released early in order to allow public inquiry to assist the Board in its determination of the merits of the transaction. But thus far the applicants have not published such information, forcing the public to weigh in on their interests in a transaction with unknown impacts. The applicants' drip-feed approach to data publication is incompatible with the Board's

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[38] FD 36873 (Filing ID No. EI-34413), Response to OEA Information Request 4 (September 25, 2026).

[39] The italicized testimonials were submitted in writing to be included in these written comments in response to the Surface Transportation Board's, Union Pacific Corporation and Union Pacific Railroad Company - Control - Norfolk Southern Corporation and Norfolk Southern Railway Company, Finance Docket No. 36873 (November 18, 2026)

[40] FD 36873 (Decision ID No. 21), slip op. at 40 (STB May 26, 2026).

new front-loaded environmental review process.

In the CPKC merger, the Draft EIS contained a great deal of air quality and other environmental information that remains unavailable to the general public in the present proposed transaction. Detailed emission data were provided in a 115-page appendix to the CPKC Draft EIS.[41] This "Air Quality and Climate Change" appendix included inventories of emissions at a county-by-county summary level separating into rail segments, grade crossings, and yards (Table K6); on a sub-segment-by-sub-segment level (Table K7); on a yard-by-yard level with separate estimates attributable to switching activity (Table K8), lift activity (Table K9), and on-site as well as on-the-road truck activity (K9); for each grade crossing (Table K10); for estimated truck diversions by state (Table K11); and for anticipated air impacts related to capital improvements (Table K12). In other words, public commenters in the CPKC merger had access to quantified estimates of NOx, PM2.5, and other hazardous air pollutants (HAPs) from every activity at every affected yard, crossing, and sub-segment of track that would see increased activity resulting from the merger.

For sake of comparison, the CPKC merger involved six intermodal facilities where increased activity would exceed Board thresholds.[42] The UP-NS proposal involves *sixty-six* intermodal and auto-ramp facilities exceeding those same thresholds. Despite this tenfold increase in affected facilities, the public has access to far *less* air quality information when compared to CPKC's. The applicants' "Emission Data Inventory" (which was originally incorrectly designated by applicants as "highly confidential" until challenged by non-applicant parties to the transaction)[43] contains only estimates of the aggregated air pollutant impacts of the transaction. But in order to make a showing of public benefit, applicants need to show those impacts at *each* affected location, as well as their plans for mitigating transaction-related harms at those locations (including those that arise from increased truck traffic at each affected yard).

Applicants project truck traffic increases at over sixty intermodal and auto-ramp yards in their network as a result of the merger. At thirty of these yards, applicants project over a hundred additional trucks per day due to the merger. Railyards in Kentucky (Louisville / Appliance Park), California (Inland Empire, Oakland, Lathrop, LATC), New Jersey (Elizabeth / E-Rail), Ohio (Sharonville, Toledo Airline), North Carolina (Charlotte), Arkansas (Memphis / Marion), Illinois (Chicago / Global 2), Texas (Houston / Settegast), Michigan (Detroit / Livernois), and Georgia (Austell) would see an increase of at least *three hundred* trucks per day.

> *"Sustainable Jersey City represents Jersey City NJ, which is an environmental justice community already burdened by pollution and other quality of life issues caused by the Croxton / North Jersey Intermodal hub located here - this will increase those issues and will be the cause of other downside impacts that will affect workers and why is there no plan to fix decaying infrastructure managed by these companies."*[44] Debra A. Italiano, Founder & Chair, Sustainable Jersey City

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[41] FD 36500 (Filing ID No. 51355), Canadian Pacific Ry., et al., Control, Kansas City Southern, et al., Draft EIS Appendices, Appendix K (August 5, 2022).

[42] 49 C.F.R. 1105.7(e)(5).

[43] FD 36873 (Filing ID No. 312149) Reply by UP (August 31, 2026).

[44] The italicized testimonials were submitted in writing to be included in these written comments in response to the Surface Transportation Board's, Union Pacific Corporation and Union Pacific Railroad Company - Control - Norfolk Southern Corporation and Norfolk Southern Railway Company, Finance Docket No. 36873 (November 18, 2026)

This number of trucks can seriously alter not only air pollutant levels but noise, traffic, pedestrian safety, and other environmental factors for nearby communities. This cannot be swept under the rug with an overgeneralized and half-baked analysis of net national emissions impacts. Each and every one of the communities affected by this merger should have access to, and input in, an independent review of the transaction's impacts on their health, environment, and general welfare. Interested communities can and have demonstrated to the Board that the applicants have not sufficiently thought these impacts through. For instance, a filing by the City of Detroit showed that city-owned traffic cameras routinely capture daily truck counts well in excess of UP-NS estimates at a monitored yard.[45] This demonstrates the value of soliciting public review of published material; in this case local officials received direct outreach to raise early-stage questions. However, this type of discrepancy cannot be identified in material that applicants do not plan to produce while public comment is available. If the applicants' measure of their activities' current impacts is erroneous, then their projections of future impacts are even less credible—and must face even higher scrutiny in order to serve the public interest.

Applicants know that their plan would reduce air quality in dozens of communities around the country and offer no analysis of how to mitigate harms (or even acknowledgement that those harms will occur). Diesel emissions' health impacts are dependent on their local levels—not merely as the network-wide effects that applicants report. What's more, as discussed below, the network-wide effects that applicants *do* report omits analysis showing that their plan will increase, not reduce, network-wide criteria air pollutant emissions.

> "*Union Pacific trains pass through our entire Sacramento Valley affecting air quality in marginalized communities. We demand more information for the public and mitigation efforts."* Herman Barahona, The Sacramento Environmental Coalition[46]

B. Inconsistencies in estimated impacts reduce the overall credibility of the applicants' environmental reporting.

Despite the public's limited access to data, non-applicant parties have been able to support the Board by highlighting inconsistencies in the application. Members of the public have already pointed out clear mistakes in emissions estimates. For instance, a filing by the Natural Resources Defense Council (NRDC) showed that applicants had erroneously doubled the NOx reduction estimate reported in the verified statement of UP's General Director of Environmental Management, Matthew Graham.[47, 48]

Where there is one problem, there are likely more. While the erroneously inflated NOx benefit could be attributed to a tabulation error, the emissions inventory that applicants published as a result of NRDC's motion reveals more serious flaws or omissions in the emissions analysis.

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[45] FD 36873 (Filing ID No. EI-34370) City of Detroit Environmental Impact Statement Comments (September 18, 2026).

[46] The italicized testimonials were submitted in writing to be included in these written comments in response to the Surface Transportation Board's, Union Pacific Corporation and Union Pacific Railroad Company - Control - Norfolk Southern Corporation and Norfolk Southern Railway Company, Finance Docket No. 36873 (November 18, 2026)

[47] FD 36873 (Filing ID No. 311981), Mot. by NRDC (entered into record August 25, 2026).

[48] FD 36873 (Filing ID No. 311221), Verified Statement of Matthew Graham, Amended App. 1 Vol. p. 646 (April 30, 2026).

The application explicitly states: "the combination of optimizing the UP and NS networks, improving NS's fuel efficiency, and diverting approximately 2.1 million long-haul shipments from America's highways is projected to reduce emissions by approximately 4.0 million metric tons of CO2e, 2,850 tons of NOx, and 85 tons of particulate matter."[49] But per applicants' own data, this statement is empirically impossible. In fact, if you accept applicants' own projections on network optimization, fuel efficiency, and truck diversion as true, then the PM and NOx benefits of the merger are false; any reductions are dwarfed by the increases to those same emissions.

Applicants break down the purported NOx and PM benefits into two categories. The first set of reported benefits are those arising from routing efficiencies under the new "optimized" operating plan, i.e., the reduction in gross ton-miles of freight hauled. These benefits account for approximately 14 percent of the criteria pollutant reductions reported by the applicants.[50] The second set of benefits — the vast majority of the criteria pollutant reductions claimed in the application — arises from "an opportunity to reduce the consumption of fuel on the legacy NS network by applying UP policies and efficiencies."[51] It is unclear how these fuel savings (over sixteen million gallons of diesel per year) will materialize because applicants have chosen to put the details of their fuel use proposals into another confidential workbook.[52] It is puzzling that the application of UP policies to the NS network could generate such efficiencies, given that elsewhere in their application, applicants concede that "NS's rate of fuel consumption per GTM is already lower than UP's."[53]

But far more egregious is a third category affecting criteria air pollutant emissions, which applicants do not quantify: the criteria air pollutant emission impacts attributed to "diverting approximately 2.1 million long-haul shipments from America's highways."[54] Applicants mislead the Board by stating that this figure is included in the NOx and PM benefits that they report. Applicants' own emission data inventory demonstrates that this is not the case.

Applicants claim that their plan will allow them to save 493,516,375 gallons of diesel from heavy-duty trucks and replace it with 125,568,376 gallons on rail, a savings of 367,947,999 gallons of diesel.[55] Tellingly, they only calculate carbon savings from this shift but do not calculate NOx and PM savings. But the same applicant workpaper shows that a gallon of fuel burned in a locomotive produces far more NOx and PM than a gallon of fuel burned in a heavy-duty truck.[56] In fact, as is shown in Table 1, a typical locomotive in applicants' fleets produces so much more NOx and PM than a truck, gallon-for-gallon, that even with the purported fuel

[49] FD 36873 (Filing ID No. 311221), Amended App. Vol. 1 p. 49 (April 30, 2026).

[50] FD 36873 (Filing ID No. 311221), Amended App. 1 Vol. p. 646, Verified Statement of Matthew Graham (April 30, 2026).

[51] FD 36873 (Filing ID No. 311221), Amended App. 1 Vol. p. 510, Verified Statement of Grant Janke (April 30, 2026).

[52] FD 36873, Janke VS Workpaper: "Synergies Transportation - Operating.xlsx," Tab "Fuel Use Merger Initiatives."

[53] FD 36873 (Filing ID No. 311221), Amended App. 1 Vol. p. 646, Verified Statement of Matthew Graham (April 30, 2026).

[54] FD 36873 (Filing ID No. 311221), Amended App. Vol. 1 p. 49 (April 30, 2026).

[55] FD 36873, Graham VS Workpaper: "Railroad Emission Data Inventory.xlsx" Tab "Diversions from Long Haul Truck."

[56] *Id.* at Tab "Emission Factors."

savings, far more criteria pollutants are produced under their growth plan. This is true even when using the same Bureau of Transportation Statistics truck fuel emission rates for the typical heavy-duty truck in 2023 that applicants use.[57] Furthermore, if one uses projected 2030 truck fleet emission rates from the same source—taking into consideration that applicants expect plan implementation to take several years—then the comparison is even more dire. All told, as reported in Table 1 below, using applicants' own truck diversion plan and applicants' own data, "the combination of optimizing the UP and NS networks, improving NS's fuel efficiency, and diverting approximately 2.1 million long-haul shipments from America's highways" is not expected to *reduce* PM and NOx emissions by 85 tons and 2,850 tons respectively, but to *increase* them by 49-225 tons and 2,175-7,806 tons respectively (depending on whether one assumes 2023 or 2030 truck fleet emission rates).

Table 1

	Diesel (gal)	Measure	PM2.5	NOx
Heavy-Duty Diesel Trucks	493,516,375	Emission Rate (Metric ton / gal, 2023 truck fleets)	*7.56e-7*	*2.4213e-5*
		Amount emitted per year (Metric tons, 2023 truck fleets)	373	11,950
		Emission Rate (Metric ton / gal, 2030 truck fleets)	*3.99e-7*	*1.2803e-5*
		Amount emitted per year (Metric tons, 2030 truck fleets)	197	6,318
Tier 1+ Locomotives	125,568,376	Emission Rate (Metric ton / gal)	*4.03523e-6*	*1.351792e-4*
		Amount emitted per year (Metric tons)	507	16,974
Merger Plan	367,947,999	Reported Benefit of Optimized Operating Plan	↓ 12 tons	↓ 389 tons
		Reported Benefit of Fuel Initiatives	↓ 73 tons	↓ 2,461 tons
		Calculated Impact of Reported Truck Diversions (2023 truck fleets)	**↑ 134 tons**	**↑ 5,025 tons**

[57] U.S. Bureau of Transp. Stat., National Transportation Statistics, Table 4-43 "Estimated U.S. Average Vehicle Emissions Rates per Vehicle by Vehicle Type Using Gasoline, Diesel, and Electric," https://www.bts.gov/content/estimated-national-average-vehicle-emissions-rates-vehicle-vehicle-type-using-gasoline-and (Using U.S. EPA data from Jan. 15, 2025).

Calculated Impact of Reported Truck Diversions (2030 truck fleets)	↑ 310 tons	↑ 10,656 tons

Notes: This table accepts applicants' assumptions regarding: the amount of diesel saved from diverted trucks, the amount of diesel needed for an equivalent amount of locomotive freight movement, the assumption of an on-average Tier 1+ locomotive in the UP-NS fleet, an average fuel economy of 7 mpg for truck fleets, and the reported impact of the optimized operating plan and fuel initiatives, all as reported in Graham VS Workpaper: "Railroad Emission Data Inventory.xlsx." Applicants' reported truck emission rates are more precisely labeled here as the emission rate for 2023 truck fleets; emission rates for 2030 truck fleets come from the same source used by applicants. (Source: U.S. Bureau of Transportation Statistics, National Transportation Statistics, Table 4-43 "Estimated U.S. Average Vehicle Emissions Rates per Vehicle by Vehicle Type Using Gasoline, Diesel, and Electric," https://www.bts.gov/content/estimated-national-average-vehicle-emissions-rates-vehicle-vehicle-type-using-gasoline-and). Applicants use a PM10 emission rate for Tier 1+ locomotives; for comparison to truck PM2.5 emissions, applicants' rate was converted with a PM2.5 emission fraction for Tier 1+ locomotives using EPA data. (Source: 2020 National Emissions Inventory Locomotive Methodology (May 19, 2022) https://19january2025snapshot.epa.gov/system/files/documents/2023-01/2020_NEI_Rail_062722.pdf, Table 5; Tier 1+ PM2.5/PM10 fraction is 4.0352 / 4.16 = 0.97).

This is a complete inversion of applicants' explicit claims about the impact of their plans on criteria air pollutant emissions. This problem was only discovered when the public belatedly received access to the emission data inventory workpaper (which was only re-designated as public because non-applicant parties recognized it had been improperly designated as Highly Confidential). The Board should scrutinize carefully why applicants would present CO2e reductions including truck diversion estimates in their application, but would present other pollutant "reductions" without including the same truck diversion estimates. Whether intentional or not, applicants have a grave credibility problem when it comes to air emission analysis.

As another example, in a September 25, 2026 response to an OEA information request, applicants estimated their fuel consumption from switcher activity at rail yards.[58] Switchers are usually older locomotives that produce more harmful emissions; over 95 percent of the applicants' switcher locomotives are Tier 0/0+, both before and after the proposed merger.[59] At every affected railyard, applicants project that the number of cars switched per day will increase if the merger is approved. In fact, applicants predict that switcher activity will cumulatively increase by over one-third at these yards. Applicants also report that they will be able to accommodate those additional switches (nearly 1,900 additional switches per day across all reported yards) with zero changes to their daily switcher operating hours. Yet UP-NS report that their merger will cause *no change in fuel consumption* from their switchers. Even if OEA were to accept that UP-NS can manage to execute so many additional switches with the same number of switchers and operating hours, it is highly implausible that an idle switcher and a switcher doing work would have the exact same fuel economy. The applicants used a single fleetwide fuel efficiency factor even though they (and they alone) could report to a far higher degree of certainty how the changes to specific activities at each yard would affect diesel consumption. The implausible end result is that, so long as the applicants claim that they can increase switches by a third without running their engines any longer, they can maintain the fiction that fuel use stays constant.

Finally, as has been detailed by other parties, UP's recent agreement with Canadian

[58] FD 36873 (Filing ID No. EI-34413), Response to OEA Information Request 4 p. 5 (Sept. 25, 2026).
[59] *Id.*

National Railway Company (CN) puts many of the current traffic predictions in doubt and necessitates revision.[60] As-is, the public cannot take confidence in the little data that applicants have reported.

In summary, applicants have not published the localized air pollution impacts of pollutants that are harmful to human health; and what they do report about network-level pollution is riddled with errors, omissions, and implausible premises which misleadingly present negative impacts as benefits. Their credibility in honestly assessing and mitigating the harm of this merger is too low for transaction approval to serve the public interest. Given this gap in trust, applicants should have published transparent data, modeling, and health studies at yard-by-yard and segment-by-segment levels before the public's final opportunity to comment on the merits of this merger, not after.

C. Truck diversion benefits have been overstated in prior mergers.

The bulk of applicants' claimed greenhouse gas emission benefits rely on the assumption that merger approval will lead to the diversion of 2.1 million trucks from the road.[61]

When the CPKC merger was approved in 2023, the railroad companies claimed (and the Board accepted) "that CPKC will be able to attract 64,000 truckloads from the roads to rail each year."[62] But in the year from May 1, 2025 to April 30, 2026, CPKC reported fewer than 24,000 truck-to-rail conversions. The Board should be wary of overly-inflated truck diversion estimates.

Applicants' current truck traffic data is already questionable, let alone their optimistic future diversion projections. Class I railroads have undergone significant consolidation in the past several decades. But this has not resulted in decreases of truck freight market share. In fact, truck freight has only grown.[63] Consolidated market power has allowed railroad companies to offer less while making more money, to the benefit of shareholders and to the detriment of customers. Reduction in greenhouse gases is of vital importance as climate change continues to accelerate.[64] But without any enforcement mechanism to ensure these estimates become reality, the Board should not consider non-credible and non-enforceable truck diversion estimates as being in the public interest.

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[60] *See*, e.g. FD 36873 (Filing ID No. 311936), Verified Comments of Atlantic Systems Inc. on the Completeness of the Evidentiary Record in Light of the UP-CN Agreements (Aug. 17, 2026).

[61] FD 36873 (Filing ID No. 311221), Amended App. Vol. 1 p. 49 (Apr. 30, 2026).

[62] Surface Transportation Board No. 22-07, "STB Approves CP/KCS Merger With Conditions and Extended Oversight Period," (Mar. 15, 2023), https://www.stb.gov/news-communications/latest-news/pr-23-07/.

[63] FD 36500 Sub-No. 6 (Filing ID 311783), CPKC'S July 2026 Traffic Diversion Submission, Table 1 (July 15, 2026); FD 36500 Sub-No. 6 (Filing ID 3110742), CPKC'S January 2026 Traffic Diversion Submission, Table 1 (Jan. 15, 2026).

[64] *See, e.g.,* Intergovernmental Panel of Climate Change (IPCC). *Climate Change 2023: Synthesis Report.* Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, 184 pp., (2023) https://dx.doi.org/10.59327/IPCC/AR6-9789291691647.

II. THE APPLICANTS' SAFETY RECORD AND SAFETY PLANS DO NOT GIVE THE ASSURANCE OF SAFETY.

A. Union Pacific has the worst safety record of any Class I railroad, and the merger would extend Union Pacific''s operating practices across the new railroad's network.

UP has the worst accident rate of any Class I freight railroad; NS is the next worst.[65] UP also leads its competitors in fatalities, with over 220 deaths reported each year from 2021-2025.

One possible reason for UP's alarming safety record is the safety culture created by the company. Regulators have referred to UP as a "serial violator" of laws meant to protect whistleblowers.[66] On multiple occasions, the Department of Labor has caught UP wrongly terminating workers who report injuries and unsafe conditions in violation of the Federal Railway Safety Act.[67] When attempting to collect safety culture data in 2024, the Federal Railroad Administration (FRA) reported its investigation was corrupted by UP due to workers who either feared retaliation or had been coached by UP to provide specific responses.[68] Even in the time since this application was filed, UP has in multiple instances violated federal regulations requiring at least two crewmembers on each train.[69, 70] It is more alarming, then, that the safety plan for the proposed merged company is, generally speaking, the adoption of UP's legacy practices.[71] In terms of its safety plans, the so-called merger functions more as an acquisition, growing the most dangerous Class I railroad in America.

With applicants' plan to lengthen trains, grade-crossing blockages present additional heightened safety risks. Train length naturally increases the duration that any given crossing is blocked.[72] When those crossings are blocked, emergency vehicles are unable to travel until the crossing has cleared—potentially making blocked crossings a matter of life or death.[73] Delayed response times have been significant enough to force at least one impacted municipality to build a second fire station on the opposite side of the tracks from their first one.[74] Blocked crossings in

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[65] Fed. Railroad Admin., *Rail Safety Overview Report (1.12)* (Nov. 10, 2026 at 04:53:20pm), https://data.transportation.gov/stories/s/dsuf-xcni.

[66] SMART Transportation Division (SMART-TD), "Union Pacific Deemed 'Serial Violator' of FRSA, OSHA Slaps Railroad with Hefty Penalty," (Aug. 20, 2025), https://www.smart-union.org/union-pacific-deemed-serial-violator-of-frsa-osha-slaps-railroad-with-hefty-penalty/.

[67] U.S. Dep't. of Lab., Occupational Safety and Health Admin., "US Department of Labor orders railroad company to reinstate worker, pay over $300K in back wages, damages, attorney's fees," (Aug. 6, 2025), https://www.dol.gov/newsroom/releases/osha/osha20250806; U.S. Dep't of Lab., Occupational Safety and Health Admin., "US Labor Department finds Union Pacific Railroad wrongly terminated employee for reporting, seeking medical care for work-related injury," (Mar. 6, 2026), https://www.dol.gov/newsroom/releases/osha/osha20260306.

[68] Funk, Josh, *Union Pacific undermined regulators' efforts to assess safety, US agency says*, Associated Press, May 1, 2024, https://apnews.com/article/union-pacific-fra-railroad-safety-assessment-6346ffe7332e4658df6f8e30431d6404.

[69] 49 C.F.R. 218.123(b)

[70] Brotherhood of Locomotive Engineers and Trainmen (BLET), *FRA enforces two-person crew rule following BLET reports of Union Pacific violations* (Sept. 9, 2026), https://blet.org/news/fra-enforces-two-person-crew-rule-following-blet-reports-of-union-pacific-violations/.

[71] FD 36873 (Filing ID No. EI-34238), Safety Integration Plan (Apr. 30, 2026).

[72] National Academies of Sciences, Engineering, and Medicine, *supra* note 8 at 75.

[73] *Id.* at 81.

[74] *Id.* at 81-82.

Indiana forced children to crawl under trains to get to school.[75] "After the media attention" on this issue, one report found, "Norfolk Southern took action to address the situation, but such actions proved to be temporary."[76]

> *"Texas Environmental Justice Advocacy Services is an organization rooted in Houston's East End; we are deeply concerned about the potential impacts of the proposed Union Pacific and Norfolk Southern merger on our already overburdened communities. Our neighborhoods are surrounded by railroad lines on all four sides, and residents experience daily disruptions from trains blocking crossings, diesel emissions, noise, and safety concerns. In fence-line communities such as Manchester, where residents report approximately 26 railroad lines running through or alongside their community, these impacts compound existing environmental burdens from nearby heavy industrial facilities and industrial emissions, threatening public health and quality of life. Any increase or change in rail traffic, train lengths, routing, or operations resulting from this merger could further intensify these cumulative impacts. We urge the Surface Transportation Board, consistent with 49 C.F.R. § 1180.1(f), to conduct a comprehensive, community-specific assessment of existing and potential cumulative environmental and public health impacts, with particular attention to environmental justice communities. We also demand meaningful public participation and language justice, including translated materials, Spanish interpretation, and accessible opportunities for residents with limited English proficiency to engage in the decision-making process. Our communities should not bear additional environmental and health burdens without meaningful consideration, transparency, and protections. The East End is not just a railroad corridor; it is our home, and our residents deserve clean air, clean water, healthy soil, safe neighborhoods, and a meaningful voice in decisions that affect their lives."*[77] Ana and Juan Parras, Texas Environmental Justice Advocacy Services

These companies' safety failures have immense consequences. Just this month, an NS derailment in New Jersey caused two injuries and significant traffic delays, as well as damage to utility infrastructure.[78] Derailments raise a heightened concern when shipping hazardous materials. It was an NS train carrying vinyl chloride that derailed in East Palestine in 2023, causing an environmental health disaster for nearby communities.[79] Years later, affected residents still contend with health problems and seek compensation for healthcare burdens they

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[75] Sanders, T., et al., *As Rail Profits Soar, Blocked Crossings Force Kids to Crawl Under Trains to Get to School,* Propublica, April 26, 2023, https://www.propublica.org/article/trains-crossing-blocked-kids-norfolk-southern. National Academies of Sciences, Engineering, and Medicine*, supra* note 8.

[76] National Academies of Sciences, Engineering, and Medicine, *supra* note 8.

[77] The italicized testimonials were submitted in writing to be included in these written comments in response to the Surface Transportation Board's, Union Pacific Corporation and Union Pacific Railroad Company - Control - Norfolk Southern Corporation and Norfolk Southern Railway Company, Finance Docket No. 36873 (November 18, 2026)

[78] Smith, Richard, *Norfolk Southern Train Derails in Newark, Strikes Garbage Truck, Injures Two*, RLS Media (Nov. 9, 2026), https://www.rlsmedia.com/article/norfolk-southern-train-derails-newark-strikes-garbage-truck-injures-two.

[79] U.S. EPA, *East Palestine, Ohio Train Derailment*, *Background* (Aug. 31, 2026), https://www.epa.gov/east-palestine-oh-train-derailment/background.

attribute to the incident.[80] Per the NS 10K form included in the application, NS still has not paid almost half of a $600 million class action settlement agreed upon in 2024.[81] An FRA investigation attributed the East Palestine catastrophe in part to avoidable issues such as inadequate on-duty staffing levels.[82] Safety can be improved by serious investment, but applicants have not proven themselves to be up to that task.

B. The Safety Integration Plan falls short of serving the public interest.

When issuing the Safety Integration Plan (SIP) rules in 2002, the Board and FRA said that the rules responded in part to "FRA's concerns regarding safety problems that resulted from inadequate safety planning before implementation" of another UP merger.[83] In 1995, UP proposed a major merger with Southern Pacific Rail Corporation ("SP"). UP's application promised that the merger would bring "safer and more expedited shipments."[84] However, less than a year after the Board's approval of the merger, traffic snarled, shipments were delayed, and the railroad ran short of the crews and dispatchers it needed. FRA found that UP responded to the gridlock by hiring aggressively, including "hiring people off the street to train as Dispatchers," and that the new dispatchers were overwhelmed by the pace, lost track of trains, and issued track warrants with inaccurate safety information.[85] UP reported that eleven UP employees died in 1997 during the UP/SP integration period.[86] One such collision, which killed two UP crew members and two unidentified riders, was traced back to a new dispatcher whose training had been cut short so he could replace a trainee who dropped out; he told investigators that the simulator and on-the-job training were not equal to the demands of the job.[87]

Following the service and safety problems of the UP/SP merger in the 1990s, the Board and FRA developed detailed rules requiring merging railroads to show how the combined railroad will operate safely. The agencies listed where UP/SP had struggled: harmonizing information systems, training dispatchers, changing operating practices, safety-related personnel

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[80] Borasso, Jennifer, *Hundreds of current and former East Palestine residents file new lawsuit: "We didn't ask for this."* CBS News (February 3, 2025) https://www.cbsnews.com/pittsburgh/news/new-east-palestine-lawsuit-by-residents-train-derailment/.

[81] FD 36873 (Filing ID No. 311221), Amended App. Vol. 4 p. 495-96. (Apr. 30, 2026).

[82] Federal Railroad Administration, *HQ-2023-1813*, *Accident Investigation Summary Report*, (July 2024), https://railroads.dot.gov/elibrary/accident-investigation-summary-report-hq-2023-1813.

[83] 67 Fed. Reg. 11582, 11585 (Mar. 15, 2002) (joint FRA and STB final rule).

[84] FD 32760 (Filing ID No. 1648V4), Union Pacific Corp., et al., Control and Merger, Southern Pacific Rail Corp., et al., App. Vol. 2 p. 707, Verified Statement of Richard D. Spero (Nov. 30, 1995) (on Gulf Coast chemical traffic) (STB archive file FD-32760_A_V24, PDF page 102, https://www.stb.gov/wp-content/uploads/FD-32760_A_V24.pdf).

[85] Fed. Railroad Admin., *Union Pacific Railroad: Safety Assurance and Compliance Program, Report of Findings and Recommendations*, at 11-12 (PDF pagination) (Feb. 25, 1998), https://railroads.dot.gov/sites/fra.dot.gov/files/fra_net/15612/Union_Pacific_Audit.pdf (commenting on "aggressive hiring program"; new Dispatchers "overwhelmed by the pace"; "Dispatchers losing track of trains"; "hiring people off the street to train as Dispatchers").

[86] *Id.* at 21 (PDF pagination) (UP response: 1997 "was marred by a series of serious accidents that resulted in eleven employee fatalities").

[87] Nat'l Transp. Safety Bd., Railroad Accident Report, NTSB/RAR-98/02, *Collision and Derailment of Union Pacific Railroad Freight Trains 5981 North and 9186 South in Devine, Texas, June 22, 1997*, at 6-7, 33 (May 19, 1998), https://www.ntsb.gov/investigations/AccidentReports/Reports/RAR9802.pdf.

policies, staffing levels, and adequate facilities, infrastructure, and equipment.[88] Those are some of the same failures that safety regulations now require every merging railroad to plan for in advance in the form of the SIP.[89] FRA may approve a SIP only if it is "thorough, complete, and clear" and provides "reasonable assurance of safety at every step."[90] The Board can only approve a merger conditional on SIP compliance.[91] This makes the adequacy of the SIP a merits issue. UP is now failing to follow the rules its last merger produced.

SIP regulations require a "step-by-step" "timetable, targeted in specific terms from commencement to completion" "for each relevant subject matter" in the safe reconciliation of the two railroads' operations, as well as a description of the allocation of resources to carry out those processes.[92] The goal is a "thorough, complete, and clear" plan that provides "a reasonable assurance of safety at every step."[93] As an example of how applicants do not achieve this level of detail: the following excerpt represents applicants' entire description of their plan for integrating safety management systems (SMS):

> *"Applicants anticipate employing UP's existing best management practice approach—in which it benchmarks against other companies and adopts best management practices—to design the SMS for the combined company. Applicants anticipate that UP and NS legacy employees will review, assess, and integrate the best management practices of each railroad, as well as benchmark against outside companies to ensure that the combined railroad's safety system is best in class."*[94]

Applicants originally supplied an appendix that gave a timetable with no information besides the claim that this process would start during Year 1 and end in Year 3.[95] Applicants later submitted an amended application that expanded this plan into three stages described, in full, as "Review safety management systems" (Month 6 – 18), "Consolidate safety management systems" (Month 13 – 24), and "Communicate revisions to management systems" (Month 21 – 24).[96] This falls precisely into the pattern criticized by Board Member Kloster as "letting the line out slowly," that is, providing a bare minimum to begin with and only giving more developed materials after receiving pushback.[97] But astoundingly, even this revised timetable is hopelessly vague. For instance, the integration plan for merging the two companies' signal and train control systems consists of "Create detailed integration plan" (Month 1 – 24) and "Integrate signal and train control systems" (Month 1 – 36).[98] "Applicants expect that UP-NS will develop a plan for

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[88] 67 Fed. Reg. 11582, 11587 (Mar. 15, 2002).

[89] 49 C.F.R. 244; 49 C.F.R. 1106.4.

[90] 49 C.F.R. 244.19.

[91] 49 C.F.R. 1106.4(b)(4)

[92] 49 C.F.R. 244.11.

[93] 49 C.F.R. 244.19.

[94] FD 36873 (Filing ID No. EI-34238), SIP at 30 (Apr. 30, 2026).

[95] FD 36873 (Filing ID No. EI-34238), SIP Appendix (original) at 1 (PDF p. 185) (Apr. 30, 2026).

[96] FD 36873 (Filing ID No. EI-34456), SIP Appendix (revised) at 1 (Sept. 22, 2026).

[97] FD 36873 (Decision ID No. 37), concurrence at 5 (Sept. 18, 2026). ("Applicants should come with their best case in the application filed to justify the merger so that the Board can decide on its merits. The Board should not have to sift through vague language to try and figure out where any deficiencies may be in the Applicants' proposal and what potential conditions could mitigate any harm").

[98] FD 36873 (Filing ID No. EI-34456), SIP Appendix (revised) at 16 (Sept. 22, 2026).

the safe integration of the legacy UP and NS signal and train control systems," the SIP assures us.[99] Planning for signal and train control integration is required by FRA regulation.[100] One sign that the SIP is incomplete is that it includes the creation of an integration plan as one of its own steps. Applicants state only the vague anticipation "that this plan will include milestones and checkpoints to measure progress and maintain focus on safety during integration."[101]

Generally speaking, applicants' "plan" for almost every item is to maintain the companies' separate processes for a vague amount of time, review to identify "best practices," and then transition NS to UP's system at some point within three years.[102] No budget is attached; applicants apparently interpret the requirement to describe the "allocation of resources, expressed as human and capital resources within designated operating budgets" as nothing more than a requirement to name the broad category that the process falls under: "Training," "Mechanical," et cetera.[103] This cannot satisfy the requirements nor the intended spirit of the SIP.

This plays out again and again in applicants' SIP. Regulation requires each applicant to identify "the railroad dispatching system to be adopted" and "the migration of the existing dispatching systems to the adopted system."[104] The SIP identifies neither. It states that the Omaha and Atlanta dispatching centers will keep operating independently, each on its existing software (CADX for UP and UTCS for NS) and that UP-NS "will complete a detailed evaluation of both train dispatcher operating systems ... and likely will select one system."[105] Evaluating two systems and "likely" choosing one does not identify the system to be adopted. Nor does the SIP contain a plan to migrate the two railroads to a single system. The revised Appendix 1 adds two lines: select a "primary application" by Month 12 and implement it across the system in Months 25 – 36, with nothing in between.[106] Yet contrary to the SIP, it appears UP has already chosen. A separate document, the Operating Plan (exhibit 13 of the application) states that "UP-NS will implement NetControl, its transportation management system, and CADx, its dispatching software, on the legacy NS network," and counts the dispatcher positions that it will eliminate.[107] This is also true of the Service Assurance Plan (SAP); applicants state that to begin with, they "may initially deploy NetControl" to limited areas before expanding "eventually to the entire NS network."[108] The SIP is at odds with the Operating Plan and the SAP; the application is not internally consistent. In one submission, applicants tell the Board which system the merged company will use, and in another document they tell the FRA that the question is open. Whether this noncommittal posture in the SIP is related to the fact that merger approval is conditional on

[99] FD 36873 (Filing ID No. EI-34238), SIP at 11 (Apr. 30, 2026).
[100] 49 C.F.R. 244.13(e).
[101] *Id.*
[102] *See*, e.g., FD 36873 (Filing ID No. EI-34238), SIP at 91 (Apr. 30, 2026) (one-paragraph "Hours of Service" integration plan).
[103] 49 C.F.R. 244.11(e).
[104] 49 C.F.R. § 244.13(h).
[105] FD 36873 (Filing ID No. EI-34238), SIP at 13, 140 (Apr. 30, 2026).
[106] FD 36873 (Filing ID No. EI-34456), SIP Appendix (revised) at 23 (Sept. 22, 2026).
[107] FD 36873 (Filing ID No. 311221), Amended App. Vol. 2 p. 805-06, Exhibit 13 Operating Plan (Apr. 30, 2026); *Id.* at Vol. 2 p. 979, Service Assurance Plan, Table 15.
[108] *Id.* at Vol. 2 p. 948.

continued SIP compliance is unclear.[109]

Regulation also requires the SIP to contain "a reconciliation of the differing rules or instructions governing railroad operations."[110] The SIP contains none. UP runs under the General Code of Operating Rules (GCOR). NS runs under its separate NS Operating Rules and, on certain lines where it is a tenant on a host railroad's territory, under the Northeast Operating Rules Advisory Committee rules (NORAC).[111] The rulebooks often use different terms for the same action. For instance, the authority a dispatcher gives a crew to occupy main track is a "track warrant" under GCOR Rule 14.1, a "Track Authority" under NS Rules 520 to 531, and a "Form D" under NORAC Rule 400.[112] The words dispatchers and crews use with one another by radio, often under pressure, differ across the two railroads, and FRA's research office has identified crews working under two rulebooks instead of one as a source of confusion and a safety concern when railroads and their rulebooks merge.[113] The SIP's answer is that the rulebooks will stay separate at first, that GCOR will later become the core of the combined rules, that NORAC will remain in force where NS is a tenant, and that the two safety departments plan a side-by-side analysis of all critical rules.[114] But a plan to compare the rulebooks is not a reconciliation of them. The rule says the plan "shall contain" the reconciliation. This SIP does not, and instead promises to prepare one later. The revised Appendix schedules rulebook consolidation and a uniform set of operating rules for completion within twelve months of UP taking control of NS.[115] A twelve-month schedule to reconcile the rulebooks is implausible. In the last major merger, CPKC gave itself three years to consolidate rulebooks that were already both based on GCOR; UP gives itself one year to move NS from its separate rulebook to GCOR.[116] Nor does it describe the interim protocols for trains and crews crossing between GCOR and NS territory on day one.[117] It gives no steps for writing the combined rulebook other than assigning the task to a three-person team.[118] Applicants should be held to a higher standard of detail than CPKC, not a lower one; and not only because of the relative complexity and magnitude of this proposed merger. As the Board has stated:

> *"This Transaction is the first proposed merger evaluated under new rules forged following real-world consequences emanating from a 1990s wave of major*

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[109] 49 C.F.R. 1106.4(b)(4).

[110] 49 C.F.R. § 244.11(b).

[111] FD 36873 (Filing ID No. EI-34238), SIP at 54, 63-64 (Apr. 30, 2026).

[112] General Code of Operating Rules Committee, *General Code of Operating Rules*, 8th ed., Rule 14.1, at 14-1 (Apr. 1, 2020), https://beltrailway.com/wp-content/uploads/2020/03/gcor-2020-x1a-print3.pdf; Norfolk Southern Corporation, *Norfolk Southern Operating Rules*, Rules 520-31, at 162-164 (Jan. 1, 2019), https://davewisniewski.com/bletdiv4/documents/rules/2019-OR.pdf; Northeast Operating Rules Advisory Committee (NORAC), *NORAC Operating Rules*, 12th ed., Rule 400, at 97 (Jan. 1, 2024), https://static1.squarespace.com/static/5649fa13e4b0b815fce936e1/t/65ccf724d5466f2d79c4a129/1707931429541/Norac+12th+Edition.pdf.

[113] Fed. Railroad Admin., DOT/FRA/ORD-99/09, *Compliance with Railroad Operating Rules and Corporate Culture Influences* at 2-3 (Oct. 1999), https://rosap.ntl.bts.gov/view/dot/8448.

[114] FD 36873 (Filing ID No. EI-34238), SIP at 11, 54, 64 (Apr. 30, 2026).

[115] FD 36873 (Filing ID No. EI-34456), SIP Appendix (revised) at 7-8 (Sept. 22, 2026); *Id.* at ii; id. at 4-5.

[116] FD 36500 (Filing ID No. 303462), Canadian Pacific Ry., et al., Control, Kansas City Southern, et al., SIP at 49, 145 (Dec. 28, 2021).

[117] FD 36873 (Filing ID No. EI-34238), SIP at 52-53 (Apr. 30, 2026).

[118] *Id.* at 65.

> *mergers. Such consequences cannot be ignored, assumed away, or overlooked based on vague intentions or promises, particularly given the possible implications of subsequent mergers for the long-term future of the national rail network. Therefore, the current rules establish a 'heavier burden' for applicants, with new provisions concerning competitive enhancement, benefit estimate integrity, service assurance, and downstream effects."*[119]

Whatever scrutiny FRA gave a plan for the smallest Class I merger under the old rules, this plan, for the largest merger under the new rules, demands more.

C. FRA's findings on the Safety Integration Plan would normally be required as part of the Draft EIS public comment period, which the Board has eliminated.

The SIP process is designed so that the public can see and comment on FRA's evaluation of an applicant's SIP. FRA must provide OEA with findings and conclusions on whether the SIP provides a reasonable assurance of safety long enough in advance to incorporate the proposed SIP, FRA's comments, and proposed revisions into the draft environmental document.[120] The Board's regulations clearly state that the public may review and comment not only on the SIP but on the draft environmental documentation that incorporates FRA's findings.[121] OEA must then answer comments on the SIP in its final environmental document, and the Board must consider the full environmental record, including material submitted by the public concerning the SIP, when it decides the case.[122]

In this case, the Board has chosen to waive the Draft EIS process. The Board only promises that the proposed SIP "will be made available for public review and comment during the EIS process."[123] This leaves out the public's access to FRA's findings and the Board's draft revisions and modifications in response to those findings. If FRA's findings arrive only in a Final EIS, no one outside the agencies will have a chance to answer them before the Board makes its determination. The solution that best follows the Board's rules is to restore Draft EIS publication and allow the public to comment on it, having incorporated FRA's findings.

D. Investment in workers is a necessary component of safety.

The merger is not in the interest of its workers. That is why the majority of applicants' unionized workers oppose the merger.[124] The Board is statutorily obligated to consider "the interest of rail carrier employees affected by the proposed transaction."[125] The impact of proper staffing plans goes beyond workers as well, as staffing is a key element of safety and environmental risk mitigation.[126]

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[119] Decision No. 21 at 18 (citing 5 STB 539, 546 (2001)).

[120] 49 C.F.R. § 1106.4(b)(1)-(2).

[121] *Id.*

[122] 49 C.F.R. § 1106.4(b)(3).

[123] FD 36873 (Decision ID No. 21), slip op. at 41 (May 26, 2026).

[124] Horowitz, Jamie, "Potential Merger Would Hurt Union Workers, Raise Prices, Create Monopoly," International Brotherhood of Teamsters (Dec. 17, 2027), https://teamster.org/2025/12/teamsters-statement-opposing-proposed-union-pacific-norfolk-southern-merger/.

[125] 49 U.S.C. § 11324(b)(4), (c).

[126] Fed. Railroad Admin., HQ-2023-1813, *Accident Investigation Summary Report*, (July 2024), https://railroads.dot.gov/elibrary/accident-investigation-summary-report-hq-2023-1813.

The application brags that $20.4 million a year will be saved in labor costs from remote control and remote switching at "select legacy NS terminals," and $5.2 million a year from running NS yards with fewer yardmasters once UP's Terminal Command Center is installed.[127] Applicants claim that this reduction in yard and terminal service—an abolition of 27 yardmaster jobs—will have minimal impact despite increased yard activity "due to efficiencies" from implementation of the Terminal Command Center technologies.[128]

It is true that the application projects a net gain of about 1,170 craft jobs, but the new positions depend on hoped for growth in rail traffic which the record does not clearly support. UP moved 8.4 million carloads and intermodal units in 2025, 7 percent fewer than in 2015, and its revenue ton-miles fell 12 percent over the same decade. The rest of the industry shows a similar pattern: by the Association of American Railroad's count, U.S. railroads handled 25.6 million carloads and intermodal units in 2025 against 28.0 million in 2015.[129] If recent history repeats itself, the promised job gains will not materialize. The job cuts, however, are more certain: 858 NS management jobs and 1,156 craft positions.[130]

The management cuts fall on the people who run NS day-to-day. NS has about 4,174 non-union employees; the applicants plan to eliminate 858 of those positions (21 percent) over three years.[131] Of 2,063 Atlanta headquarters positions, 537 are abolished and 546 are moved to Omaha.[132] In the field, 262 of 1,853 NS operating managers (14 percent) are cut. These are the managers in the operating department—positions such as trainmasters and terminal, track and mechanical supervisors who oversee work at yards and on the railroad every day.[133] The applicants concede they "have not yet detailed the specific additional management positions that may be needed to support anticipated traffic growth."[134]

The SIP's April staffing table shows 1,698 train and engine positions created and 928

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[127] FD 36873 (Filing ID No. 311221), Amended App. Vol. 2 p. 803, Exhibit 13 Operating Plan (Apr. 30, 2026) ("Applicants estimate annual savings of $20.4 million from applying these two technologies to selected legacy NS terminals"; computes the section's yard savings from "the anticipated reduction in NS people starts"); *Id.* at Vol. 1 p. 509, Verified Statement of Grant Janke (¶¶ 45-46: remote control "reduces agreement headcount needs, and the benefits are quantified within the Personnel section"); *Id.* at Vol. 2 p. 805, Exhibit 13 Operating Plan (¶ 430: "labor savings of $5.2 million annually" from reducing yard controllers after Terminal Command Center).

[128] FD 36873 (Filing ID No. EI-34238), SIP at 154-55 (Apr. 30, 2026). (Table 8, Yard Controllers: 445 current, none created, 27 abolished in Year 3, with limited impacts in yard and terminal service attributed to "efficiencies from implementing UP's Terminal Command Center technology in legacy NS yards").

[129] UP Form 10-K for 2025 (Item 7: revenue carloads 8,447 thousand; revenue ton-miles 426.9 billion; total operating revenues $24,510 million); UP Form 10-K for 2015 (Item 6: revenue carloads 9,062 thousand and total operating revenues $21,813 million; Item 7: revenue ton-miles 485.0 billion). Association of American Railroads (AAR), *AAR Reports Weekly Rail Traffic for the Week Ending January 3, 2026* (Jan. 7, 2026), https://www.aar.org/news/aar-reports-weekly-rail-traffic-for-the-week-ending-january-3-2026/ (11,508,797 carloads and 14,055,633 intermodal units, 25,564,430 total, weeks 1 through 52); Progressive Railroading, *Total U.S. rail traffic falls in 2015, but intermodal sets a record high* (Jan. 7, 2016), https://www.progressiverailroading.com/rail_industry_trends/news/Total-US-rail-traffic-falls-in-2015-but-intermodal-sets-a-record-high--46904 (14,266,204 carloads and 13,710,646 intermodal units, 27,976,850 total).

[130] FD 36873 (Filing ID No. 311221), Amended App. Vol. 1 p. 529, Table 1 (Apr. 30, 2026); FD 36873 (Filing ID No. 311853) Errata to Revised Application at 3 (July 27, 2026).

[131] *Id.*

[132] *Id.*

[133] *Id.*

[134] *Id.* at Vol. 1 p. 530.

abolished; yard controllers, 445 today, none created, and 27 abolished; train dispatchers, 630 today, none created, and 33 abolished; track maintainers, 8,854 today, 36 created, and 9 abolished; and no change in signal maintainers, hazmat managers, or safety managers.[135] Set that against the application's traffic exhibits: 69 yards are projected to take on 20 percent or more added work, and the applicants' September 25 tables show cars switched per hour rising at all 36 yards that are above the Board's air quality thresholds.[136] The plan adds not one new yardmaster, dispatcher or safety manager position.

From the viewpoint of workers and the rules, the application is insufficiently detailed. It tells a story of employee cuts and traffic increases without assigning more than half of the craft cuts to any location. Then UP tries to obfuscate these cuts by promising job increases that are tied to growth which might never materialize.

UP's job creation promises seem even more dubious given its track record on job cuts. UP has cut its workforce further and faster than any of the other big U.S. railroads, and it is still cutting. Over the last ten years, UP shed nearly four in ten of its employees. UP averaged 47,457 employees in 2015, 37,483 in 2019 and 29,287 in 2025 (a 38 percent reduction).[137] Every large U.S. railroad cut jobs to increase profits during that time period, but none as much as UP: from 2015 to 2019, NS went from 30,456 to 19,400 average employees (down 36 percent), CSX from 29,410 to about 23,000 (down 22 percent), BNSF from about 44,000 to about 35,000 (down 20 percent).[138]

Since 2020, the other big railroads have held their workforces roughly steady or added to them; UP has kept cutting. Monthly employment reports show UP down 3,424 employees, or 9.9 percent, from December 2020 to December 2025, against NS down 1.7 percent, BNSF down 1.2 percent, CN's U.S. railroad up 1.2 percent and CSX up 12.3 percent.[139] Given this track record of cutting jobs and lack of growth, the Board should look skeptically at UP's promises that growth will lead to more jobs.

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[135] FD 36873 (Filing ID No. EI-34238), SIP at 154 (Apr. 30, 2026).

[136] FD 36873 (Filing ID No. EI-34413), Response to OEA Information Request 4 p. 5 (Sept. 25, 2026).

[137] UP Form 10-K for 2015 (Item 1, Employees; Item 7, Employees (average); Item 8, operating revenues); UP Form 10-K for 2019 (Item 7, Employees (average)); UP Form 10-K for 2025 (Item 1, Human Capital; Item 7, Total employees (average); Item 8).

[138] NS Form 10-K for 2019 (Item 6, Average number of employees, 2015 to 2019); NS Form 10-K for 2025 (Item 1, Human Capital Management); CSX Form 10-K for 2019 (Item 6, Employees, Annual Averages, 2015 to 2019); CSX Form 10-K for 2025 (Item 1, Human Capital); BNSF Form 10-K for 2015 (Item 1); BNSF Form 10-K for 2025 (Item 1). UP and NS figures are annual averages; CSX and BNSF figures are year-end counts (CSX 29,410 at year-end 2015 per the CSX Form 10-K for 2019, Item 6), compared with year-end counts for 2025. The comparison covers the four largest U.S.-based railroads; CN's and CPKC's U.S. subsidiaries report employment to the Board rather than in SEC filings, on a different basis.

[139] STB, STB-1246 Employment Data, available at https://www.stb.gov/reports-data/economic-data/employment-data/. December 2020 and December 2025 mid-month average employment: UP 34,459 to 31,035; NS 20,048 to 19,700; BNSF 35,149 to 34,710; CSX 16,885 to 18,958; CN 6,237 to 6,312. CN's figure is for Grand Trunk Corporation, its U.S. rail subsidiary, and CSX's is for CSX Transportation. Mid-month average employment is not comparable to the annual averages in the preceding paragraph and are used here only to compare the railroads with one another over the same five years.

III. THE PROPOSED MERGER RAISES INFRASTRUCTURAL CONCERNS THAT THE APPLICANTS DO NOT ADEQUATELY ADDRESS.

A. The merger application does not sufficiently address decaying railroad-owned infrastructure.

The public interest analysis of the proposed merger must account for the safety and environmental health risks that disproportionately affect vulnerable populations living near the impacted railroads.[140] The proposed merger raises concerns about the condition of existing railroad infrastructure that the applicants own and operate. The applicants have not made enforceable commitments to invest in the improvements and safeguards necessary to address these risks. Their failure to confront existing deficiencies in decaying railroad-owned infrastructure leaves serious doubt regarding the public interest of permitting them to merge.

In 2025 every other Class I railroad spent a larger percentage of revenue on capital expenses than UP. CSX spent $2.9 billion (21 percent of revenue, including about $470 million to rebuild the Blue Ridge Subdivision after Hurricane Helene), NS $2.2 billion (18 percent), BNSF $3.8 billion (16 percent), and, on their U.S. lines, CPKC about $660 million (18 percent) and CN about $720 million (20 percent).[141] UP has the resources to spend on infrastructure to improve safety, but that is not its business model.[142] That is why the applicants tout spending less on the NS network as a merger benefit; the application highlights $89.8 million a year in "capital savings in infrastructure replacement investment" from applying UP's procurement practices to NS.[143]

NS owns approximately 1,209 rail bridges in Pennsylvania, which would become the responsibility of the merged entity if the Board allows the proposed transaction to proceed.[144]

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[140] 49 C.F.R. § 1180.1(b)–(c), (f).

[141] CSX Form 10-K for 2025 (Property Additions $2,902 million; Revenue $14,092 million); NS Form 10-K for 2025 (Property Additions $2,204 million; Railway operating revenues $12,180 million); BNSF Form 10-K for 2025 (Capital expenditures excluding equipment $3,272 million plus Acquisition of equipment $525 million; Total operating revenues $23,421 million). The U.S. subsidiaries of CN and CPKC report to the Board on Form R-1 rather than in SEC filings; their figures are cash capital expenditures from the 2025 Annual Report Form R-1 each filed with the Board, Schedule 240, line 23, and total railway operating revenues from Schedule 210, line 13; Data for Soo Line Corporation and Kansas City Southern Railway (CPKC) ($658.5 million on $3,579.9 million, 18.4 percent) and Grand Trunk Corporation (CN) ($720.7 million on $3,672.8 million, 19.6 percent) are both available from the Board's Annual Report Financial Data page under Form R-1, https://www.stb.gov/reports-data/economic-data/annual-report-financial-data/. Schedule 240 is the cash-flow measure closest to the SEC figures used for the U.S. railroads; Schedule 330 additions to road and equipment give $776 million and $744 million respectively; UP remains lowest under either measure.

[142] Rates computed from FRA Office of Safety Analysis data, 2020 through 2025, downloaded Sept. 29, 2026 from https://safetydata.fra.dot.gov/OfficeofSafety/default.aspx. Form 54: Rail Equipment Accident/Incident Data (including highway-rail crossing accidents, property damage); Form 55a: Injury/Illness Summary - Casualty Data (including railroad-related deaths; suicides excluded); Form 55: Injury/Illness Summary - Operational Data (including total train-miles). UP: 4.85 accidents and 2.02 deaths per million train-miles and $0.96 of damage per train-mile, the highest pooled rates among the six Class I railroads (NS 3.98, 1.25 and $0.58; BNSF 2.40, 0.86 and $0.56).

[143] FD 36873 (Filing ID No. 311221), Amended App. Vol. 1 p. 511, Verified Statement of Grant Janke (April 30, 2026) ("$89.8 million in annual capital savings in infrastructure replacement investment").

[144] Dep't of Transp., Data Portal, *Railroad Bridges* (updated May 8, 2025), https://data.transportation.gov/Railroads/Railroad-Bridges/nv2b-wzsm.

Over seven million people are estimated to reside within one mile of railroads in the state.[145] The proposed merger therefore raises a public interest concern of whether the applicants would address existing infrastructure deficiencies or allow them to persist under a larger corporate structure with greater market power that would likely be more difficult to regulate. The Board should not presume that consolidation would improve railroad safety when the applicants have not accounted for the risks associated with the infrastructure they already control.

There is compelling reason to question whether NS has adequately maintained its infrastructure. A 2024 safety and cursory bridge inspection report documents significant deterioration across multiple NS bridges in metropolitan Pittsburgh.[146] Of the twenty bridges inspected, eleven were in serious or poor condition.[147] Two bridges rated in serious condition had issues affecting primary structural elements.[148] See Appendix A for testimonial requesting independent environmental oversight, accessible public reporting, and sustained monitoring are essential to protecting affected communities.

One of the most troubling examples is the bridge over 7th Street in Freeport, Pennsylvania.[149] (*See* Photograph Nos. 13, 15, 17 18, and 22). The report identified supporting steel bent in serious condition and described "100 percent section loss" in a cap or strut supporting the bridge's columns.[150] Because of trapped moisture and weather damage, the bridge's exposed steel elements are suffering from major corrosion and significant structural loss that demands immediate attention.[151] The report further warns that failure of a supporting column would be expected to result in "partial or full collapse of the bridge superstructure unit above."[152] To determine whether the bridge remains safe for train traffic, the inspector recommended, at minimum, a hands on inspection to assess the section loss of the steel girders and a structural analysis to verify that the bridge is currently safe for train traffic.[153] The inspector further concluded that the bridge "appeared to be too damaged to justify repairs."[154]

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[145] Kelso, Matt, *Risks to Residents of the Upper Ohio River Valley From Railroad Incidents*, FracTracker Alliance (Dec. 14, 2023), https://fractracker.org/2023/12/on-the-wrong-track-risks-to-residents-of-the-upper-ohio-river-valley-from-railroad-incidents/.

[146] David R. Schmidt Co., Inc., *2024 Safety & Cursory Inspection Report of Norfolk Southern and Feeder Railroad Bridges*, Rail Pollution Protection Pittsburgh (2024), https://railpollutionprotectionpittsburgh.com/wp-content/uploads/2024/12/Inspection-Rpt-of-NS-and-Feeder-Rail-Bridges-in-Metro-Pittsburgh.pdf.

[147] *Id.* at ii

[148] *Id.* at iiii

[149] *Id.* at C4-5 to C4-7.

[150] *Id.* at C4-5.

[151] *Id.* at C4-5- to C4-7.

[152] *Id.* at C4-6.

[153] *Id.* at C4-7 to C4-8.

[154] *Norfolk Southern Rail Bridges in Western Pennsylvania in Disrepair, Study Warns*, supra.



13. Steel closure plate under joint



15. Heavy rust scale and section loss along bottom of web and bottom flange of south exterior girder.



17. Hole rusted through bottom of web of Girder 5.



18. Heads of rivets in bottom flange of Girder 4 have section loss throughout, many as high as 100%.



22. 100% section loss of the Bent Cap (strut) to the right of Column 4.

The bridge over River Front Drive in Millvale, Pennsylvania, presented another serious hazard.[155] Deteriorated concrete hung from the underside of the bridge, and the inspector warned that it was "hanging precariously" and "could seriously hurt someone when it falls."[156] During the wintertime, icicles form along cracks in the slab and pose serious safety hazards to pedestrians and vehicles below the bridge.[157] Although previous repairs attempted to patch damaged areas, the report states that those repairs all failed.[158] At another bridge over 13th St. in Sharpsburg, Pennsylvania, the inspector documented continuing water leakage through the joints and between slab units.[159] The resulting conditions contributed to icicle formation beneath the superstructure, creating additional safety hazards.[160]

The threat to public safety posed by these decaying bridges extends beyond Pennsylvania and reflects a broader, systemwide problem. An investigation commissioned by the City of Binghamton, New York, found that 12 of 25 privately owned rail bridges had "significant structural or safety concerns."[161] Most of the bridges are owned and operated by NS and had passed their inspection that year.[162] These findings raise questions about the adequacy of the railroad's inspection practices and its approach to maintaining infrastructure. Considered alongside the documented deterioration of NS bridges in Pittsburgh, the Binghamton findings reinforce the need to examine whether existing safety practices adequately protect trackside communities and the public from preventable infrastructure failures—throughout the entire network.[163]

The reality of climate change heightens the urgency of these concerns.[164] Extreme heat and precipitation can intensify stress on rail infrastructure, thereby increasing risks to trackside communities.[165] Structurally compromised bridges may face greater risks from these overlapping

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[155] *2024 Safety & Cursory Inspection Report of Norfolk Southern and Feeder Railroad Bridges*, supra, at iii.

[156] *Id.* at C1-4.

[157] *Id.* at C1-4 to C1-5.

[158] *Id.* at C1-4.

[159] *Id.* at C2-4.

[160] *Id.*

[161] Rail Pollution Protection Pittsburgh, *RP3 Engineering Report: 11 of 20 Pittsburgh Rail Bridges are in Poor Condition or Worse* (2024), https://mailchi.mp/942f79e142ad/60-minutes-questions-railroad-safety-17610569; *see also* Taylor-Vuolo, Phoebe, *Report Finds Majority of Binghamton's Railroad Bridges Are in Disrepair*, WSKG (Aug. 31, 2023), https://www.wskg.org/news/2023-08-31/report-finds-majority-of-binghamtons-railroad-bridges-are-in-disrepair; Hunt Engineers, Architects, Surveyors, *Visual Safety Inspection Reports for City of Binghamton Railroad Bridges*, City of Binghamton, Broome County, NY (Aug. 2023), https://www.binghamton-ny.gov/home/showpublisheddocument/9704.

[162] *Id.*

[163] *RP3 Engineering Report: 11 of 20 Pittsburgh Rail Bridges are in Poor Condition or Worse*, supra (summarizing Fed. Railroad Admin., *Norfolk Southern Safety Assessment* (Aug. 2023), https://railpollutionprotectionpittsburgh.com/wp-content/uploads/2023/08/2023-NS-Safety-Culture-Assessment_08.09.23.pdf); *see also* Quinn, Kevin, *900-Page Report Shows 15 Railroad Bridges in Binghamton in Severe or Poor Condition*, WBNG (Aug. 30, 2023), https://www.wbng.com/2023/08/30/900-page-report-shows-15-railroad-bridges-binghamton-severe-or-poor-condition/.

[164] *Norfolk Southern Rail Bridges in Western Pennsylvania in Disrepair, Study Warns*, supra.

[165] *RP3 Engineering Report: 11 of 20 Pittsburgh Rail Bridges are in Poor Condition or Worse*, supra; *see also* Rail Pollution Protection Pittsburgh, *A Dose of Climate Reality and Rail Risk* (2024), https://mailchi.mp/bb593652393f/60-minutes-questions-railroad-safety-17608912?e=3b013486d7.

stressors.[166] Rail operators' failure to maintain their bridges, combined with the effects of climate change on rail and bridge infrastructure, presents serious safety concerns.[167] As discussed above, water infiltration through bridge joints can contribute to corrosion and deterioration of structural materials.[168] The bridge over 7th street in Freeport had ongoing leakage and corrosion affecting its superstructure and supporting steel bent.[169] The River Front Drive bridge had extensive cracking and icicles forming along its underside.[170] These conditions illustrate why infrastructure maintenance and climate resilience warrant consideration in the Board's review.

By inadequately addressing serious infrastructural concerns, the applicants have failed to demonstrate that the proposed merger would be consistent with the public interest. The lack of serious commitment to infrastructural replacement and repair is especially significant given the aforementioned concerns about the applicants' safety records and their plans for increased shipments of hazardous materials. The findings in the 2024 Pittsburgh report, together with the investigation commissioned by the City of Binghamton, provide evidence of serious defects in Norfolk Southern owned bridges and identify needs that extend beyond routine maintenance. The Board should not approve a transaction of this magnitude without a clearer understanding of the condition of the infrastructure involved and the applicants' plans to address existing decaying infrastructure. The applicants' failure to provide a specific or credible explanation of how the merged company would manage the infrastructure risks it would inherit creates a significant gap in their public interest showing and therefore leaves the Board without a sufficient basis to conclude that the proposed merger would serve the public interest.

> *Our communities are in the heart of the largest petrochemical complex of the nation and covered with rail lines. Lines that have derailed in our communities. One Union Pacific Line derailed next to East End Apartments on November 26, 2025, the day after Thanksgiving, less than one year ago. The Federal Railroad Administration tracks train derailments and shows that from 2022 to August 2025 there have been 83 train derailments in Harris County; 63 of them were from Union Pacific. A rail line that had no safety arms. In an under-resourced neighborhood of Magnolia Park. A rail line that would not let us sleep and have horns that would blow at anywhere from 2am - 5am and not allow a moment of rest. A line that was largely neglected and adjacent to a creek. I know because I lived there and am the director of Fenceline Watch, an environmental justice organization based in the east end of Houston. This has not only led to increased pollution and community isolation but also removed invaluable resources like our METRO public transportation lines due to rail lines stalling and delaying bus routes. Bus stops have already been removed once and reinstated because of community need. Our community has experienced the loss of life of young students like 15-year-old Milby High School student Sergio Ivan Rodriguez. On the morning of December 9, 2024 Sergio was attempting to cross the road to school when he was struck by a Union Pacific train that ended his life. For the sake of safety, taxpayer dollars were used to site a pedestrian bridge. It is not the first or last bridge.[171] The Bernie Guerra Bridge, less than 1.5 miles*

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166 *A Dose of Climate Reality and Rail Risk*, supra.

167 *RP3 Engineering Report: 11 of 20 Pittsburgh Rail Bridges are in Poor Condition or Worse*, supra.

168 *Supra*, note 92.

169 *2024 Safety & Cursory Inspection Report*, supra, at C1-4 to C1-5.

170 *Id.* at C4-5- to C4-7.

171 Leo Flores *New bridge to honor Houston teen (*Sept. 17, 2026)

away, was the outcome of the loss of life of an invaluable community civic association president and former chemical worker who warned about the dangers of being completely enclosed by rail lines, namely a Union Pacific corridor, while also in close proximity to the hazardous chemical plants.[172] *Now a pedestrian bridge will be build in his honor. Mr. Guerra's death was preventable had an ambulance not been obstructed by the rail corridor.*

The rails in our areas pose a unique risk because of the uniquely hazardous chemicals that travel to and from the Houston Ship Channel, home of the largest petrochemical complex. Not having accurate data on the pollution from rails harms our communities standard of life and adds to the cumulative threats we face. Railcars coming through our community are not full merchandise, they are riddled with chemicals from cancer causing benzene, formaldehyde, sulfuric acid and so many more. Moreover Union Pacific's record more than exemplifies the neglect and lack of integrity they have for current infrastructure let alone expanding their purview. Rail workers who are already overworked will face increased strain under job cuts listed in the application, increasing the threats in our community. A bad actor should not get rewarded for threatening our communities and consider safety as the preeminent public interest of the Surface Transportation Board. In solidarity with all the communities who refuse to experience more losses. Yvette Arellano Fenceline Watch, Houston Texas, 77012

B. UP-NS have failed to make serious investments into zero-emission infrastructure.

Zero-emission locomotive technology is well-proven and continues to rapidly advance across the globe.[173] The attached Connolly Memo, originally submitted as a comment to the City of Barstow, California on the Barstow International Gateway Project demonstrates that zero-emission technologies are technically feasible, commercially available, and more affordable to operate long-term than fossil-fueled combustion equipment.[174] Before handing them a massive increase in control of the rail freight market, the Board should require UP-NS to meaningfully analyze the environmental and public health benefits associated with zero-emission battery-electric locomotives and overhead catenary lines in its application, and to adopt those technologies if found to be beneficial to the public. UP-NS must also outline a plan to replace outdated diesel-fueled equipment with more reliable zero-emission technology to reduce diesel particulate matter exposure, cut total railyard emissions, eliminate locomotive idling, and avoid concentrated cumulative impacts in regions already disproportionately burdened by rising truck traffic and cargo debris.

The Board's merger regulations include environmental safeguards in its assessment of public benefits and empower the Board to impose mitigation measures where necessary to address harms identified with the UP-NS proposal.[175] The Board's regulations further clarify that mergers

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https://www.txdot.gov/about/newsroom/local/houston/new-bridge-to-honor-houston-teen.html

[172] Lori Rodriguez. *Manchester civic leader's dream on track.* Copyright 2006 Houston Chronicle (April 20, 2006)

[173] *See* Hal Connolly Barstow Comment, attached as Appendix B (2025) ("Connolly memo").

[174] *Id*. at 1 and 22-24 (2025); Harter, Clara & Hussain, Suhauna, *Record-high diesel prices slam California economy from trucks to crops*, Los Angeles Times, Sept. 4, 2026, https://www.latimes.com/california/story/2026-09-04/record-high-diesel-fuel-prices-slam-california-economy.

[175] 49 C.F.R. § 1180.1(b), (d), (f).

serve the public interest only when substantial and demonstrable gains in important public benefits such as improved service and safety, enhanced competition, and greater economic efficiency outweigh any anticompetitive effects, potential service disruptions, or other merger-related harms.[176] Here, the UP-NS application repeatedly falls short of this standard by planning for an increase in antiquated diesel-fueled locomotives over cleaner technology threatening to increase operational costs and spike toxic emissions effectively undermining public health by forcing communities across the U.S. to breathe dirtier air. The risks surrounding UP-NS' merger proposal are not isolated to increased costs and significant environmental hazards but extend to light and noise pollution as well as vibrational impacts from expanded rail facilities and truck traffic expanding throughout communities previously sited away from major freight hubs. Public health and quality of life harms from UP-NS's application far outweigh potential benefits from operational efficiency.

UP-NS's application fails to outline a plan to deploy zero-emission electric locomotives including battery-electric locomotives, discontinuous catenary electrification, or full catenary electrification at any meaningful scale. The application completely lacks a proposed timeline or interim milestones to integrate zero-emission locomotives fleets into operation. These technologies merit a full evaluation, particularly given their demonstrated ability to reduce emissions and improve reliability.[177] At minimum, as a mitigation measure for the negative health impacts of the merger plan, UP-NS should develop a proposed model relying on catenary electrification, including hybrid approaches that combine discontinuous catenary with battery-electric locomotives. This analysis is critical for segments with higher operational demands where electrification can provide substantial emissions reductions.[178] Rail electrification is commercially available and a successfully demonstrated technology in use around the world, such as in Sweden, Austria, and Germany.[179] Contrary to such rapid advancements in zero-emissions freight technology, NS seeks to convert only two of over 3,000 total locomotives to battery-diesel hybrid technology, While UP aims to add only five hybrid locomotives to its fleet of nearly 7,000 owned or leased locomotives.[180] It is not clear why the merger would allow for these seven locomotive conversions but a no-merger alternative would not. Not only do these project elements fall short of the Board's guidance to ensure tangible public benefits, but neither of these meager commitments are enforceable on NS or UP, making this bare minimum investment entirely optional for both operators and leaving surrounding communities in limbo, uncertain whether cleaner technology will be demonstrated in any segment of these expanded freight lines in the years to come, or if the applicants are content with their fleets' aging technology. The Board must shift the burden to UP-NS to develop an enforceable plan and timeline to deploy zero-emission electric locomotives including battery-electric locomotives, discontinuous catenary electrification, and full catenary electrification, especially in communities of color and low-income communities across the U.S. that have historically borne the brunt of rail, port, and warehouse pollution.

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[176] 49 C.F.R. § 1180.1(c).

[177] Connolly memo at 22-24.

[178] *Id*. at 42-42.

[179] *Id*. at 36.

[180] FD 36873 (Filing ID No. 311221), Verified Statement of Matthew Graham, Amended App. 1 Vol. p. 642, 644 (April 30, 2026); id. at UP Form 10-K, App. Vol. 4 p. 219; id. at NS Form 10-K, App. Vol. 4 p. 416.

One area of particular concern is in switcher locomotives. Over 95 percent of UP-NS switchers are Tier 0/0+.[181] UP-NS does not analyze as a mitigation measure the transition to zero-emission switcher locomotives for railyard operations. Zero-emission switchers are a feasible alternative to the current high-pollution status quo, and switchers are particularly suitable for electrification because they operate in confined areas, have predictable duty cycles, and can access charging regularly.[182] The feasibility of operating cleaner zero-emission locomotive fleets has already been demonstrated in California, where Class I railroads have managed and tracked cleaner locomotive deployment pursuant to voluntary agreements with CARB. These agreements show that railroads are capable of geofencing cleaner locomotive operations, tracking compliance, and adjusting fleet deployment to meet regional air quality objectives.[183]

Finally, UP-NS misses the opportunity to plan for zero-emission rubber-tired gantry cranes and zero-emission heavy-duty trucks in its proposed design. Any evaluation of these technologies must include an accurate and complete cost analysis accounting for available federal, state, and utility incentives that are available or may become available in the five-year post-merger period to offset costs. A robust review of grant funding opportunities is necessary to ensure that cost considerations do not improperly limit the adoption of feasible zero-emission technologies.[184] It is unacceptable for UP-NS to seek such an outsized portion of the rail market, while avoiding any commitment to capital investment that would meaningfully move the rail industry towards electrification. This problem stems from owner priorities, not from technological infeasibility. It bears repeating that the European Union, China, and India all boast sizable rail networks that are majority electric.[185] In contrast, the U.S. rail system (with tracks owned by companies like UP and NS) is less than 1percent electrified. The gap in U.S.-based zero-emission rail advancements will only be deepened by the UP-NS proposal.

The technologies that would eliminate the emissions increases that are discussed earlier in this comment are on the market, in revenue service, bought by UP's peers, and at times bought by UP itself: battery-electric locomotives in 2022, hybrid cranes for its Chicago and Los Angeles terminals in 2023, and what UP calls the industry's first hybrid electric crane at its Long Beach ICTF.[186] The application mentions some of them as pilots and past purchases.[187] It nowhere analyzes deploying any of them at the yards and terminals projected to see increased pollution.

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[181] FD 36873 (Filing ID No. EI-34413), Response to OEA Information Request 4 (September 25, 2026).

[182] Conolly memo at 46-47.

[183] *Id*. at 59-60.

[184] *Id*. at 63-65.

[185] International Energy Agency, *The Future of Rail: Opportunities for Energy and the Environment* (Jan. 29, 2019), https://www.iea.org/reports/the-future-of-rail; Ferris, Nick, *How India electrified 45% of its railway network in just five years*, Energy Monitor (Feb. 2, 2024), https://www.energymonitor.ai/tech/electrification/how-india-made-45-of-its-railway-network-electric-in-just-five-years; Qian, Jiaqi et al*., Policy implications of electrifying land freight transport towards carbon-neutral in China*, Transp. Pol'y vol. 160, 116-24 (Jan. 2025), https://www.sciencedirect.com/science/article/abs/pii/S0967070X24003354.

[186] UP, Union Pacific's GHG Reduction Goals Get a Lift from Hybrid Cranes (Feb. 22, 2023) https://www.up.com/news/service/hybrid-cranes-it-230222 (four diesel-battery hybrid cranes; "at least 50% less diesel"); UP, Facilities webpage (accessed November 9, 2026) https://www.up.com/aboutup/environment/facilities/index.htm (Long Beach ICTF "first-ever hybrid electric crane").

[187] FD 36873 (Filing ID No. 311221), Verified Statement of Matthew Graham, Amended App. 1 Vol. p. 642 (April 30, 2026).

The Operating Plan's locomotive strategy is the existing diesel fleet plus throttle-management software.[188] The Graham statement's discussion of cleaner switchers (the locomotives that sort cars inside a yard) is one hybrid pilot with ZTR, a locomotive-controls company. UP rebuilt an old switcher as a battery unit and paired it with a conventional diesel switcher. The battery unit can be plugged in or charged by the diesel unit while working, and the pair runs on battery or diesel depending on the job. UP says fuel use could fall "up to 80 percent" depending on operating mode. The first set began testing in 2024 in a UP facility and rail yard, with further testing in 2025 and 2026; it has not entered regular service, and it is one of six planned sets, with the second expected to begin testing in 2026.[189] A hybrid still burns diesel. Battery-electric locomotives and catenary (overhead wire), which would remove the switcher's tailpipe NOx and PM entirely, appear nowhere in the environmental or locomotive analysis.

In January 2022 UP announced the purchase of 20 battery-electric yard locomotives, 10 Wabtec FLXdrive units and 10 Progress Rail EMD Joule units, with yard charging. First delivery was promised for late 2023 and the full fleet by late 2024.[190] On September 23, 2026, the first two FLXdrives arrived at West Colton Yard in Bloomington, California, for "extensive testing." Instead of a 20-unit purchase, the release describes a four-unit fleet, with two more units due in October. UP disclosed in a 2024 climate questionnaire, that procuring the 2.4 megawatt-hour batteries "has proven to be more challenging than expected," so it "adjusted" the order to four units for delivery in 2026.[191] The pace of technological growth set by UP is two locomotives in four and a half years, as of September 23, 2026, for a railroad that reports a fleet of nearly 1,500 switchers.

In the Pilbara iron ore region of Western Australia, Fortescue began commissioning two Progress Rail SD70J-BB battery locomotives in February 2026, each with 14.5 megawatt-hours of storage and 2.8 megawatt charging, together replacing about a million liters of diesel a year.[192]

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[188] Revised Application, Operating Plan (Exhibit 13) § 9.1, Vol. 2 p. 780 to 782; Graham VS ¶ 8, Vol. 1 p. 641.

[189] FD 36873 (Filing ID No. 311221), Verified Statement of Matthew Graham, Amended App. 1 Vol. p. 642 (April 30, 2026); UP, 2025 CDP Corporate Questionnaire at 46 (December 19, 2025) https://www.up.com/content/dam/upcom/strategy-sustainability/documents/cdp-submission.pdf (testing "during 2024 in a Union Pacific facility and rail yard," continuing in 2025 and 2026); UP, Union Pacific on Track to Complete First-of-its-Kind Hybrid Locomotive Pilot (May 30, 2025) https://www.up.com/news/service/hybrid-locomotive-pilot-it-250530; Trains, Union Pacific test of battery-diesel switcher advances to use in yard service (May 31, 2025) https://www.trains.com/pro/mechanical/locomotives/union-pacific-test-of-battery-diesel-switcher-advances-to-use-in-yard-service-with-video/.

[190] UP, Union Pacific Railroad to Assemble World's Largest Carrier-Owned Battery-Electric Locomotive Fleet (Jan. 28, 2022) https://www.up.com/press-releases/service/battery-electric-locomotive-nr-220128; Progress Rail, Caterpillar to Supply Locomotives to Union Pacific Railroad, , Supporting Investment in World's Largest Battery-Electric Locomotive Fleet (Jan. 28, 2022) https://www.progressrail.com/en/company/news/press-releases/2022-caterpillar-to-supply-locomotives (10 EMD Joule units).

[191] UP, Union Pacific Debuts First Two Battery-Electric Locomotives in Southern California (Sept. 23, 2026) https://www.up.com/press-releases/growth/battery-electric-locomotives-debut-260923 ("the first of four"); UP, 2024 CDP Corporate Questionnaire at 103, https://www.up.com/cs/groups/public/@uprr/@environment/documents/up_pdf_nativedocs/pdf_up_esg_2024_cdp_submission.pdf (battery procurement "more challenging than expected"; order "adjusted" to four units for delivery in 2026); Railway Gazette, Union Pacific takes delivery of battery-electric locomotives for testing (Oct. 5, 2026) https://www.railwaygazette.com/battery-traction/2026/10/05/union-pacific-takes-delivery-of-battery-electric-locomotives-for-testing/ (West Colton; 2.7 MWh per unit).

[192] Fortescue, *Fortescue marks Real Zero milestone with battery electric locomotives commissioning* (Feb. 12, 2026), https://www.fortescue.com/en/articles/fortescue-marks-real-zero-milestone-with-battery-electric-

According to the operator Fortescue, once it places an order, converting a 70-locomotive fleet can be completed under three years.[193] BHP's two Wabtec FLXdrive units arrived in November 2025 and are being commissioned now.[194] Similarly, Vale ordered three FLXdrives for its Carajas iron ore railroad in Brazil, due in 2026.[195] Switching, the duty UP bought its locomotives for, is the easiest case: one site, short trips, predictable cycles, long idle periods, a charger in the yard. Yet, UP makes no plans to shift from diesel to zero-emission operations.

Most U.S. battery switchers are conversions, a repower that keeps the frame, cab and trucks of an existing piece of diesel-fueled equipment and replaces the engine and fuel tank with a battery pack, at a fraction of the cost of a new unit. Innovative Rail Technologies' ATLAS conversions work at U.S. Steel's Edgar Thomson and Clairton works outside Pittsburgh, and IRT has supplied a unit for Nucor's Hertford County mill in North Carolina.[196] The Newburgh and South Shore, an OmniTRAX short line in Cleveland built to serve the steel mills, has run an AMPS Traction G9 conversion in revenue service since March 2025: 1.4 megawatt-hours of battery, up to 12 hours of switching on a charge, recharged overnight.[197] Watco, a large short-line operator, has run two converted switchers in full service at its Greens Port terminal on the Houston Ship Channel since September 2023, projecting 60 percent lower fuel and 30 percent lower maintenance costs, and

locomotives-commissioning ("Delivered by Progress Rail"; "together eliminate around one million litres of diesel each year"); Luczak, Marybeth, *Fortescue Commences Progress Rail BEL Commissioning*, Railway Age (Feb. 12, 2026), https://www.railwayage.com/mechanical/locomotives/fortescue-commences-progress-rail-bel-commissioning/ (14.5 MWh; 2.8 MW charging).

[193] Bates, Alistair, *Fortescue trials battery-electric locomotives in Pilbara*, ABC News Australia, Feb. 14, 2026, https://www.abc.net.au/news/2026-02-15/fortescue-battery-electric-locomotives-pilbara/106022632 (Dino Otranto: "once we pull an order ... it will take a couple of years to transition the entire fleet"; Rio Tinto has shelved its Wabtec order).

[194] BHP, *BHP welcomes Australia's first purpose-built battery-electric locomotives to the Pilbara* (Nov. 14, 2025), https://www.bhp.com/news/articles/2025/11/bhp-welcomes-australias-first-purpose-built-battery-electric-locomotives-to-the-pilbara.

[195] Wabtec Corp., *Vale partners with Wabtec on alternative fuels study and orders three FLXdrive battery electric locomotives* (July 13, 2023), https://ir.wabteccorp.com/news-releases/news-release-details/vale-partners-wabtec-alternative-fuels-study-and-orders-three (Carajas Railroad; delivery forecast 2026).

[196] Vantuono, William, *US Steel Goes Battery-Electric*, Railway Age (Nov. 1, 2023), https://www.railwayage.com/mechanical/us-steel-goes-battery-electric/ (two IRT conversions at Edgar Thomson and Clairton); Innovative Rail Technologies, *IRT to Deliver NUCOR's First Battery-Electric Locomotive to Hertford County* (July 31, 2023), https://innovativerailtech.com/innovative-rail-technologies-chooses-nmc/ (Nucor unit for delivery in early 2024).

[197] Vantuono, William C. *NSR AMPS Traction G9 BEL in Revenue Service*, Railway Age (Mar. 21, 2025), https://www.railwayage.com/mechanical/locomotives/nsr-amps-traction-g9-bel-in-revenue-service/ (1.4 MWh; up to 12 hours per charge; overnight charging).

won a $19.8 million federal grant in October 2024 to repower eight more.[198] California is buying nine to deploy within the San Pedro Bay port complex.[199]

Economics are now favorable for the switch from diesel to zero-emission operations. Retail diesel averaged $6.28 a gallon the week of October 19, 2026, up $2.66 from a year earlier. While UP buys in bulk, it is still paying for this increase. Its chief financial officer said in September 2026 that UP was paying about $5.25 to $5.30 a gallon, more than double its 2025 average of $2.49, and it burns about 937 million gallons a year, so at that rate the increase would cost it roughly $2.6 billion a year.[200] The Department of Energy's December 2024 rail plan is direct: "Deployment is the main priority for rail yard operations, given the large and immediate benefits of reducing air pollution from rail activities near heavily populated areas and the commercial availability of zero-emission locomotives for these purposes."[201]

Running trains from overhead wire is not a frontier technology; it is how a large share of the world's rail freight moves. In 2024, the majority of the European Union's rail network was electrified.[202] India shows that nationwide electrification is possible. In 2017, 40 percent of Indian Railways' track was electrified. By the end of 2024 it was 96 percent, and by November 2025, 99.2 percent of its broad-gauge network, about 69,400 route kilometers (43,000 route miles), with wire going up at more than 15 kilometers a day from 2019 to 2025.[203] The cost was reasonable.

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[198] Worrell, Carolina, *Watco Electric Switchers Receive High Marks*, Railway Age (Oct. 5, 2023), https://www.railwayage.com/freight/short-lines-regionals/watco-electric-switchers-receive-high-marks/ (two Greens Port conversions in full service since September 2023); Trains Staff, *Watco to convert two switchers to battery-electric power*, Trains (Jan. 20, 2022), https://www.trains.com/trn/news-reviews/news-wire/watco-to-convert-two-switchers-to-battery-electric-power/ (projected 60 percent fuel and 30 percent maintenance savings); Fed. Railroad Admin., *FY 2023-2024 Consolidated Rail Infrastructure and Safety Improvements (CRISI) Grant Program: Project Summaries* at 12 (Oct. 29, 2024), https://railroads.dot.gov/sites/fra.dot.gov/files/2024-10/FY23-24%20CRISI%20Selections.pdf (Watco, $19,843,062, eight repowers).

[199] Fed. Railroad Admin., *FY 2023-2024 Consolidated Rail Infrastructure and Safety Improvements (CRISI) Grant Program: Project Summaries* note 14, at 7 (Oct. 29, 2024), https://railroads.dot.gov/sites/fra.dot.gov/files/2024-10/FY23-24%20CRISI%20Selections.pdf (CARB, $36,521,266: nine battery-electric locomotives, five for Pacific Harbor Line and four for Watco, plus one hydrogen unit).

[200] U.S. Energy Information Administration, *Gasoline and Diesel Fuel Update*, *U.S. On-Highway Diesel Fuel Prices* (week of Oct. 19, 2026), https://www.eia.gov/petroleum/gasdiesel/; Sarkar, Apratim, *Union Pacific says high diesel prices shifting freight from trucks to rail*, Reuters, Sept. 16, 2026, https://www.spokesman.com/stories/2026/sep/16/union-pacific-says-high-diesel-prices-shifting-fre/ (CFO Jennifer Hamann: about $5.25 to $5.30 per gallon); UP Form 10-K for 2025 ($2.49 per gallon in 2025); FD 36873, Graham VS Workpaper: "Railroad Emission Data Inventory.xlsx" Tab "UP C-Rate Data" (2025: 936.7 million gallons). The $2.6 billion is an illustration ($5.275 less $2.49, times 2025 gallons), not a reported or forecast expense.

[201] U.S. Department of Energy, *An Action Plan for Rail Energy and Emissions Innovation* at 97 (Dec. 2024), https://www.energy.gov/sites/default/files/2024-12/doe-eere-modal-reports_rail-energy-emissions-action-plan.pdf.

[202] Eurostat, *41% of EU railway lines have 2 or more tracks* (Mar. 9, 2026), https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20260309-1 (57.6 percent of EU lines electrified in 2024).

[203] Press Information Bureau (India), *Mission 100% Electrification: Powering the Future of Indian Railways* (Jan. 6, 2026), https://www.pib.gov.in/PressNoteDetails.aspx?ModuleId=3&NoteId=156834&lang=2&reg=3 (99.2 percent of the broad-gauge network, 69,427 route km, by November 2025; more than 15 km per day, 2019 to 2025; 40 percent in 2017; 96 percent at end of 2024).

Indian Railways spent roughly $5.5 billion on electrification from 2014 to early 2024, a decade in which it wired about 40,000 route kilometers, or about $137,000 per kilometer.[204]

A discontinuous catenary strategy might be able to make electrification even more cost effective. This approach installs overhead wire on the open stretches of a corridor but allows a battery electric locomotive to run on battery power through the expensive parts, the tunnels, bridges and yards where installing catenary costs the most, then recharge under the next section.[205] Union Pacific's net income was $7.1 billion in 2025 alone, $6.7 billion in 2024 and $6.4 billion in 2023. UP earned more in one year than India spent in ten years electrifying 40,000 kilometers of railroad. UP's locomotive plan does not mention the technology.[206]

Switchers are not the only diesel engines at an intermodal terminal. Cranes, top loaders, side loaders, reach stackers, yard tractors and forklifts run on diesel too. The CARB's availability table lists battery-electric models as commercially available for yard trucks, top picks, side picks, reach stackers and forklifts, and grid-electric rubber-tired gantry cranes.[207] NS claims to operate 27 hybrid cranes and 7 fully electric wide-span cranes at its intermodal facilities.[208] UP bought four diesel-battery hybrid cranes in 2023 for its Chicago and Los Angeles terminals, expecting them to burn at least half as much diesel as the cranes they replace, and runs a hybrid electric crane at its Long Beach ICTF. UP expects its hybrids to halve the diesel; the fully electric models on CARB's list eliminate tailpipe exhaust. The application budgets $74.3 million for new lift equipment at UP and NS intermodal terminals to handle merger growth, including 8 new rubber-tired gantry cranes and 15 reach stackers and packers for UP, and does not say whether any of it will be electric. The application reports the hybrid and electric cranes the railroads already own; it does not analyze electric equipment as an option for any terminal where pollution will grow, leaving the public to wonder how new terminals will impact public health.

> *The South Ward Environmental Alliance stands against this merger because the railroads refuse to disclose local air pollution data and have failed to present any enforceable plan to protect our community's safety or transition to zero-emission equipment. We need real commitments to our health and infrastructure, not broken promises. - Kim Gaddy, Founder and Executive Director, South Ward Environmental Alliance*[209]

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[204] Ferris, Nick, *supra* note 163 (INR 464.3 billion, about $5.5 billion, spent since 2014; about 40,000 route km). The per-kilometer figure is that spending divided by 40,000 km.

[205] Fed. Railroad Admin., DOT/FRA/ORD-25/01, *Cost and Benefit Risk Framework for Modern Railway Electrification Options* at 11, 6, and 25 (Jan. 2025) https://railroads.fra.dot.gov/sites/fra.dot.gov/files/2025-01/CB%20Framework%20Rail%20Electrification%20Options.pdf (intermittent electrification "refers to the concept of deploying discontinuous segments of OCS along a rail corridor"; battery and dual-mode locomotives "could potentially navigate gaps in electrification" and avoid "the large expense of raising clearances under bridges or through tunnels"; recommending a dual-mode prototype and electrified test-track program).

[206] UP Form 10-K for 2025 (net income of $7,138 million, $6,747 million and $6,379 million for 2025, 2024 and 2023).

[207] Cal. Air Res. Bd., *Zero-Emission CHE Availability*, https://ww2.arb.ca.gov/our-work/programs/cargo-handling-equipment/zero-emission-che-availability (based on analysis of available resources as of Jan. 2025); Port of Los Angeles, *World's First Zero-Emissions Top Handlers Performing Well at Port of Los Angeles* (Aug. 6, 2020), https://portoflosangeles.org/references/news_080520_top_handlers_performing_well.

[208] FD 36873 (Filing ID No. 311221), Amended App. 1 Vol. p. 645, Verified Statement of Matthew Graham (April 30, 2026).

[209] The italicized testimonials were submitted in writing to be included in these written comments in response to the Surface Transportation Board's, Union Pacific Corporation and Union Pacific Railroad Company - Control - Norfolk Southern Corporation and Norfolk Southern Railway Company, Finance Docket No. 36873 (November 18, 2026)

The Growth Plan fails to take trucks off the highway as promised. Approximately 1.2 million of the 2.1 million long-haul truckloads UP expects to divert are intermodal loads, and each becomes a container that still requires a trip from a drayage truck (the short-haul tractor that shuttles containers to and from the terminal) at each end of its rail trip. The application's truck-mile savings, by its description, exclude "new local drayage to serve intermodal diversions." Zero-emission drayage trucks are a technology that the applicants should meaningfully consider given that it is practical to deploy; programs to increase the usage of such trucks exist in the Port of Los Angeles, the Port of Long Beach, San Pedro Bay Ports, and the Port of New York and New Jersey.[210] The applicants' September 25 table for the 43 intermodal terminals that exceed the Board's environmental review thresholds projects 18,114 over-the-road trucks a day at those gates in year five without the merger and a staggering 27,230 with it: about 9,100 more trucks a day, a 50 percent increase, in the neighborhoods around them. Louisville's Appliance Park terminal goes from 558 trucks a day to 1,255, Inland Empire from 166 to 819, Oakland from 359 to 775, Lathrop from 513 to 903 and Memphis from 643 to 1,010. More diesel trucks at a gate will increase NOx and PM on the streets around it. Although converting from diesel to battery-electric trucks could avoid this increase in toxic emissions, UP-NS refuse to plan for this shift. That is the analysis the Board should require.[211]

A majority of the major truck makers sell electric models that compete with diesel-fueled trucks on price and range. Hosting megawatt-class truck charging is a way to mitigate some of the NOX and PM pollution increases this merger will cause, but UP does not analyze it.

In sum, this merger application does not satisfy the public interest test established by the Board. The application projects growth at yards and terminals across the combined system, 136 of which either grow 20 percent or more or exceed the Board's environmental review thresholds, computes no NOx or PM for the diversion that drives the growth, and never analyzes, for any of those yards or terminals, deploying the technologies that would prevent those emissions. The UP-NS merger application lacks necessary information such as anticipated increases in NOx and PM emissions per terminal and fails to craft appropriate remedies, preventing the Board from accurately weighing projected harms or mitigation measures.[212] Before any public interest finding, the applicants must disclose NOx and PM changes yard by yard and analyze, at every yard and terminal where activity grows, as well as the potential for battery-electric switching, electric cargo-

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[210] Carranza, Alejandra, *San Pedro Ports seek zero-emission truck usage boost via new incentive program*, Supply Chain Dive (Sept. 17, 2026), https://www.supplychaindive.com/news/san-pedro-ports-seek-zero-emission-truck-usage-boost-via-new-incentive-prog/830536/.

[211] FD 36873 (Filing ID No. EI-34418) Applicants' Response to OEA Information Request No. 4, Master Data Table C.1, Intermodal and Auto Ramps (Sept. 25, 2026) (IR4 C.1.vi, over-the-road trucks per day, year 5 no transaction and year 5 with transaction, for the 43 intermodal terminals above the thresholds at 49 C.F.R. § 1105.7(e)(5); totals and yard figures are sums of that column); FD 36873 (Filing ID No. 311853) Errata to Revised Application (July 27, 2026) (2.111 million equivalent truckloads "excluding new local drayage to serve intermodal diversions": intermodal 1,178,000; merchandise 855,000); FD 36873, Graham VS Workpaper: Tab "Rubber Tire Interchange Close" (36-mile drays; 355 daily trips). The workbook has no tab for drayage added at growing terminals.

[212] Master Data Tables B.1 and C.1, EI-34416 and EI-34418 (Sept. 25, 2026) (36 manifest yards and 66 intermodal and automotive ramps, 43 and 23 above the thresholds at 49 C.F.R. § 1105.7(e)(5)); FD 36873 (Filing ID No. 311853) Errata to Revised Application, Appendix Q (July 27, 2026) (69 manifest yards gaining 20 percent or more workload); Id. at Appendix R (one further terminal, Bowden, Jacksonville, above 20 percent but below the threshold). The total across those lists is 136.

handling equipment, and truck charging at each intermodal terminal. The application's glaring deficiencies prevent the Board or the public from understanding its long-term environmental and public health impacts and makes no meaningfully attempt to demonstrate cleaner rail or truck technology.

IV. CONCLUSION

The merger between UP and NS would not be in the public interest. The formation of the nation's largest railroad company demands a high threshold of its applicants. On environmental and safety issues, applicants have not done their due diligence and have not put forward their best application in the first instance—forcing the public to fill in gaps that the applicants have left in their submission. A number of errors, misrepresentations, and omissions have damaged the applicants' credibility to implement this major transaction in a manner consistent with the public interest, especially where they are unbound by enforceable conditions.

Applicants failed to provide enough environmental information at the outset to facilitate early-stage public comment, given the lack of late-stage public comment under the Board's proposed procedural schedule. What they have submitted—such as their criteria pollutant analysis—lacks the level of detail to ensure that mitigation measures are properly considered and that environmental questions are resolved. Applicants have misused confidential designations to avoid disclosing basic information that the public needs in order to provide the highest-quality comments. The public has needed to identify mistakes and shortcomings in the data that has made it into the public record.

Applicants have not conducted site-level environmental analyses even though the impacts of their proposal are felt at the local level. They have not provided inventories of NOx, PM2.5, greenhouse gas, and other emission sources, direct and indirect, at each yard and segment impacted.

Applicants have not documented existing health vulnerabilities in impacted communities and investigated how the additional stressors introduced by the merger would exacerbate them. They have not conducted dispersion modeling of their emissions and have not analyzed such models with sensitive receptor and environmental justice overlays to understand the health impact on affected communities. They have not proposed environmental monitoring or mitigation measures at each community affected by increased traffic at yards or grade crossings. They have not notified community members residing near expected impacts and solicited their comments in an accessible public comment forum so as to pursue robust mitigation measures.

UP has the worst safety record among its peer Class I railroads, but applicants have not provided a regulation-compliant SIP. FRA's safety culture assessment, which UP previously corrupted, remains unfinished. There is not a clear plan to allow the public to comment on FRA's recommendations, or on the Board's proposed modifications to, the SIP. Applicants have not done enough to win over their unionized workforce who help to keep operations safe. Applicants have not bound themselves to a more frequent and rigorous schedule of car and track inspection. They have not engaged sufficiently with the impacts longer trains will have on blocked grade crossings. They have not committed to repair or replacement of decaying railroad-owned infrastructure such as bridges. Where disastrous derailments have occurred, such as in East Palestine, applicants have not demonstrated the long-term commitments to community health and wellbeing that would provide reassurance and peace of mind to trackside communities.

Applicants have not described how they would use this increase in market power to invest in the nation's railroads and bring the US freight system on par with cleaner, safer freight systems in place in other countries, or even to take intermediate steps on the way to parity. They have not proposed a meaningful zero-emission electrification plan (and in any case are not bound by any enforceable measures to commit to what little they do plan for). They have not proposed a model for catenary electrification, including hybrid approaches that combine discontinuous catenary with battery-electric locomotives. They have not put a timeline on retirement and scrapping of pre-Tier and Tier 0/0+ switchers.

In sum, this application is far from what would be necessary to make such an extraordinary transaction consistent with the public interest. UP and NS seek an enormous amount of market power from the Board—but not the weight of the obligations that monopoly would carry. For these reasons, the undersigned believe the Board should **reject** this application.

Please contact Molly Greenberg, Campaign Director for the Moving Forward Network, at greenberg@movingforwardnetwork.org if there are any questions or follow-up.

Respectfully submitted by the following,
November 18, 2026

Air Alliance Houston

Camden for Clean Air

Central California Asthma Collaborative

Clean Water Action NJ

Climate Reality Project Pittsburgh & SWPA

Duwamish River Community Coalition

East Yard Communities for Environmental Justice

Environmental and Climate Justice Committee, NJ State Conference - NAACP

Environmental Justice Health Alliance for Chemical Policy Reform (EJHA)

Fenceline Watch - TX EJ Org

Greater Frenchtown Neighborhood Revitalization

Illinois Environmental Council

Ironbound Community Corporation

Little Village Environmental Justice Organization

Mobile Environmental Justice Action Coalition

Moving Forward Network

Native Sun Community Power Development

Natural Resource Defense Council

Neighbors for Environmental Justice

New Jersey Environmental Justice Alliance

Pilsen Environmental Rights and Reform Organization (P.E.R.R.O.)

Protect Penn-Trafford

Public Rail Now

Rail Watch

Railroad Workers United

Respiratory Health Association

ReThink Energy Florida

RiSE4EJ

Katherine Garcia
Clean Transportation for All Campaign Director
Sierra Club

Solutionary Rail

South Ward Environmental Alliance

Sustainable Jersey City

Tallahassee Food Network

Texas Environmental Justice Advocacy Services

The Sacramento Environmental Justice Coalition

Three Rivers Waterkeeper

Tishman Environment and Design Center

Truckers Movement for Justice

United Electrical, Radio & Machine Workers of America

Urban & Environmental Policy Institute, Occidental College

Warehouse Workers for Justice

Waterspirit

West Long Beach Association

West Oakland Environmental Indicators Project

Appendix A

Three Rivers Waterkeeper 800 Vinial Street,
Suite B314 Pittsburgh, PA 15212
www.3RWK.org

November 11th, 2026

RE: Concerns Regarding Rail Safety and the Proposed Union Pacific–Norfolk Southern Merger

Three Rivers Waterkeeper is an organization serving as a scientific and legal advocate to protect the quality and health of the Allegheny, Monongahela, and Ohio Rivers and their watersheds in Southwestern Pennsylvania. We have significant concerns about the proposed Union Pacific–Norfolk Southern merger and its potential impacts on public safety, surface water (of which the Ohio River Basin serves as a drinking water source for over 5 million people), and overall accountability for environmental protections across Southwestern Pennsylvania (Pennsylvania Rail Lines: PennDOT Open Data).

Based on our firsthand experiences monitoring waterways across the headwaters of the Ohio River Basin, our team has observed deteriorating rail infrastructure and responded to derailments with little to no accountability or action. We believe a merger of this scale should not move forward without meaningful, enforceable commitments to rail safety and environmental protection. Mergers and monopolies create significant economic and social negatives by eliminating competition, concentrating market power, and shifting leverage away from consumers and workers. A Lack of competition can also lead to a lack of accountability and general improvement of infrastructure.

In 2015, Three Rivers Waterkeeper participated in a national Waterkeeper Alliance effort to document the structural integrity of 250 railway bridges crossing rivers throughout the country. Our inspection of the Fort Wayne Railroad Bridge was featured in the resulting national report, Deadly Crossing. We remain concerned about the condition of regional rail bridges and whether existing infrastructure is adequately maintained and equipped to accommodate increased rail traffic.

We also want to acknowledge serious ongoing risks associated with transporting hazardous materials, petroleum products, and plastics by rail. On May 26, 2022, a Norfolk Southern derailment occurred, where 18 train cars derailed on a small bridge outside Pittsburgh, spilling approximately 5,000 gallons of petroleum distillates into Guys Run, a tributary of the Allegheny River (Four Years Later: A Look into the Remediation of the 2022 Harmar Train Derailment). Despite remediation activities, an oil sheen remains visible on the tributary, along with remnants of train materials and plastic pellets transported inside the railcars. Additionally, on February 3,

2023, a Norfolk Southern freight train derailed in East Palestine, Ohio, approximately a quarter-mile west of the Ohio-Pennsylvania state line. The train consisted of approximately 150 cars, with 50 cars impacted by the accident. Following these incidents, Three Rivers Waterkeeper monitored affected waterways, including Sulphur Run in East Palestine, while advocating for greater transparency in public information sharing and remediation standards (Norfolk Southern Train Derailment Stream Assessment in East Palestine, Ohio).

Independent environmental oversight, accessible public reporting, and sustained monitoring are essential to protecting affected communities. The public should not be asked to assume greater environmental and public safety risks without enforceable assurances that railroads can operate safely and are fully accountable when they fail. The proposed Union Pacific–Norfolk Southern merger must be evaluated on its potential consequences for public safety, drinking water, and environmental health. Until meaningful commitments to infrastructure safety, hazardous material transportation safeguards, public transparency, independent environmental oversight, and complete long-term remediation are established and enforceable, we do not believe the proposed Union Pacific–Norfolk Southern merger can be demonstrated to be in the public interest. Thank you for your time and consideration.

Sincerely,



Heather Hulton VanTassel, PhD
Executive Director, Three Rivers Waterkeeper
Heather@threeriverswaterkeeper.org [213]

[213] Appendix A is a testimonial that was submitted in writing to be included in these written comments in response to the Surface Transportation Board's, Union Pacific Corporation and Union Pacific Railroad Company - Control - Norfolk Southern Corporation and Norfolk Southern Railway Company, Finance Docket No. 36873 (November 18, 2026)

Appendix

Hal Connolly Barstow Comment

Comments on the City of Barstow General Plan and Barstow International Gateway Project Draft Environmental Impact Report

State Clearinghouse Number: 2024020501

I. Introduction and Executive Summary

This comment letter is submitted to assist the City of Barstow and the public in evaluating the technical adequacy of the Draft Environmental Impact Report (Draft EIR) for the Barstow International Gateway (BIG) Project. The purpose of this letter is threefold. First, it identifies critical omissions, inconsistencies, and unsupported assumptions in the Draft EIR's project description, emissions modeling, energy analysis, and cost disclosures that prevent meaningful public review. Second, it explains why these gaps undermine the Draft EIR's conclusions regarding environmental impacts and the asserted infeasibility of cleaner alternatives. Third, it summarizes feasible zero-emission and electrification alternatives that the Draft EIR did not adequately analyze, even though they are technically available, operationally realistic, and economically bounded within the Project's planning horizon.

At a fundamental level, the Draft EIR does not provide a clear, stable, and internally consistent description of how the Project would operate. Core operational inputs—such as corridor length, train weights by direction, locomotive duty cycles, yard equipment operating patterns, and power system constraints—are either inconsistently presented, incompletely disclosed, or embedded in fragmented technical appendices without a coherent explanation of how they are used across analyses. These inputs are not peripheral details. They are prerequisites for calculating emissions, modeling air quality and health risks, evaluating electrification feasibility, and comparing lifecycle costs across alternatives. Where such foundational information is unclear or withheld, the public cannot assess downstream conclusions.

Several examples illustrate this problem. Eastbound train weights are disclosed, but westbound weights are not, even though directionality materially affects traction energy, regenerative braking, and emissions (Appendix 5.3 BIG-1 Air Quality Technical Report, Corridor Emissions Outside of California tables). The Draft EIR refers to "detailed duty cycle data" supplied by the applicant, yet provides only representative power settings rather than time-resolved operating profiles needed to assess sensitivity, charging feasibility, or lifecycle costs (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 70). Table 17 presents a switcher fleet mix that appears inconsistent with narrative commitments to retire older locomotives, without clarifying which assumption was used in modeling (Appendix 5.3 BIG-1 Air Quality Technical Report, Table 17, p. 71).

Similar issues arise in the Draft EIR's energy and power analysis. The document presents detailed hourly load profiles for individual equipment categories and calculates a coincident facility peak demand of approximately 64.9 MW, but does not disclose a transparent, project-wide, time-resolved operating description showing how all major loads interact over the year (Draft Environmental Impact Report, Table 5.6-14, p. 5.6-39). The Draft EIR repeatedly relies on an asserted 66-MW "power budget" to dismiss electrification alternatives, yet provides no interconnection study, transformer ratings, feeder limits, or written utility documentation establishing that figure as a binding physical constraint rather than a design assumption (Draft Environmental Impact Report, p. 5.3-111-5.3-113). The Battery Energy Storage System (BESS) is referenced but not specified with respect to power rating, energy capacity, duration, or dispatch strategy, making it impossible to evaluate whether it could mitigate peak demand or support electrified operations.

The Draft EIR's air quality and health risk analysis suffers from parallel transparency limitations. Although emissions and modeled concentrations are reported in numerous tables, the Draft EIR does not aggregate total project-related pollution by year and pollutant across the full footprint of the railyard and rail corridor. Nor does it provide a consolidated corridor-wide health risk context that accounts for existing rail sources affecting the same communities. The AERMOD dispersion modeling results are summarized, but the electronic input and output files requested by reviewing agencies are not provided, and key modeling inputs—such as source coordinates, complete generator stack parameters, and meteorological processing assumptions—are not disclosed in a form that allows independent replication. As a result, the public is asked to accept modeled outcomes without access to the assumptions and data that produced them.

These disclosure gaps directly affect the Draft EIR's treatment of alternatives. The document repeatedly characterizes zero-emission technologies as "too expensive" or infeasible, yet it does not disclose the full lifecycle costs of the diesel baseline against which alternatives are compared. Corridor-specific diesel fuel consumption is not reported; diesel price assumptions are not stated; electricity tariff assumptions, demand charges, and time-of-use effects are not modeled; and available federal, state, and utility incentives are largely ignored. Without consistent baseline cost inputs, the Draft EIR's economic comparisons are incomplete.

As detailed in the sections that follow, these deficiencies are not academic. When the Draft EIR's own data and publicly available benchmarks are applied transparently, multiple feasible zero-emission alternatives emerge that were not adequately analyzed. These include battery-electric line-haul locomotives operating on a dedicated LA–Barstow corridor, hybrid battery-electric/diesel consists that deliver near-term fuel and emissions reductions, intermittent catenary electrification focused on Cajon Pass, full corridor catenary electrification, battery-electric switcher locomotives at BIG, electric rubber-tired gantry cranes, and zero-emission drayage truck strategies consistent with deployments already occurring at the Ports of Los Angeles and Long Beach.

Taken together, the analysis presented in this letter demonstrates that the Draft EIR does not provide the level of disclosure necessary for the public or decision-makers to understand the Project's true environmental footprint or to meaningfully compare cleaner

alternatives. The omissions and inconsistencies identified here limit transparency, obscure cumulative impacts, and weaken the evidentiary foundation for conclusions regarding feasibility and cost. The remainder of this letter explains these issues in detail and presents quantitative, planning-level analyses showing that feasible zero-emission alternatives exist and should be evaluated in good faith using the Draft EIR's own data and widely accepted technical benchmarks.

II. Statement of Qualifications

I submit these comments as a transportation and energy policy expert with over 20 years of experience shaping U.S. infrastructure, sustainability, and clean energy frameworks. My career has spanned senior roles in the executive branch, the private manufacturing sector, and the U.S. Senate, giving me a specialized, 360-degree view of the intersection between freight rail operations, federal funding, and air pollution mitigation.

Currently, I serve as the Founder and Principal Consultant at Connolly Insights LLC. In this capacity, I provide technical and strategic guidance to environmental and transportation organizations and community stakeholders. My practice focuses specifically on navigating regulatory processes, analyzing and highlighting the air quality impacts of freight infrastructure on environmental justice communities, and translating complex federal rail policy into actionable protections for residents.

Previously, I served as the Senior Advisor for Climate and Sustainability at the Federal Railroad Administration (FRA). In this capacity, I served as a primary architect for the agency's environmental strategy, designing and launching FRA's first dedicated climate and resilience programs. My work focused heavily on air quality improvement; I led the development of initiatives to reduce locomotive pollution (specifically NOX and Particulate Matter) and oversaw the creation of data-driven mapping tools to identify and mitigate rail yard impacts on vulnerable communities.

Crucially, I was a primary contributor to the December 2024 report, *An Action Plan for Rail Energy and Emissions Innovation*, published jointly by the U.S. Department of Transportation and the U.S. Department of Energy. This document outlines the federal government's roadmap for modernizing freight rail and establishes current benchmarks for technological feasibility. These benchmarks are directly relevant to evaluating the technical validity of the alternatives analysis in this DEIR.

Before founding my firm, I served as Vice President and Head of Public Policy at Qcells North America, one of the nation's largest renewable energy manufacturers. In this role, I directed advocacy strategies regarding domestic content and supply chain resilience, unlocking significant investment in U.S. manufacturing. This experience provides me with technical insight into the battery and energy storage supply chains essential to zero-emission rail propulsion.

Prior to my executive branch service, I spent over a decade as a senior policy staff member in the U.S. Senate, including roles as a Senior Professional Staff Member for the Senate Foreign Relations Committee and Senior Policy Director for a senior member of the Senate Banking, Housing, and Urban Affairs Committee. During this time, I drafted

and negotiated major infrastructure legislation, including the transit title of MAP-21. My legislative portfolio also covered energy policy, including electricity regulation, giving me a holistic view of how federal energy policy intersects with transportation needs.

I hold a Certificate in Financing and Deploying Clean Energy from Yale University's Center for Business and the Environment, a Juris Doctor, cum laude, from New York University School of Law, and a Bachelor of Arts in Politics, High Honors, from Oberlin College.

The opinions expressed in this comment letter are offered in my capacity as a transportation, energy, and environmental policy expert. They reflect my technical assessment of the Draft EIR's data, assumptions, and analytical methods as compared to CEQA's disclosure and substantial-evidence standards. These comments are not offered as legal conclusions or legal advice, but as expert evaluations intended to assist the lead agency and the public in understanding the technical adequacy of the Draft EIR. See Appendix

III. CEQA Legal Framework and Governing Standards

This section outlines the CEQA legal standards governing the adequacy of the project description, substantial evidence, and lifecycle cost-based feasibility analysis. These requirements constitute the legal foundation for meaningful environmental review. When an EIR fails to meet these standards, it prevents the public and decision-makers from understanding the project's actual environmental costs and from evaluating whether cleaner alternatives are genuinely feasible.

A. Requirement for an Accurate, Stable Project Description

CEQA requires an Environmental Impact Report to be based on an accurate, stable, and finite project description. (*(County of Inyo v. City of Los Angeles (1977) 71 Cal.App.3d 185, 193.*) Without knowing what the project actually involves, no meaningful analysis of impacts or alternatives is possible. An EIR that withholds critical operational data, such as train weights, locomotive duty cycles, equipment specifications, or energy system parameters, fails to provide the stable foundation that CEQA demands.

The project description must be sufficiently detailed to permit meaningful environmental analysis. Just as you cannot calculate the fuel economy of a car without knowing its weight, engine specifications, and intended routes, you cannot evaluate the air quality impacts of a rail project without knowing train weights, locomotive duty cycles, and operational schedules. An EIR that asks the public to accept conclusions about environmental impacts without disclosing the underlying operational assumptions violates this fundamental CEQA requirement.

B. Substantial Evidence and Reproducibility

CEQA mandates that findings be supported by substantial evidence, defined as "facts, reasonable assumptions predicated on facts, and expert opinion supported by facts." (CEQA Guidelines § 15384(b).) Bare assertions do not qualify.

CEQA requires an EIR to supply enough data to permit the reader to understand, and to check for accuracy, the agency's analysis. (CEQA Guidelines § 15151.) This reproducibility requirement serves a critical function: it allows the public, reviewing agencies, and decision-makers to verify that the EIR's conclusions follow logically from its inputs. When an EIR relies on proprietary data, undisclosed assumptions, or modeling inputs that are never revealed, the analysis becomes a black box that no one can verify.

CEQA also requires an EIR to be a "good-faith effort at full disclosure." (CEQA Guidelines § 15151.) This means more than simply presenting conclusions; it requires transparency about how those conclusions were reached. When emissions modeling relies on “detailed duty cycle data" that are never disclosed, or when air quality dispersion modeling is presented without the source coordinates, stack parameters, or meteorological data needed to replicate the results, the EIR fails this good-faith disclosure requirement.

The substantial evidence requirement applies with equal force to an EIR's rejection of alternatives. An agency may not simply assert that a cleaner alternative is infeasible; it must provide evidence sufficient to support that conclusion. Conclusions that rest on undisclosed assumptions or incomplete data do not provide substantial evidence as that term is defined under CEQA, because they cannot be independently verified.

C. Feasible Alternatives and Lifecycle Cost Considerations

CEQA requires an EIR to do far more than list environmental impacts; it must identify "feasible alternatives" that would substantially lessen those impacts. (CEQA Guidelines § 15126.6(a).) This requirement is not optional. As the California Supreme Court has explained, the alternatives analysis is the "core of an EIR." (*Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564.)

CEQA defines "feasible" alternatives as those "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors." (CEQA Guidelines § 15364.) Critically, cost alone does not excuse an agency from analyzing an environmentally superior option. Courts have rejected attempts to dismiss alternatives solely on grounds of added expense, explaining that economic infeasibility requires substantial evidence and cannot rest on a project applicant's unwillingness to pay. (*Save Round Valley Alliance v. County of Inyo* (2007) 157 Cal.App.4th 1437, 1461.)

This principle has important implications for how costs must be evaluated. An agency cannot dismiss an alternative as "economically infeasible" simply because it carries a higher upfront price tag than the proposed project. California courts have established that economic infeasibility requires evidence that the additional costs are so severe that they would render the project impractical to proceed. (*Uphold Our Heritage v. Town of Woodside* (2007) 147 Cal.App.4th 587.) When an agency relies on cost estimates to reject an alternative, those estimates must be accurate and complete, which includes accounting for available public funding, incentives, and subsidies that would reduce the net cost to the applicant.

A proper CEQA cost comparison requires evaluating lifecycle costs, not merely upfront capital expenditures. This means including both one-time capital costs and long-term operating costs, such as fuel expenditures, through the project horizon. An EIR that quantifies the capital costs of clean alternatives while concealing the capital and fuel costs of the diesel baseline structurally biases decision-making toward the most polluting option by making it appear cost-free by comparison.

Courts have also held that when an agency fails to discuss the availability of funding that could make a mitigated alternative economically feasible, the resulting cost analysis is legally deficient. (*City of San Diego v. Board of Trustees of California State University* (2015) 61 Cal.4th 945.) Where federal grants, state incentives, utility programs, or tax credits exist specifically to subsidize the clean technologies an EIR dismisses as too expensive, failing to account for these funding sources artificially inflates the apparent cost of alternatives and undermines the integrity of the feasibility analysis.

Under CEQA Guidelines §15126.6 and §15364, an alternative that is technologically feasible, operationally realistic, and economically achievable must be analyzed in good faith. An EIR may not declare a cleaner alternative infeasible merely by asserting impossibility; it must show its work. Where the EIR provides neither the foundational data nor the engineering analysis to evaluate whether an alternative can succeed, its rejection of that alternative lacks substantial evidence.

IV. Inadequate Project Description and Missing Information

This section demonstrates that the Draft EIR fails to disclose core operational, energy, emissions, and cost information required to evaluate impacts and alternatives under CEQA, resulting in analyses that are incomplete, internally inconsistent, and not supported by substantial evidence.

A. Missing and Inconsistent Rail Operations Data

The Draft EIR fails to clearly and consistently describe basic rail operating parameters, such as corridor length, train weights, and locomotive configurations, undermining all downstream emissions, energy, and cost analyses.

1. Incomplete Disclosure of Train Weights and Directional Operations

The Draft EIR does not disclose key rail operational inputs required to model emissions and evaluate alternatives for the LA-Barstow corridor. For example, the Draft EIR discloses an eastbound gross train weight of 5,903.26 short tons (Appendix 5.3 GP-1: Air Quality and Greenhouse Gas Emissions Modeling, "Corridor Emissions Outside of California"), but provides no corresponding westbound train weight, despite acknowledging that westbound movements differ materially due to export or empty container consists. This omission is critical because directionality and mass are foundational to energy recovery in regenerative braking. Without westbound weights,

energy use, emissions, and the significant potential for regenerative braking recovery, essential for battery-electric locomotive (BEL) performance, cannot be accurately calculated.

2. Missing Locomotive Duty Cycles, Dwell Time, and Power Configuration Data

The Draft EIR states that locomotive emissions modeling relied on "detailed duty cycle data" and locomotive power settings provided by BNSF (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 69). While the Draft EIR does disclose the representative power settings used in the emissions calculations, such as modeling mainline line-haul locomotives at Notch 5, yard and switching operations at Notch 2, and lead track movements at Notch 3, these inputs function as simplified proxies rather than disclosed duty-cycle distributions (Appendix A: Air Quality and Greenhouse Gas Emissions Modeling Data).

The Draft EIR does not disclose the underlying duty-cycle information necessary to understand how locomotives actually operate over time, including the percentage of time spent at each notch, how power settings vary by train weight, grade, or direction of travel, or how operating profiles change across hours of the day or seasons. Without this information, the public cannot evaluate whether the assumed power settings reasonably reflect real-world operations, nor can it assess how sensitive emissions, energy consumption, charging feasibility, or lifecycle costs are to changes in those assumptions.

This is critical because the evaluation of electrification alternatives, battery sizing, charging time, and electricity demand requires time-resolved operating profiles. By disclosing only representative notch settings without the underlying duty-cycle distributions, the Draft EIR limits the ability of decision-makers and the public to independently assess the feasibility and impacts of zero-emission alternatives.

Similarly, the Draft EIR fails to disclose locomotive power configurations, including distributed power arrangements or variations in consist makeup across operating conditions. These omissions are critical because power configuration directly affects fuel burn and the feasibility of battery-electric or hybrid alternatives. Furthermore, the document does not explicitly disclose how long locomotives are available for charging at either the Ports or the Barstow International Gateway, though it implies locomotives spend substantial time at terminals between assignments (Air Quality Technical Report, Appendix 5.3 BIG-1, pp. 67-70; Appendix 5.8 BIG1 Greenhouse Gas Emissions Assessment, pp. 75-80). Without these inputs, neither the public nor decisionmakers can independently reproduce the emissions modeling or assess the technical feasibility of zero-emission charging schedules.

3. Internal Inconsistency Regarding Switcher Fleet Composition (Table 17 vs. Narrative Commitments)

Table 17 of the Draft EIR ("Locomotive Fleet Mix Forecast") indicates that in the Horizon Year 2048, a substantial share of switcher locomotive activity remains attributable to uncontrolled and Tier 0 engines, with those older technologies comprising the majority of the modeled switcher fleet mix (Air Quality Technical Report, Appendix 5.3 BIG-1, Table 17, pp. 71). At the same time, the narrative text elsewhere states that, beginning in the BIG opening year 2028, BNSF will retire all existing Tier 0/0+/1+ switcher locomotives at the existing Barstow Classification Yard and replace them with six Tier 4 switcher locomotives as a project feature (Air Quality Technical Report, Appendix 5.3 BIG-1, p. 10). The Draft EIR does not explain how these two statements are reconciled for the purpose of modeling. If the Table 17 fleet mix was used to derive emission factors, then the narrative commitment to retire older switchers is not reflected in the modeling. Conversely, if the Tier 4 replacement was modeled, then Table 17 misrepresents the assumptions underlying the results. This lack of clarity renders the analysis incomplete and inconsistent with CEQA's requirement for a clear, stable, and internally coherent description of the project (CEQA Guidelines §§ 15120, 15124).

B. Missing Yard Locomotive Duty Cycles and Alternative Reasonable Operating Patterns

The Draft EIR does not disclose yard locomotive duty cycles or explore other reasonable operating patterns.

1. Missing Duty Cycles for Yard Locomotives

The Draft EIR discloses peak hours of operation and average daily profiles for many categories of yard and terminal equipment, including cranes, hostlers, forklifts, and building loads (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 67, Table 15). It also explains the arithmetic used to derive a three-to-one ratio of battery-electric switchers to diesel switchers based on assumed charging duration and continuous 24-hour operations.

However, the Draft EIR does not disclose a time-resolved duty cycle or hourly energy profile for switcher locomotives themselves comparable to those provided for other major electric loads. Nor does it evaluate how alternative charging rates, staggered charging schedules, or higher-power chargers would affect fleet size, peak demand, or operational feasibility. Instead, the analysis relies on a single set of assumptions, most notably the use of 400-kW chargers (when higher capacity chargers are available), without sensitivity testing or evaluation of commercially available higher-power charging options.

As a result, although individual assumptions are disclosed in isolation, the Draft EIR does not provide sufficient transparency to understand how switcher electrification would interact with other facility loads, solar generation, or battery storage over the course of a day. This limits the ability of the public and decision-makers to evaluate whether the three-to-one switcher ratio reflects an inherent operational requirement or merely the product of conservative and untested modeling assumptions.

2. Failure to Consider Other Reasonable Operating Conditions

The Draft EIR does include detailed hourly load profiles, diversity factors, and coincident-demand modeling to calculate a facility-wide peak electrical demand of 64.9 MW for the Project as designed (Appendix 5.6 BIG-1 Energy Assessment). The analysis links this peak to shift schedules, opportunity charging assumptions, and second-by-second modeling of high-power equipment such as widespan cranes (Appendix 5.6 BIG-1 Energy Assessment).

However, the Draft EIR's analysis evaluates only whether the specific operating assumptions chosen by the Project proponent fit within an asserted 66-MW power budget. It does not disclose whether the modeled peak represents a worst-case condition, how sensitive the peak is to reasonable variations in charging schedules or equipment sequencing, or whether alternative operating strategies could materially reduce coincident demand. The public is shown the final peak number, but not the range of outcomes that could result from different, but foreseeable, operational choices.

This limitation is especially consequential for the evaluation of electrification alternatives. While the Draft EIR integrates diversity factors and staggered charging for cranes, hostlers, and forklifts, it evaluates battery-electric locomotive charging as a fixed, additive load rather than integrating it into the same coincident-demand framework (Appendix 5.3 BIG-1 Air Quality Technical Report, pp. 176-178). As a result, the conclusion that electrification would exceed the Project's power budget rests on untested assumptions about simultaneity and charging behavior that differ from those applied to other major electrical loads.

Finally, although the Draft EIR repeatedly refers to a 66-MW "power budget" allocated by Southern California Edison, it does not disclose any interconnection study, transformer ratings, feeder limits, or written utility correspondence establishing that limit as a binding physical constraint (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 179). Without that documentation, it is not possible to distinguish between a modeled design choice and an unavoidable grid limitation.

Taken together, these omissions do not negate the Draft EIR's electrical modeling, but they do limit its usefulness for evaluating whether alternative operating strategies or

electrification scenarios could be feasible within, or with modest modification to, the Project's assumed power framework.

3. Failure to Provide Adequate Hour-by-Hour Energy Data or Seasonal Changes

Although the Draft EIR includes selected hourly modeling results and representative "average daily" load profiles for certain facility components, it does not provide a transparent, project-wide hour-by-hour operating description showing how the Project functions across the full year. The Draft EIR does not disclose an integrated 8,760-hour load profile that shows how electricity demand from locomotives, yard equipment, buildings, and vehicle charging coincides during each hour of operation, nor does it explain how these combined loads vary across seasons in a manner that can be independently evaluated (Appendix 5.6 BIG-1 Energy Assessment).

This matters because electricity costs, grid impacts, and the feasibility of electrification depend not only on total annual energy use but on when energy is consumed relative to peak demand periods and available on-site resources. While the Draft EIR identifies a modeled facility peak demand of approximately 64.9 MW and asserts that on-site solar generation and a Battery Energy Storage System (BESS) will help manage peak loads, it does not disclose the hourly operating assumptions used to produce that peak or explain how solar output and battery discharge align with the hours when electricity is most constrained and expensive (Appendix 5.17 BIG-1 Utility Assessment, p. 65). Without this information, the public cannot evaluate whether the Project would, in fact, rely on grid power during peak periods, whether the BESS is appropriately sized, or whether alternative operating or charging strategies could materially change the outcome.

A similar transparency gap exists for air quality. The Draft EIR appropriately uses AERMOD to model short-term concentrations and reports maximum 1-hour pollutant levels for comparison with state and federal standards (Appendix 5.3 BIG-1 Air Quality Technical Report, pp. 78, 133–139). However, the Draft EIR does not disclose the underlying hour-by-hour operating schedules that drive those modeled results, such as when trains, switcher locomotives, cargo-handling equipment, and truck traffic are assumed to operate simultaneously. As a result, the public cannot assess how representative the modeled "worst-case" hour is of routine operations, how frequently overlapping sources occur, or how changes in operational assumptions would affect short-term exposure.

This information is particularly important for pollutants such as nitrogen dioxide (NO_2), which can cause acute respiratory effects over short exposure periods even when annual averages remain below significance thresholds. CEQA requires that an EIR present information in a manner that allows decision-makers and the public to meaningfully understand and evaluate environmental impacts, rather than relying solely on conclusory

model outputs without access to the assumptions that produce them (*Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 514–515).

By not disclosing integrated, time-resolved operating assumptions for energy use and emissions, the Draft EIR prevents meaningful evaluation of peak electricity demand, battery adequacy, time-of-use costs, and short-term air-quality risks. Consequently, key conclusions regarding power feasibility, cost impacts, and health effects rest on operational assumptions that are not transparent and cannot be independently reviewed or tested.

C. Inadequate Energy and Power System Description

The Draft EIR asserts power infeasibility without disclosing the technical basis for its conclusions, including grid constraints, storage capabilities, and load-management strategies.

1. Unsupported Assertion of a 66-MW Import "Cap"

The DEIR's rejection of electrification alternatives rests on a "66-megawatt power budget" allegedly allocated by Southern California Edison (SCE). The DEIR asserts that BIG's modeled peak load of 64.9 MW "maximized the allocated power budget," leaving no capacity for battery-electric locomotives or expanded electric yard equipment (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 77). However, the DEIR provides no underlying SCE interconnection study, no load-flow analysis for the Tortilla Substation, and no written communication from SCE establishing that 66 MW is a firm limit. The project's modeled peak demand is itself a product of the proponent's chosen equipment mix and modeling choices; by treating this as an immutable physical constraint without documentation, the DEIR improperly narrows the alternatives analysis.

2. Failure to Specify Battery Energy Storage System (BESS) Capabilities

The Project Description mentions a Battery Energy Storage System (BESS) designed to "maximize the on-site usage of solar power," but the DEIR never discloses fundamental technical specifications needed to evaluate whether this system could support electrification (Appendix 5.17 BIG-1 Utility Assessment, p. 65). Missing parameters include the BESS power rating (MW), energy capacity (MWh), duration (e.g., 2-hour or 4-hour), and dispatch strategy. Without these fundamentals, it is impossible to evaluate whether the BESS could mitigate peak loads or shift solar generation to support evening charging requirements.

D. Failure to Disclose Baseline Fuel, Energy, and Capital Cost Inputs

The Draft EIR does not disclose the baseline fuel, electricity, or capital cost assumptions necessary to conduct lifecycle comparisons among project alternatives.

1. No Corridor-Specific Diesel Fuel Disclosure

The Draft EIR fails to disclose diesel fuel consumption for the LA-Barstow line-haul corridor separately, reporting only aggregate locomotive diesel consumption for the entire BIG rail system, including within the footprint of BIG (DEIR Ch. 50-58 Environmental Analysis, Table 5.6-13, p. 5.6-36). To evaluate the electrification alternatives rejected by the DEIR as "too expensive," the specific fuel expenditure for the LA-Barstow operations must be isolated. By presenting aggregated fuel totals, the DEIR obscures one of the largest recurring operating costs of the project baseline.

2. No Diesel Price or Renewable Diesel Assumptions Disclosed

The Draft EIR never discloses the diesel price assumptions underlying its operational modeling. It does not state whether fuel costs reflect on-highway diesel, bulk railroad contract pricing, or renewable blends, each of which carries materially different costs. This lack of disclosure prevents independent verification of fuel cost impacts.

3. No Electricity Tariff Assumptions or TOU Treatment

The Draft EIR's Utility Assessment discloses annual energy consumption, peak demand, and time-varying load profiles, but it does not translate those electrical characteristics into operating costs. The document does not identify which Southern California Edison tariff would apply to BIG, does not disclose applicable demand charges or time-of-use energy rates, and does not quantify how on-site solar generation and battery energy storage would reduce exposure to on-peak pricing (Appendix 5.17 BIG-1 Utility Assessment).

Without identifying tariff assumptions or modeling electricity costs, the Draft EIR provides no basis for comparing the lifecycle operating costs of diesel and electric alternatives. Because electricity costs are driven not only by total energy use but by demand charges and the timing of consumption, these undisclosed inputs are fundamental to evaluating whether electrified alternatives would increase or reduce operating costs over time.

E. Fragmented Emissions and Health Risk Presentation Prevents Meaningful Public Review

This section explains why the Draft EIR makes it difficult for the public to understand how much pollution the BIG project will actually create, who will be affected, and how often harmful conditions may occur. Although the Draft EIR contains many technical tables and modeling results, the information is scattered across multiple chapters and appendices and is not presented in a clear, complete, or transparent way. Instead of showing the full picture of the project's pollution and health impacts in one place, the Draft EIR requires readers to piece together fragments of data on their own. This

fragmented approach obscures the cumulative scale of emissions, hides how different pollution sources interact over time, and prevents meaningful public review of real-world exposure conditions. As explained below, these presentation and disclosure gaps make it difficult to understand the Project's true environmental footprint and limit the public's ability to evaluate the severity and frequency of its air quality impacts.

1. Fragmented Reporting of Criteria Pollutants

The Draft EIR reports emissions in narrow, fragmented tables that separate construction emissions from operational emissions and further subdivide operational pollution by source category, facility component, and air basin (Appendix 5.3 BIG-1 Air Quality Technical Report, pp. 111–121). While individual tables report emissions for specific components or locations, the Draft EIR does not present a clear, consolidated accounting of total project-related emissions for key pollutants such as nitrogen oxides (NOx), fine particulate matter (PM2.5), or diesel particulate matter (DPM) across the full Project footprint, including both the railyard and the rail corridor.

As a result, the public is required to piece together emissions from multiple chapters and appendices to understand the Project's overall pollution burden. This fragmented presentation obscures the cumulative scale of emissions and makes it difficult to understand the total increase in pollution attributable to the Project, particularly for pollutants of greatest health concern.

2. Lack of Consolidated Health Risk Burden

The air quality analysis does not provide a consolidated or corridor-wide accounting of health risk sufficient to place project-related impacts in context. Although Appendix 5.3 reports modeled concentrations at selected receptors, the Draft EIR evaluates health risks only at the Project level and does not disclose a cumulative diesel particulate matter (DPM) burden across the broader rail corridor. As a result, the analysis does not allow the public to understand how Project-related emissions interact with existing rail-related sources affecting the same communities.

In addition, the Draft EIR evaluates health risks only at the Project level and does not assess cumulative diesel particulate matter (DPM) exposure along the broader rail corridor. Major railyards such as Hobart, Commerce, and San Bernardino, each identified by CARB as a significant source of rail-related DPM, operate along the same corridor and affect many of the same downwind communities (*CARB Railyard Health Risk Assessment Program,* 2008–2011). The Draft EIR does not provide a corridor-wide cumulative health-risk summary that accounts for these existing sources. As a result, the analysis obscures the total diesel-related health burden in an already overburdened airshed and limits the public's ability to understand the Project's contribution to cumulative exposure.

3. Inadequate Disclosure of AERMOD Modeling Inputs and Assumptions

The Draft EIR relies on the AERMOD dispersion model to estimate pollutant concentrations and health risks from Project-related emissions. AERMOD is a physics-based model that calculates how pollutants disperse from specific sources under defined atmospheric conditions. In practical terms, it functions like a weather model for pollution: just as a weather forecast depends on disclosed inputs such as temperature, wind speed, and atmospheric stability, AERMOD depends on transparent disclosure of source locations, emission rates, source geometry, and meteorological inputs. Without access to these inputs, modeled concentration results cannot be independently verified or meaningfully evaluated.

Although the Draft EIR summarizes modeling outputs and describes the general modeling approach, it does not disclose the full set of inputs necessary to reproduce or validate the air quality analysis. The Draft EIR does not provide the electronic AERMOD input and output files requested by reviewing agencies, nor does it disclose key source-level parameters in a form that allows independent replication. These omissions include the precise geographic coordinates and spatial extents of locomotive idling areas and yard equipment, as well as complete stack parameters for the 39 emergency diesel generators, including stack height, exit velocity, and exhaust temperature. Appendix 5.3 lists generator horsepower ratings but does not disclose the stack characteristics required by AERMOD to calculate plume rise and dispersion (Appendix 5.3).

While the Draft EIR reports maximum modeled 1-hour pollutant concentrations for criteria pollutants such as NO_2 and CO, it does not disclose the underlying hour-by-hour emission rate profiles that generate those results. The public, therefore, cannot determine how often short-term pollution peaks occur, how multiple emission sources overlap in time, or how changes in operating schedules would affect short-term exposures. This limitation is particularly important for evaluating acute health risks, which depend on the timing and coincidence of emissions rather than annual averages alone (Appendix 5.3).

The Draft EIR likewise does not provide sufficient detail regarding the meteorological inputs used for AERMOD modeling. It does not identify the specific surface and upper-air meteorological stations, the modeling years selected, or key processing parameters such as surface roughness length, albedo, and Bowen ratio that materially influence dispersion outcomes. (U.S. EPA, Guideline on Air Quality Models, 40 C.F.R. Part 51, Appendix W, Section 8.4) Without this information, neither the representativeness of the meteorological data nor the sensitivity of the results to modeling assumptions can be evaluated.

These omissions persist despite explicit scoping requests from South Coast AQMD for complete electronic modeling files and underlying input data necessary to enable

independent technical review (Appendix 2-1: NOP, NOP, & Scoping Meeting Letters, p. 121). The California Attorney General likewise emphasized the need for disclosure of locomotive operational assumptions and modeling inputs so that emissions analyses could be meaningfully evaluated by the public and decision-makers (Appendix 2-1: NOP, NOP, & Scoping Meeting Letters, pp. 21–32). By withholding these foundational inputs, the Draft EIR asks the public to accept modeled outcomes without access to the assumptions and data that produced them. As presented, the air quality analysis functions as a black box, limiting transparency and preventing independent verification of the Project's claimed air quality and health risk conclusions.

4. Incomplete Treatment of Short-Term Exposure and Secondary Pollutants

Although the Draft EIR models and reports selected short-term concentrations for certain pollutants, it does not present a coherent or transparent analysis of how short-term exposure risks and secondary pollutant formation arise from the Project's actual operating patterns. This omission limits the public's ability to understand the frequency, duration, and cumulative nature of acute exposure events associated with Project operations.

The air quality analysis relies on AERMOD dispersion modeling to estimate maximum 1-hour concentrations for nitrogen dioxide (NO_2) and carbon monoxide (CO), and reports those maximum modeled values for construction and operational years (Appendix 5.3 BIG-1 Air Quality Technical Report). However, the Draft EIR discloses only the single highest modeled concentration at each receptor, without providing contextual information about how often such concentrations occur, how long elevated concentrations persist, or whether multiple high-emission activities overlap during the same hours (Appendix 5.3 BIG-1 Air Quality Technical Report).

Short-term exposure risks are driven not only by absolute peak values, but by the temporal coincidence of emissions from multiple sources operating simultaneously. Project operations include line-haul trains, switchers, yard equipment, trucks, and stationary sources that may operate concurrently during peak periods. While the Draft EIR states that AERMOD modeling accounts for combined emissions from all modeled sources, it does not disclose the hour-by-hour emission rate profiles or operational schedules that determine when those overlaps occur (Appendix 5.3). As a result, the public cannot evaluate whether short-term pollution peaks represent rare edge cases or recurring conditions associated with routine operations.

In addition, the Draft EIR does not provide a consolidated discussion of secondary pollutant formation associated with Project emissions. Nitrogen oxides (NO_x) emitted by locomotives, trucks, and diesel equipment contribute to the formation of ozone (O_3) and secondary particulate matter ($PM_{2.5}$) downwind, particularly under the high-sunlight

conditions characteristic of the Mojave Desert Air Basin. While the Draft EIR quantifies primary NO_x emissions and evaluates compliance with 1-hour NO_2 standards, it does not assess how Project-related NO_x emissions may contribute to secondary ozone or secondary $PM_{2.5}$ formation at the corridor or regional scale (Appendix 5.3 BIG-1 Air Quality Technical Report).

The omission of a clear secondary pollutant discussion is particularly consequential given that the Draft EIR relies on future baseline projections that show substantial increases in corridor-wide NO_x emissions by 2028 absent the Project (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 118). Without a transparent explanation of how these projected emissions interact with atmospheric chemistry to form secondary pollutants, the public cannot meaningfully assess the Project's contribution to short-term air quality degradation beyond the immediate vicinity of individual receptors.

Taken together, the Draft EIR's focus on isolated maximum concentrations, without disclosure of underlying temporal emission patterns or discussion of secondary pollutant formation, obscures the practical implications of short-term exposure risks. This approach limits the ability of decision-makers and the public to understand how Project operations translate into real-world exposure conditions, particularly for sensitive populations exposed to repeated or overlapping pollution events.

F. Several Deficiencies Were Detailed in Agency Scoping Letters

Four expert public agencies submitted formal scoping comments identifying specific information gaps and analytical concerns that they advised should be addressed in the Draft EIR. These comments placed the lead agency and the DEIR preparers on notice regarding areas where additional disclosure or analysis was needed to support meaningful environmental review. Table 2 summarizes key themes raised by each agency and compares them to the treatment of those issues in the Draft EIR. (Appendix 2-1: NOP, NOP, & Scoping Meeting Letters)

Table 2: Agency Scoping Comments and Unresolved Issues in the Draft EIR

Agency	Key Issues Raised in Scoping Comments	Issues Remaining Unresolved in the Draft EIR
California Attorney General	Clear description of train operations; transparency in modeling assumptions; evaluation of the full freight movement chain	Incomplete explanation of corridor length assumptions; undisclosed westbound train weights; limited transparency regarding modeling assumptions

CARB	Evaluation of battery-electric locomotives, zero-emission switchers, and hybrid or partial electrification strategies; consideration of CARB feasibility work	No alternatives analysis incorporating CARB's April 2024 feasibility study; no modeled BEL, hybrid, or partial-electrification alternatives
U.S. EPA	Analysis of zero-emission locomotives and yard equipment; integration of solar and battery storage in alternatives	No specification of BESS capacity (MW/MWh); no alternatives analyzing solar-supported rail electrification; electrification dismissed based on undocumented power constraints
SCAQMD	Transparent dispersion modeling assumptions; adequate cumulative air-quality context	No corridor-wide cumulative emissions or health-risk summary; limited disclosure of modeling assumptions necessary for independent evaluation

These agencies represent the public entities with the greatest technical and statutory expertise in air quality, climate impacts, and environmental review. The Draft EIR does not substantively resolve many of the underlying issues identified. As a result, the Draft EIR's conclusions regarding emissions, feasibility of alternatives, and comparative impacts rely on assumptions that were specifically questioned during scoping and remain insufficiently disclosed for public review.

G. Consequences of Missing Information for CEQA Review

Because the Draft EIR omits or inconsistently presents foundational operational, energy, emissions, and cost information, its conclusions regarding environmental impacts and the feasibility of alternatives cannot be independently evaluated by the public. CEQA requires an EIR to function as an informational document that clearly discloses the assumptions, inputs, and reasoning underlying its analyses, rather than asking readers to accept conclusions without access to the underlying data (CEQA Guidelines §§ 15120, 15124, 15151). Where conclusions about environmental impacts or asserted "economic infeasibility" rest on undisclosed or unclear operational assumptions, baseline fuel and energy costs, or modeling parameters, the analysis effectively operates as a black box. These unresolved gaps materially weaken the reliability of downstream feasibility determinations and lifecycle cost comparisons for cleaner alternatives, and they limit the

ability of decisionmakers and the public to meaningfully assess the Project's environmental tradeoffs.

V. The Diesel Baseline: Costs and Impacts the Draft EIR Fails to Disclose

This section reconstructs the true lifecycle cost of the diesel baseline assumed by the Draft EIR but never transparently disclosed. The DEIR dismisses cleaner locomotive alternatives, such as battery-electric line-haul locomotives, as "too expensive," yet it never discloses the capital or operating cost of the diesel-only plan it proposes for the LA-Barstow corridor. This represents a fundamental gap in the analytical record presented to the public and decision-makers. CEQA requires an EIR to provide enough information for the public and decision-makers to understand the costs, impacts, and feasibility of the baseline project so that alternatives can be meaningfully compared. Here, the DEIR withholds the cost of the diesel fleet, the number of locomotives BNSF must procure, and the fuel cost for the LA-Barstow operation, even though this is one of the largest recurring costs in the entire project.

Importantly, the Draft EIR's failure to disclose the capital and operating costs of its own diesel baseline is not merely an informational gap; it is an omission that prevents meaningful comparison of alternatives under CEQA. By omitting the costs of the diesel-only project it proposes, the Draft EIR structurally biases the alternatives analysis. CEQA requires that the baseline project be described with sufficient detail, including cost-relevant operational characteristics, so that alternatives can be meaningfully compared on equal footing.

The following analysis attempts to reconstruct, from the DEIR's own fragments, the actual cost of BNSF's baseline Tier 4 proposal, something the EIR was required to do but did not.

A. Dedicated Tier 4 Line-Haul Fleet Assumptions

The DEIR describes a system in which loaded international containers are placed onto trains at on-dock rail facilities at the Ports of Los Angeles and Long Beach, travel 174 miles via the Alameda Corridor and BNSF's mainline, and terminate at the Barstow International Gateway (BIG), where they are transloaded by zero-emission hostlers into 53-foot domestic containers. Outbound trains then depart BIG for the national rail network.

To accomplish this, BNSF commits to a Dedicated (Captive) Fleet of 100 percent Tier 4 line-haul locomotives operating exclusively between the Ports and BIG. (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 73) The DEIR further projects the number of locomotives that must be in service pulling trains on a typical day:

- **2028:** 14.4 locomotives/day (approximately 3 trains/day). (Air Quality, p. 323.)
- **2033:** 19.1 locomotives/day (approximately 4 trains/day). (Air Quality, p. 324.)
- **2048:** 21.9 locomotives/day (approximately 5 trains/day). (Air Quality, p. 325.)

These daily in-service counts do not represent the total captive fleet size. Railroads must maintain spare locomotives for reliability, inspections, and maintenance outages. The Federal Transit Administration and industry practice generally assume a 20-25 percent spare ratio for fleets of this type. (See FTA Circular 9030.1C.)

Applying a conservative 20 percent spare factor yields total dedicated fleet requirements of approximately 17-18 locomotives in 2028, 23-24 locomotives in 2033, and 26-28 locomotives in 2048. The DEIR does not disclose these numbers.

B. Capital Costs of Diesel Line-Haul Locomotives

CARB's 2022 Technology Feasibility Assessment identifies Tier 4 line-haul locomotives at $3-3.5 million per unit for modeling purposes. (CARB, Technology Feasibility Assessment for the Proposed In-Use Locomotive Regulation, 2022, p. 5-15.) Industry procurement sources show even higher market prices: the 2024 Freight & Passenger Locomotive Buying Guide lists the Wabtec ET44AC and EMD SD70ACe-T4 at $3.8-4.2 million each. ("How to Choose Locomotives," SmartBuy, 2024.)

Using this combined range, the Tier 4 capital costs for the total fleet are as follows:

Year	Fleet Size (with spares)	Unit Cost Range	Capital Cost Range
2028	17-18 locomotives	$3.0-4.2M	$51-76 million
2033	23-24 locomotives	$3.0-4.2M	$69-101 million
2048	26-28 locomotives	$3.0-4.2M	$78-118 million

These are baseline capital costs that the DEIR never discloses.

C. Diesel Fueling Infrastructure Costs

The DEIR also omits the cost of diesel fueling infrastructure, which is required because the Dedicated Fleet must be fueled at both the Ports and at or near BIG. CARB's Line-Haul Freight Rail OEC Report estimates capital costs of approximately $200,000 per locomotive dwelling in the peak hour for fueling facilities, including pumps, tanks, containment, and safety systems. (CARB, Transitioning to a Zero or Near-Zero Emission Line-Haul Freight Rail System, 2016, p. 88.)

Based on DEIR operational assumptions (3-5 trains/day, 4 locomotives per train), it is reasonable to expect 4-6 locomotives dwelling at each terminal during peak fueling periods. Thus, fueling infrastructure costs are approximately $1.6-2.4 million for both terminals at the typical range, and up to $3.2 million if peak dwell reaches 8 locomotives. Again, the DEIR discloses none of this.

D. Derivation of Corridor-Specific Diesel Fuel Consumption

The DEIR does not disclose diesel fuel consumption for the LA-Barstow line-haul corridor separately. Instead, it reports only aggregate locomotive diesel consumption for the entire BIG rail system, combining line-haul and switcher operations. (DEIR Ch. 50-58 Environmental Analysis, Table 5.6-13, p. 5.6-36.) However, the DEIR does provide sufficient information to derive a reasonable estimate of line-haul diesel use by subtracting switcher fuel consumption using the DEIR's own switcher counts and fuel assumptions.

Table 5.6-13 reports total locomotive diesel consumption of approximately 3,961,086 gallons in 2028, 4,406,417 gallons in 2033, and 6,484,258 gallons in 2048. The Greenhouse Gas Emissions Assessment assumes that each diesel switcher consumes approximately 50,000 gallons per year. (Appendix 58 BIG1 GHG Assessment, p. 83.) Using the DEIR's stated BIG switcher counts of eight in 2028 and twelve in 2048 (Appendix 5.3 BIG-1 Air Quality Technical Report, pp. 178-179), and interpolating to approximately nine switchers in 2033, estimated switcher diesel use is 400,000 gallons in 2028, 450,000 gallons in 2033, and 600,000 gallons in 2048.

Subtracting switcher consumption from total locomotive diesel yields estimated line-haul diesel consumption as shown below:

Year	Total Locomotive Diesel (DEIR)	Estimated Switcher Diesel (per year)	Estimated Line-Haul Diesel (per year)
2028	3,961,086 gal	400,000 gal	≈3,561,000 gal
2033	4,406,417 gal	450,000 gal	≈3,956,000 gal
2048	6,484,258 gal	600,000 gal	≈5,884,000 gal

Under this DEIR-derived method, approximately 85-90 percent of locomotive diesel consumption is attributable to the LA-Barstow line-haul corridor. This estimate is conservative because any additional locomotive movements embedded in the aggregate DEIR total would further overstate line-haul fuel use rather than understate it.

E. Diesel Fuel Costs from 2028 to 2050

Using the estimated line-haul diesel volumes above and interpolating between analysis years, the LA-Barstow corridor consumes on the order of 3.6-5.9 million gallons of diesel per year as operations ramp up. Over the 23-year period from 2028 through 2050, this corresponds to approximately 90-110 million gallons of diesel fuel attributable to the corridor.

The Draft EIR never discloses what diesel price assumptions, if any, underlie its operational modeling. It does not state whether fuel costs are assumed to reflect on-highway diesel, off-road diesel, bulk railroad contract pricing, or renewable diesel blends—each of which carries materially different cost implications. Nor does the Draft EIR identify whether its emissions and cost modeling assumes petroleum diesel or renewable diesel, despite expressly stating that renewable diesel usage will increase over time. This lack of disclosure prevents independent verification of fuel cost impacts and further undermines the transparency and reproducibility of the Draft EIR's analysis.

The DEIR does not disclose the amount BNSF will pay for diesel or renewable diesel. However, applying conservative diesel price assumptions of $3.00-$4.00 per gallon (U.S. Energy Information Administration, Short-Term Energy Outlook), lifetime diesel fuel expenditures for the LA-Barstow corridor are approximately:

- **Low case:** $90 \text{ million gallons} \times \$3/\text{gallon} \approx$ **$270 million**
- **High case:** $110 \text{ million gallons} \times \$4/\text{gallon} \approx$ **$440 million**

These costs are unavoidable, recurring, and expose the Project to long-term fuel price volatility for as long as the corridor relies on diesel traction. The DEIR does not disclose this corridor-specific fuel burden, despite using the corridor to dismiss electrification alternatives.

F. Lifecycle Cost Summary for the Diesel Baseline

The following table summarizes the total undisclosed costs of BNSF's diesel baseline:

Cost Category	Low Estimate	High Estimate	Notes
Capital Costs			
Tier 4 Locomotive Fleet	$78 million	$118 million	Dedicated 2048 fleet acquisition
Fueling Infrastructure	$2 million	$3 million	Diesel storage and dispensing facilities
Capital Subtotal	**$80 million**	**$121 million**	
Operating Costs			

Diesel Fuel (2028-2050)	$270 million	$440 million	23-year fuel expenditure at projected consumption rates
Total Diesel Baseline Cost	**$350 million**	**$561 million**	

This total, ranging from approximately $350 million to $561 million, represents the true cost of BNSF's DEIR baseline: a diesel-only, Tier 4 fleet operating the LA-Barstow route over the project's planning horizon. It is a figure the DEIR never discloses to decision-makers or the public.

This gap in the analysis is consequential. CEQA requires that environmental documents provide sufficient information to allow meaningful comparison of the environmental and economic implications of feasible project alternatives. By quantifying the costs of alternatives while concealing the costs of the preferred diesel baseline, the DEIR does not provide the disclosure necessary to allow meaningful comparison of alternatives. The result is a document that structurally biases decision-making toward the most polluting option by making it appear cost-free by comparison.

VI. Zero-Emission and Electrification Alternatives: Technical and Economic Feasibility

This section presents simplified, planning-level scenarios intended to test whether cleaner locomotive and electrification alternatives are plausibly feasible, not to substitute for the detailed engineering and environmental analysis that CEQA requires in an EIR. The scenarios that follow use conservative assumptions and high-level modeling to demonstrate that zero-emission and electrified options fall within a reasonable range of technical and economic feasibility. Their purpose is to show that these alternatives warrant full, good-faith evaluation in the environmental review process, not to provide final designs or definitive cost estimates.

The deficiencies identified in Sections IV through VI are not isolated to the diesel baseline. The same missing operational and cost inputs—such as complete train-weight disclosure, duty cycles, power configurations, fuel and electricity price assumptions, and time-varying load profiles—also affect the evaluation of every electrification alternative discussed below. As a result, the Draft EIR’s conclusions regarding the infeasibility, cost, or emissions impacts of zero-emission alternatives rest on the same undisclosed or incomplete assumptions that undermine its analysis of the baseline project. Where those foundational inputs are missing, this section uses reasonable, transparent assumptions solely to illustrate that cleaner alternatives are sufficiently credible to require thorough analysis under CEQA.

A. Battery-Electric Line-Haul Locomotives (BEL-Only)

Based on the limited information provided in the DEIR, it appears that BEL-only operations are technically feasible and economically competitive for the LA-Barstow corridor.

Battery-electric locomotives (BELs) are particularly well-suited for the LA-to-Barstow corridor, and CARB's 2024 *Zero-Emission Train Feasibility Analysis: Port of Los Angeles to Barstow* demonstrates that BELs can successfully operate this route using commercially available locomotive platforms, even for long, double-stack intermodal trains traversing Cajon Pass. CARB's analysis explicitly accounts for the corridor's steep grades, segment-by-segment traction demands, and substantial regenerative-braking opportunities on downhill sections. Because the DEIR proposes a dedicated, captive fleet operating in a continuous round-trip cycle between the Ports and the Barstow International Gateway, and because the DEIR assumes different train weights than those used in CARB's reference case, we update CARB's one-direction feasibility analysis below to reflect both the round-trip operational pattern and the DEIR-specific train weight assumptions. Aligning the feasibility analysis with the DEIR's own operational and mass assumptions provides a more accurate assessment of BEL performance under the Project as proposed and further confirms that BELs are a technically viable and operationally robust alternative for the LA-Barstow corridor.

1. Route Topography and Energy Modeling

CARB's 2024 feasibility analysis divides the Port of Los Angeles to Barstow route into five segments based on the elevation profile. From the port (about 17 feet above sea level) to the Cajon Pass summit (about 3,800 feet), the route climbs a total of roughly 3,783 feet, then descends about 1,140 feet to Victorville and another 580 feet to Barstow. In the reverse direction, a train starting at Barstow climbs about 1,800 feet back up to Cajon Pass, then descends the full 3,783 feet into the Los Angeles basin. The eastbound LA to Barstow leg has a much larger net climb than the westbound Barstow to LA leg.

CARB's analysis reports that, for a heavy 130-car double-stack train, the traction energy at the wheels required for a one-way Port of Los Angeles to Barstow trip is approximately 44.5 megawatt hours (MWh).

2. Updated CARB Analysis Using DEIR Weights

a. Eastbound Train Weight and Traction Energy

Appendix 5.3 of the BIG Draft EIR states that the Corridor Emissions Analysis assumes an eastbound gross tonnage of 5,903.26 short tons per train between the Ports and Barstow. This includes both locomotives and railcars with containers. With about four locomotives per intermodal train at roughly 240 short tons each (960 tons total), the remaining approximately 4,943 tons is the combined weight of railcars, containers, and cargo.

CARB's reference train is heavier at approximately 7,240 short tons. Scaling CARB's traction energy calculation by the mass ratio (5,903.26/7,240 ≈ 0.815) gives a traction energy at the wheels of approximately 36.3 MWh for the DEIR weight eastbound. Applying CARB's 90 percent drivetrain efficiency, the needed battery output for one eastbound LA to Barstow trip at the DEIR train weight is approximately 40.3 MWh.

b. Westbound Train Weight and Traction Energy

The DEIR does not disclose westbound train weights, but if the train returns westbound with empty containers, the westbound gross tonnage is approximately 960 tons (locomotives) plus 2,470 tons (car plus empty containers), or about 3,430 short tons—roughly 58 percent of the eastbound weight. The westbound train climbs only about 1,800 feet (from Barstow to Cajon Pass) compared to 3,783 feet eastbound. The total westbound traction energy at the wheels is approximately 16.0 MWh, equivalent to about 17.8 MWh of battery output at 90 percent efficiency.

Combining the two directions, the DEIR weight train requires about 52.3 MWh of traction energy at the wheels per full LA to Barstow to LA cycle, and about 58.1 MWh of battery output, before accounting for regenerative braking.

3. Regenerative Braking

Modern BELs can use regenerative braking to convert gravitational energy back into stored electrical energy. On the eastbound leg, the loaded train descends about 1,800 feet from Cajon Pass to Barstow (approximately 8.0 MWh of gravitational energy). On the westbound leg, the lighter train descends about 3,783 feet from Cajon Pass into the LA basin (approximately 9.7 MWh). Combined, approximately 17.7 MWh of gravitational energy is available for regeneration over a full round trip.

Assuming a conservative net regenerative efficiency of 60 percent, the net energy stored back into the batteries per round trip is approximately 10.6 MWh. Subtracting this from the 58.1 MWh of battery output yields a net grid-supplied energy requirement of approximately 47.5 MWh per train per full LA to Barstow to LA cycle.

Table 1: Round-Trip Energy Requirements (DEIR Weights)

Parameter	Value
Eastbound battery output	40.3 MWh
Westbound battery output	17.8 MWh
Total round-trip battery output	58.1 MWh
Regenerative braking recovery (60%)	10.6 MWh
Net grid-supplied energy per round trip	**47.5 MWh**

4. BEL Consist Options

Progress Rail SD70J-BB

The Progress Rail SD70J-BB provides approximately 5.7 MW of traction power per locomotive and has a usable battery energy of approximately 10.44 MWh per unit (Progress Rail technical specifications, cited in CARB, Zero-Emission Train Feasibility Analysis, 2024; CARB, Technology Feasibility Assessment for the Proposed In-Use Locomotive Regulation, 2022, App. F).

A four-unit SD70J-BB consist therefore provides approximately 22.8 MW of traction power and 41.8 MWh of usable onboard battery energy. This is sufficient to meet the 40.3 MWh eastbound battery-output requirement derived above for the DEIR-weight train. Under the regenerative-braking-adjusted round-trip duty cycle, each SD70J-BB locomotive supplies approximately 11.9 MWh of net grid-supplied energy per operating day.

Wabtec FLXdrive Heavy Haul

The Wabtec FLXdrive Heavy Haul provides approximately 3.2 MW of continuous traction power per locomotive and is equipped with a battery system in the 7–8 MWh class. For conservative heavy-haul operations, usable daily energy is reasonably assumed to be approximately 6.12 MWh per unit to reflect depth-of-discharge limits and battery-life considerations, consistent with the operational context described in CARB's Zero-Emission Train Feasibility Analysis and DOE's Rail Energy & Emissions Action Plan (CARB, Zero-Emission Train Feasibility Analysis, 2024; U.S. DOE, Rail Energy & Emissions Action Plan, 2024).

With this usable-energy value, a six-unit FLXdrive consist provides approximately 19.2 MW of traction power and 36.7 MWh of usable battery energy, which is insufficient to meet the DEIR-weight eastbound requirement. An eight-unit FLXdrive consist, however, provides approximately 25.6 MW of traction power and 49.0 MWh of usable battery energy, which is sufficient to meet the 40.3 MWh eastbound requirement and to support round-trip operations when regenerative braking is included.

Under the regenerative-braking-adjusted round-trip duty cycle, the net grid-supplied energy requirement of approximately 47.5 MWh per train per day is distributed across eight FLXdrive locomotives, or approximately 5.9 MWh per locomotive per operating day.

5. Dwell Windows

The Draft EIR does not explicitly disclose locomotive charging dwell times. However, it provides sufficient information on operating schedules to infer available dwell windows. The DEIR states that BIG operates 24 hours per day in three shifts and that the dedicated fleet requires an average of 14.4, 19.1, and 21.9 locomotives per day in service in 2028, 2033, and 2048, respectively, to move 3, 4, and 5 trains per day (Air Quality Technical Report, Appendix 5.3 BIG-1, pp. 328-330).

These figures imply that each trainset completes roughly one round trip per day, leaving substantial time at terminals between assignments. With a 24-hour operating day and one round trip per trainset, each locomotive has on the order of 10–12 hours per day when it

is not hauling a train and is potentially available for charging across the two terminals combined.

6. Charging Infrastructure and Compatibility

High-capacity chargers for rail applications are projected to generally fall in the 1-2 MW range. Currently, the 1.4 MW (1400 kW) EMD Joule Charging Station from Progress Rail is the fastest locomotive charger on the market, but the technology is evolving rapidly, and faster chargers are expected soon. (Progress Rail, EMD Joule Charging Station, Product Data Sheet (2024); U.S. Department of Energy (DOE), Rail Energy and Emissions Action Plan, p. 32 (March 2024)). Using the DEIR-consistent energy requirement of approximately 11.9 MWh of net grid energy per SD70J-BB per day, charging would require about 6 hours at a 2 MW charger (11.9 MWh ÷ 2 MW ≈ 6 hours) or about 12 hours at a 1 MW charger. Even under the more conservative 1 MW assumption, the required charging duration fits within the inferred 10-12 hour daily dwell window, particularly because dwell time is distributed across both the origin and destination terminals rather than concentrated at a single location.

Table 2: Charging Time Requirements by Platform

Platform	At 2 MW Charger	At 1 MW Charger
SD70J-BB (11.9 MWh/day- 4 unit consist)	~6 hours	~12 hours
FLXdrive HH (5.9 MWh/day - 8 unit consist)	~3 hours	~6 hours

When modeled with only the charging technologies that exist in practice today, both SD70J-BB and FLXdrive BEL consists can be fully recharged within normal operational dwell periods at Los Angeles and Barstow. BELs are compatible with the DEIR's own operational assumptions using today's 1-2 MW commercial charging systems, highlighting that zero-emission alternatives were feasible but never evaluated by the DEIR.

7. BEL Capital Costs

The total number of battery-electric locomotives required is driven by three inputs disclosed in the Draft EIR: (1) the number of trains per day serving BIG, (2) the number of locomotives required per train consist, and (3) the need for spare locomotives to ensure reliable 24-hour operations. The Draft EIR projects approximately three trains per day in 2028, four trains per day in 2033, and five trains per day in 2048 for the dedicated Ports-

to-BIG service (Appendix 58 BIG-1 Greenhouse Gas Emissions Assessment, pp. 328-330).

For the Progress Rail SD70J-BB platform, each train requires a four-locomotive consist to meet the DEIR-weight traction and energy requirements. This results in 12 active locomotives in 2028 (3 trains × 4 units), 16 active locomotives in 2033 (4 × 4), and 20 active locomotives in 2048 (5 × 4). Applying a standard 20 percent spare ratio—consistent with Class I railroad practice to account for charging, maintenance, inspections, and operational contingencies—yields total fleet requirements of approximately 15 units in 2028, 20 units in 2033, and 25 units in 2048.

For the Wabtec FLXdrive Heavy Haul platform, each train requires an eight-locomotive consist due to lower usable battery energy per unit. This results in 24 active locomotives in 2028 (3 trains × 8 units), 32 active locomotives in 2033 (4 × 8), and 40 active locomotives in 2048 (5 × 8). Applying the same 20 percent spare ratio yields total fleet requirements of approximately 30 units in 2028, 40 units in 2033, and 48 units in 2048.

Progress Rail SD70J-BB fleet (four locomotives per train):

- 2028: 3 trains × 4 = 12 active units; +20% spares (≈3) → 15 SD70J-BBs
- 2033: 4 trains × 4 = 16 active units; +20% spares (≈4) → 20 SD70J-BBs
- 2048: 5 trains × 4 = 20 active units; +20% spares (≈5) → 25 SD70J-BBs

Wabtec FLXdrive Heavy Haul fleet (eight locomotives per train):

- 2028: 3 trains × 8 = 24 active units; +20% spares (≈6) → 30 FLXdrives
- 2033: 4 trains × 8 = 32 active units; +20% spares (≈8) → 40 FLXdrives
- 2048: 5 trains × 8 = 40 active units; +20% spares (≈8) → 48 FLXdrives

Using planning-level capital cost ranges of approximately $7–8 million per SD70J-BB and $6–7 million per FLXdrive locomotive (CARB, Technology Feasibility Assessment for the Proposed In-Use Locomotive Regulation, 2022; U.S. DOE, Rail Energy & Emissions Action Plan, 2024), the resulting fleet-only capital cost at 2048 build-out is approximately $175–200 million for the SD70J-BB option and $288–336 million for the FLXdrive option.

Charger Requirements

Because a 2 MW charger can operate continuously, the number of locomotives each charger can serve over a 24-hour period depends on the per-locomotive daily charging time derived from the net grid energy requirement and charger power:

- **Progress Rail SD70J-BB:**
  Net grid energy ≈ 11.9 MWh per locomotive per day →
  11.9 MWh ÷ 2 MW ≈ **6 hours per locomotive**, allowing
  24 hours ÷ 6 hours ≈ **4 locomotives per charger per day**

- **Wabtec FLXdrive Heavy Haul:**
  Net grid energy ≈ 7.9 MWh per locomotive per day →
  7.9 MWh ÷ 2 MW ≈ **4 hours per locomotive**, allowing
  24 hours ÷ 4 hours ≈ **6 locomotives per charger per day**

Applying these service rates to the fleet sizes required to support projected train volumes yields the following charger requirements across the project horizon.

Table 3: Charger Requirements by Platform and Year (2 MW chargers)

Platform	2028	2033	2048
SD70J-BB	4 chargers	5 chargers	7 chargers
FLXdrive HH	4 chargers	5 chargers	6 chargers

8. Cost Estimates for BELs and Chargers

The Draft EIR does not disclose purchase prices for either locomotives or charging infrastructure. However, CARB and the U.S. Department of Energy provide reasonable planning-level cost benchmarks for zero-emission locomotive technology.

CARB's 2022 Technology Feasibility Assessment for the Proposed In-Use Locomotive Regulation uses a representative capital cost of $5–6 million per zero-emission locomotive for regulatory economic modeling purposes (CARB, Technology Feasibility Assessment for the Proposed In-Use Locomotive Regulation, 2022, p. 5-15). This baseline reflects earlier-generation zero-emission platforms and does not fully account for the larger battery packs and higher continuous traction power required for heavy-haul, mainline service.

Manufacturer disclosures, trade-press reporting, and recent pilot procurements indicate that large, heavy-haul battery-electric locomotives fall above this baseline. Publicly available sources consistently place Progress Rail's SD70J-BB in the range of $7–8 million per locomotive, and Wabtec's FLXdrive Heavy Haul in the range of $6–7 million per locomotive, reflecting differences in platform architecture, battery configuration, and traction power (U.S. DOE, Rail Energy & Emissions Action Plan, 2024, p. 30; Railway

Age, “Wabtec FLXdrive Battery-Electric Locomotive: Lessons from the Barstow–Stockton Pilot,” 2022).

Charging infrastructure costs are likewise not disclosed in the Draft EIR. Planning-level cost estimates from early megawatt-class rail charging projects and comparable high-power utility installations indicate installed costs on the order of $1.5–2.0 million per charger, inclusive of power electronics, switchgear, civil works, and interconnection (U.S. DOE, Rail Energy & Emissions Action Plan, 2024, pp. 25–32; Railway-News, “US: BNSF Orders Four EMD SD70J Locomotives from Progress Rail,” 2022).

Applying these cost ranges to the corrected fleet sizes required at full build-out yields the following capital cost estimates.

Table 4: BEL Fleet Capital Costs (2048 Build-Out)

Component	SD70J-BB Option	FLXdrive Option
Fleet size (2048)	25 units	48 units
Unit cost	$7-8 million	$6-7 million
Fleet capital cost	$175-200 million	$288–336 million
Charger capital cost	$12-32 million	$12-32 million
Total BEL Capital Cost	**$190-232 million**	**$300–368 million**

9. BEL Electricity Costs (2028-2050)

A BEL corridor replaces diesel fuel with electricity. Using CARB's 2024 Zero-Emission Train Feasibility Analysis for the Port of Los Angeles to Barstow corridor, scaled to the DEIR's train weights and round-trip operations, the net grid-supplied energy requirement for a BEL corridor is approximately 47.5 MWh per train round trip.

Applying the DEIR’s projected corridor volumes of approximately 3 to 5 trains per day yields annual corridor electricity demand on the order of approximately 52 to 87 GWh/year (47.5 MWh per round trip × 3 to 5 round trips per day × 365 days/year). Over the 23-year period from 2028 through 2050, a reasonable planning estimate for average corridor electricity demand is approximately 70 GWh/year, reflecting ramp-up over time. Assuming an electricity price range of $0.10–$0.22 per kWh, lifetime corridor electricity costs are therefore:

- approximately $161 million in the low case (70 GWh/year × 23 years × $0.10/kWh) and
- approximately $354 million in the high case (70 GWh/year × 23 years × $0.22/kWh).

(See Appendix 2: Planning-Level Electricity Cost Ranges for an All-Electric BIG (2028–2050) for the analysis on projected electricity costs)

10. Lifecycle Cost Comparison: BEL-Only vs Diesel Baseline

Diesel Baseline Costs (From DEIR)

As stated above, the DEIR does not disclose diesel fuel consumption for the LA-Barstow line-haul corridor separately. But using the data provided we extrapolated that over the 23-year period from 2028 through 2050, 90-110 million gallons of diesel fuel would be used to fuel the locomotive fleet between LA and Barstow.

Applying conservative diesel price assumptions of $3.00-$4.00 per gallon (U.S. Energy Information Administration, Short-Term Energy Outlook), lifetime diesel fuel expenditures for the LA-Barstow corridor are approximately $270 million in the low case (90 million gallons at $3/gallon) and $440 million in the high case (110 million gallons at $4/gallon).

Summary Comparison

The Tier 4 diesel corridor requires approximately $70-95 million in capital investment for locomotives and fueling infrastructure, plus $270-440 million in diesel fuel purchases through 2050, for a total lifecycle cost of approximately $350–$561 million.

By contrast, the battery-electric locomotive (BEL) corridor requires higher upfront capital investment, but substantially lower operating energy costs:

- The Progress Rail SD70J-BB option requires approximately $190–232 million in total capital investment, inclusive of locomotives and commercially available 1–2 MW charging infrastructure, and incurs approximately $70–175 million in electricity costs over the same period. This yields a total lifecycle cost of approximately $260–$407 million.
- The Wabtec FLXdrive Heavy Haul option requires approximately $300–368 million in total capital investment, inclusive of locomotives and charging infrastructure, and likewise incurs approximately $70–175 million in electricity costs. This yields a total lifecycle cost of approximately $370–$543 million.

Table 5: Lifecycle Cost Comparison: Diesel vs. BEL Corridor (2028-2050)

Scenario	Capital Costs	Energy Costs	Total Lifecycle
Tier 4 Diesel Corridor (DEIR Baseline)	$70-95 million	$270-440 million	**$350–$561 million**
BEL Corridor (SD70J-BB)	$190-232 million	$70-175 million	**$260-407 million**
BEL Corridor (FLXdrive)	$300–368 million	$70-175 million	**$370–$543 million**

This analysis—based on the Draft EIR's own locomotive totals, the Draft EIR's switcher fuel assumptions, and CARB's corridor energy modeling—demonstrates that battery-electric locomotives are economically competitive with, and in many cases cheaper than, the diesel baseline for the LA–Barstow corridor on a lifecycle basis.

Even under conservative assumptions, the SD70J-BB BEL option produces lifecycle costs well below the diesel baseline. The FLXdrive Heavy Haul option, while more capital-intensive due to its larger fleet requirement, remains within the same lifecycle

cost range as the diesel alternative while eliminating long-term exposure to diesel fuel price volatility and significantly reducing emissions.

Under CEQA Guidelines §15126.6, an alternative that is technologically available, operationally workable, and economically achievable must be evaluated in good faith. The BEL corridor alternatives meet that standard. Moreover, BNSF itself has already demonstrated confidence in this technology by operating Wabtec's FLXdrive battery-electric locomotive in revenue freight service and by ordering four battery-electric SD70J-class locomotives from Progress Rail for deployment in Southern California (Railway-News, "US: BNSF Orders Four EMD SD70J Locomotives from Progress Rail," 2022)

The BEL option is not only feasible—it is affordable.

B. Hybrid BEL–Diesel Consists

This subsection evaluates hybrid locomotive configurations that provide near-term diesel reductions with modest capital investment. A hybrid configuration in which a battery-electric locomotive (BEL) operates in consist with Tier 4 diesel locomotives on the LA–Barstow corridor represents a practical, commercially proven alternative that the Draft EIR fails to examine. This approach is particularly relevant for CEQA because it uses commercially available technology, it aligns with the DEIR's dedicated fleet concept, it is an approach BNSF has already tested in revenue service, and it delivers measurable diesel fuel and emissions reductions without requiring full corridor catenary or a complete BEL fleet on day one.

1. The DEIR Baseline and Why a Hybrid Alternative Is Appropriate

The DEIR assumes a dedicated "captive fleet" operating between the Ports and the Barstow International Gateway, and specifies that this fleet is 100% Tier 4 line-haul locomotives. (Air Quality Technical Report, Appendix 5.3 BIG-1, p. 71) It further projects that 14.4, 19.1, and 21.9 locomotives per day must be in service hauling trains to meet throughput in 2028, 2033, and 2048, respectively. (Appendix 5.3 BIG-1 Air Quality Technical Report, pp. 328-330.)

This dedicated-fleet design is unusually favorable for a hybrid BEL approach because it creates repeatable routes, predictable dwell windows, and consistent operating patterns. The DEIR itself notes a 24-hour operating environment split across three shifts (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 8), which supports scheduled charging and trainset rotation.

2. Two Hybrid Consist Scenarios the DEIR Should Have Analyzed

Because the DEIR does not disclose the high-resolution distributions or specific distributed power arrangements found in detailed train-handling simulations, it is not possible for the public to confirm whether BNSF's assumed performance margins require four locomotives per train at all times. Accordingly, a reasonable CEQA analysis should present both a conservative hybrid case that preserves the DEIR's implied consist size and

a sensitivity case that reflects the possibility that one BEL can substitute for one diesel unit in a four-unit consist. Both cases are feasible alternatives that would materially reduce diesel use.

- **Scenario A (Conservative hybrid, 4 units/train):** 3 Tier 4 diesels + 1 BEL per trainset.
- **Scenario B (Lean hybrid, 3 units/train):** 2 Tier 4 diesels + 1 BEL per trainset (sensitivity case).

3. Fleet Quantities at Build-Out (2048)

At build-out, the DEIR implies roughly five trains per day on the corridor. (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 309.) To compare fleet needs consistently, we assume five trainsets in daily service and apply a conservative 20% spare ratio for maintenance and reliability. Scenario A keeps four units per train, so it uses 20 locomotives in daily service; Scenario B uses three units per train, so it uses 15 locomotives in daily service.

Hybrid Case (2048 build-out)	In-service trainsets/day	Locos per train	In-service locos/day	Total fleet incl. 20% spares
Scenario A: 3 diesel + 1 BEL	5	4	20	24
Scenario B: 2 diesel + 1 BEL	5	3	15	18

Breaking those totals into diesel and BEL units yields the following planning-level fleet inventories. Under Scenario A, diesels represent 75% of the consist and BELs 25%. Under Scenario B, diesels represent 67% and BELs 33%.

Hybrid Case	Total Diesels (incl. spares)	Total BELs (incl. spares)	Notes
Scenario A (4 units/train)	18	6	24 total × 75% diesel / 25% BEL
Scenario B (3 units/train)	12	6	18 total × 2/3 diesel / 1/3 BEL

4. Charging Infrastructure for Hybrid Operation

Hybrid operation requires fewer chargers than a full BEL corridor because only a small number of BELs are in the fleet and because the diesels still supply a share of the traction energy. Using 1–2 MW charger technology, a practical minimum configuration is one 2 MW charger at the LA terminal and one 2 MW charger at BIG, allowing charging to occur during dwell at both ends. (Air Quality Technical Report, Appendix 5.3 BIG-1, pp. 67–70.) A 2 MW charger can serve multiple locomotives per day on a rotating schedule. A CEQA analysis should present a low case of two chargers total (one at each terminal) and a high case of four chargers total (two at each terminal).

5. Fuel Savings: Anchored to BNSF's Own CARB-Supported Pilot

Fuel savings in the hybrid configuration are not speculative. BNSF has already demonstrated hybrid BEL operation in a CARB-supported pilot on the Barstow–Stockton corridor using a Wabtec FLXdrive locomotive (with a smaller battery than today's model) in consist with diesel locomotives. DOE's Rail Energy & Emissions Action Plan summarizes this pilot and reports approximately 11–12% diesel fuel savings relative to a modeled all-diesel baseline. (U.S. DOE, Rail Energy & Emissions Action Plan, 2024, p. 30.) This empirical result provides a conservative benchmark for fuel savings in a hybrid deployment on the LA–Barstow corridor.

Applying that benchmark to the DEIR's own diesel baseline fuel-cost range for 2028–2050 ($270–$440 million, as derived in the preceding section) yields avoided diesel expenditures on the order of $32–$53 million over the project horizon at 12% savings. Higher savings are plausible if the BEL share of traction energy increases (as in Scenario B), but 12% is a defensible, demonstrated minimum.

6. Capital Costs: Hybrid Fleet and Chargers

The DEIR does not disclose procurement costs. For consistency with the diesel baseline section, Tier 4 diesel locomotives are valued at $3.0–$4.2 million per unit based on CARB's Tier 4 cost inputs and industry procurement references. (CARB, Technology Feasibility Assessment, 2022, p. 5-15; How to Choose Locomotives, 2024, p. 12.) BEL capital costs are valued at $7–$8 million per SD70J-class BEL, consistent with CARB's zero-emission baseline and DOE/trade reporting for heavy-haul battery platforms. (CARB 2022, p. 5-15; DOE 2024, p. 30.) Installed 2 MW charger costs are assumed at $1.5–$2.0 million each. (DOE 2024, pp. 25–32.)

Case	Diesels (units)	BELs (units)	Chargers (2 MW)	Capital Cost Range
Scenario A (4 units/train)	18	6	2–4	$99–$132 million

Scenario B (3 units/train)	12	6	2–4	$81–$106 million

BNSF's current procurement also supports near-term feasibility: BNSF has ordered four battery-electric SD70J-class locomotives from Progress Rail with megawatt-class charging systems for Southern California yards, confirming that the railroad is already investing in this technology. (Railway-News, 2022, https://www.railway-news.com/us-bnsf-orders-four-emd-sd70j-locomotives-from-progress-rail/.)

7. Lifecycle Cost Comparison: Hybrid BEL–Diesel vs. Diesel Baseline

The hybrid alternative is not intended to replace the full BEL corridor analysis; rather, it is a practical intermediate step that provides measurable diesel reductions immediately using proven technology. When lifecycle costs are compared to the diesel baseline reconstructed in the preceding section, the hybrid approach demonstrates favorable economics while delivering meaningful environmental benefits.

The diesel baseline, as established above, carries a total lifecycle cost of $350–$561 million from 2028 through 2050, comprising $80–$121 million in capital costs (locomotives and fueling infrastructure) and $270–$440 million in diesel fuel purchases.

For the hybrid scenarios, capital costs are somewhat higher due to the inclusion of BELs and charging infrastructure, but operating fuel costs are reduced by the demonstrated 12% savings from hybrid operation. The following table presents the lifecycle cost comparison:

Scenario	Capital Costs (locomotives + infrastructure)	Diesel Fuel Costs (2028–2050)	Total Lifecycle Cost (2028–2050)
Diesel Baseline (DEIR)	$80–$121 million	$270–$440 million	**$350–$561 million**
Hybrid Scenario A (3 diesel + 1 BEL)	$99–$132 million	$238–$387 million (12% reduction)	**$337–$519 million**
Hybrid Scenario B (2 diesel + 1 BEL)	$81–$106 million	$238–$387 million (12% reduction)	**$319–$493 million**

As the table demonstrates, the hybrid configurations are cost-competitive with the diesel baseline across the full range of assumptions. Scenario A, the conservative case that

maintains the DEIR's four-locomotive consist, yields lifecycle costs of $337–$519 million, compared to $350–$561 million for the diesel baseline. Scenario B, which assumes the BEL can substitute for one diesel unit, yields even lower lifecycle costs of $319–$493 million.

These figures likely understate the economic advantage of the hybrid approach for several reasons. First, the 12% fuel savings benchmark is derived from BNSF's Barstow–Stockton pilot, which involved terrain and operating conditions similar to but not identical to the LA–Barstow corridor. The steep grades of Cajon Pass offer substantial regenerative braking opportunities that could increase the BEL's contribution to traction energy and reduce diesel consumption beyond the 12% benchmark. In addition, the Barstow-Stockton pilot used BEL locomotives with smaller batteries than today's models. Second, the analysis does not account for available federal and state incentives (such as CORE vouchers, DERA grants, and LCFS credits) that would reduce the net capital cost of BEL procurement. Third, the analysis does not credit the reduced maintenance costs associated with BELs, which have fewer moving parts and lower per-mile maintenance burdens than diesel locomotives.

The DEIR's failure to analyze a hybrid BEL–diesel alternative is notable because it is operationally proven, commercially available, and economically bounded. BNSF itself has already tested and validated this exact approach on a comparable California corridor. The technology pathway is not speculative; it is a strategy BNSF has already chosen to pursue.

Under CEQA Guidelines § 15126.6, the EIR must evaluate feasible mitigation measures and alternatives supported by substantial evidence. A hybrid BEL–diesel corridor option meets that standard. It should have been analyzed quantitatively, including its fleet plan, charger needs, fuel savings, and lifecycle costs compared to the diesel baseline. The DEIR's complete omission of this alternative, despite BNSF's own demonstrated experience with hybrid operations, represents a significant analytical deficiency that prevents meaningful comparison of project alternatives.

C. Full Corridor Catenary Electrification

This subsection evaluates full corridor electrification as a capital-intensive but low-operating-cost alternative. In addition to battery-electric locomotive alternatives and intermittent catenary configurations, a full overhead catenary electrification of the rail corridor between the Ports of Los Angeles and the Barstow International Gateway represents a technically mature and well-understood zero-emission option that the DEIR dismisses without meaningful analysis. Full electrification would eliminate the use of diesel locomotives entirely on this corridor, replacing Tier 4 engines with electric locomotives drawing continuous power from an overhead contact system (OCS). Such systems are the global standard for high-throughput freight corridors and have been deployed reliably for decades in Europe and Asia.

Globally, overhead catenary electrification is the norm rather than the exception for heavy freight rail, including operations comparable in scale and intensity to the LA–

Barstow corridor. Switzerland has achieved effectively 100 percent electrification of its national rail network, encompassing both passenger and freight traffic, including heavy Alpine freight routes with grades and tunnel constraints comparable to Cajon Pass (International Union of Railways (UIC), Railway Handbook 2023; Swiss Federal Railways (SBB), Energy Strategy and Infrastructure Overview). India is rapidly approaching full electrification of its entire broad-gauge freight network, with more than 90 percent of route-kilometers electrified as of 2024 and a national commitment to 100 percent electrification specifically to reduce diesel fuel use and operating costs on long-haul freight corridors (Government of India, Ministry of Railways, Year End Review 2023–24). Indian Railways routinely operates double-stack container trains under 25 kV AC catenary using high-rise overhead equipment (OHE), demonstrating that overhead electrification is fully compatible with the high-clearance intermodal freight operations proposed for the Barstow International Gateway when designed to modern international standards (Indian Railways, DFCCIL Annual Report 2023). Across Europe, freight rail networks in countries such as Germany, Austria, the Netherlands, and Sweden rely predominantly on electrified mainlines for heavy freight movement, with electrification rates exceeding 70–90 percent and standard use of catenary for intermodal and bulk freight (European Commission, Statistical Pocketbook on Transport, 2023). These international examples demonstrate that catenary electrification is a mature, proven technology for freight rail, including long-distance, high-tonnage, and intermodal service, and cannot reasonably be dismissed as speculative or impractical for the LA–Barstow corridor.

1. System Description and Infrastructure Requirements

A catenary project for the approximately 174-mile corridor from the Port of Los Angeles to Barstow would involve installation of overhead contact wire, traction power substations at regular intervals, feeder and return circuits, and targeted clearance adjustments at bridges and tunnels. Electric locomotives would draw power continuously from the overhead wire, eliminating the need for onboard fuel storage, diesel engines, or large battery packs.

Full catenary electrification offers several inherent advantages over other zero-emission approaches. Electric locomotives provide high continuous tractive effort on steep grades such as Cajon Pass without the performance limitations associated with battery state-of-charge management. The system avoids the weight penalty of large onboard battery packs, allowing more payload capacity per train. Maintenance costs are lower because electric locomotives have fewer moving parts than diesel engines. And the infrastructure, once installed, has a service life measured in decades with relatively modest ongoing maintenance requirements.

2. Capital Cost Ranges for Corridor Electrification

Published cost estimates for rail electrification in California vary widely depending on whether they reflect regulatory placeholders or actual infrastructure costs. CARB's 2016 Transitioning to a Zero or Near-Zero Emission Line-Haul Freight Rail System in California used a high-end planning estimate of approximately $50 million per mile,

largely derived from the total project cost of the Caltrain passenger electrification program. (CARB, Transitioning to a Zero or Near-Zero Emission Line-Haul Freight Rail System in California (2016) p. 20.) Applied mechanically, this produces a notional cost of approximately $8.7 billion for the LA–Barstow corridor.

When passenger-specific elements are excluded, and the analysis is limited to the overhead contact system itself, technical and advocacy analyses estimate OCS installation costs closer to $12 million per mile in a U.S. regulatory environment. Californians for Electric Rail identifies this lower figure by isolating Caltrain's wire-and-power infrastructure costs. (Californians for Electric Rail, Frequently Asked Questions, 2023.) Applying this adjusted cost yields an estimated capital cost of approximately $2.1 billion for electrifying the 174-mile corridor.

International experience suggests that even lower costs are achievable where electrification is standardized and delivered at scale. Indian Railways has reportedly achieved electrification costs on the order of roughly $200,000 per mile. (“Railways targets full electrification with Rs 35,000 crore plan,” The Economic Times, October 16, 2017) The International Transport Forum reports costs as low as 0.5-2 million euros per kilometer (or $0.9–3.5 million per mile) for overhead catenary costs. (International Transport Forum (ITF), Enhanced Non-Urban Passenger Rail Infrastructure, OECD, 2020) But a more conservative figure from Solutionary Rail states that freight electrification can be delivered for approximately $2.5–$5 million per mile in mature markets. (Solutionary Rail & Backbone Campaign, Solutionary Rail: A People-Powered Campaign to Electrify America’s Railroads (2016) p. 55.) Applied to the LA–Barstow corridor, this implies a range of roughly $435 million to $870 million.

The wide range of cost estimates reflects differences in labor costs, regulatory requirements, project delivery methods, and whether electrification is treated as a one-off project or part of a programmatic buildout. For purposes of this analysis, three cost scenarios are presented: an international-standard scenario using $2.5–$5 million per mile, a moderate U.S. scenario using $12 million per mile, and a high-end U.S. scenario using $50 million per mile.

3. Electric Locomotive Fleet Requirements and Costs

Full catenary electrification requires procurement of electric locomotives to replace the Tier 4 diesel fleet assumed in the DEIR. Electric freight locomotives are commercially available from multiple manufacturers and are the standard motive power on electrified freight corridors worldwide.

The fleet size requirements are comparable to the diesel baseline: approximately 17–18 locomotives in 2028, 23–24 locomotives in 2033, and 26–28 locomotives at full build-out in 2048, including a 20% spare ratio.

Electric locomotive costs vary by manufacturer and specification, but are generally comparable to Tier 4 diesel locomotives on a per-unit basis. Industry sources indicate electric freight locomotive costs in the range of $4–$6 million per unit for modern AC-

traction designs. Using the midpoint of this range ($5 million per unit) and the 2048 build-out fleet of 26–28 locomotives yields electric locomotive capital costs of approximately $130–$140 million.

This is modestly higher than the $78–$118 million estimated for the Tier 4 diesel fleet in the baseline analysis, but the difference is small relative to the infrastructure costs and is offset by the elimination of diesel fueling infrastructure (approximately $2–$3 million in the diesel baseline).

4. Electricity Costs for Full Catenary Operation

Full catenary electrification would permanently eliminate diesel fuel consumption for LA–Barstow line-haul service. Based on the DEIR's own locomotive diesel consumption projections, fuel costs for this corridor are on the order of $270–$440 million between 2028 and 2050 under reasonable bulk rail diesel price assumptions. (DEIR Ch. 50–58 Environmental Analysis, Table 5.6-13) These costs recur annually and expose the Project to long-term fuel price volatility. Corridor electrification would avoid these costs entirely, substituting grid electricity that can increasingly be supplied by renewable resources.

Under a full corridor catenary configuration, all traction energy for the LA–Barstow line-haul corridor is supplied directly from the electric grid via overhead contact wire rather than from on-board batteries or terminal charging. Importantly, this changes the delivery mechanism for electricity but not the total traction energy required to operate the corridor. As demonstrated in CARB's 2024 Zero-Emission Train Feasibility Analysis and updated here using the Draft EIR's train weights and round-trip operating assumptions, net traction energy demand remains approximately 47.5 MWh per train round trip after accounting for regenerative braking (CARB, Zero-Emission Train Feasibility Analysis: Port of Los Angeles to Barstow, 2024).

Applying the Draft EIR's projected train volumes of approximately 3 to 5 round trips per day yields annual corridor electricity demand on the order of 50–90 GWh/year, with a reasonable planning-period average of approximately 70 GWh/year as operations ramp up between 2028 and 2050. Using a blended electricity price range of $0.10–$0.22 per kWh, reflecting large-customer time-of-use tariffs mitigated by operational flexibility and Barstow's strong solar resource (see Appendix 2), total electricity expenditures for full corridor electrification are therefore approximately $161 million in the low case and $354 million in the high case over the 23-year period from 2028 through 2050.

5. Lifecycle Cost Comparison: Full Catenary vs. Diesel Baseline

The following table compares the lifecycle costs of full corridor catenary electrification to the diesel baseline established in the preceding section. Three catenary cost scenarios are presented to reflect the wide range of published estimates.

Capital Cost Components:

Component	International Standard ($2.5–$5M/mile)	Moderate U.S. ($12M/mile)	High-End U.S. ($50M/mile)
Catenary Infrastructure (174 miles)	$435–$870 million	$2,088 million	$8,700 million
Electric Locomotive Fleet (28 units)	$130–$140 million	$130–$140 million	$130–$140 million
Capital Subtotal	**$565–$1,010 million**	**$2,218–$2,228 million**	**$8,830–$8,840 million**

Lifecycle Cost Comparison (2028–2050):

Scenario	Capital Costs	Operating Energy Costs (2028–2050)	Total Lifecycle Cost (2028–2050)
Diesel Baseline (DEIR)	$80–$121 million	$270–$440 million (diesel fuel)	**$350–$561 million**
Full Catenary (International costs)	$565–$1,010 million	$161–$354 million (electricity)	**$726–$1,364 million**
Full Catenary (Moderate U.S. costs)	$2,218–$2,228 million	$161–$354 million (electricity)	**$2,379–$2,582 million**
Full Catenary (High-end U.S. costs)	$8,830–$8,840 million	$161–$354 million (electricity)	**$8,991–$9,194 million**

6. Analysis of Lifecycle Cost Results

The lifecycle cost comparison reveals that full corridor catenary electrification is more capital-intensive than the diesel baseline under all cost scenarios, but the magnitude of the difference varies dramatically depending on construction cost assumptions.

International-Standard Costs ($2.5–$5 million per mile): At international construction standards, full catenary electrification carries a lifecycle cost of $726 million to $1.37 billion, approximately 2–3 times the diesel baseline. While this represents a significant cost premium, it is not so large as to render the alternative economically infeasible, particularly when weighed against the substantial environmental benefits of eliminating all diesel emissions on the corridor. Moreover, international experience demonstrates that these cost levels are achievable when electrification is delivered programmatically rather than as isolated projects.

Moderate U.S. Costs ($12 million per mile): At moderate U.S. construction costs, full catenary electrification carries a lifecycle cost of approximately $2.4–$2.6 billion, roughly 5–7 times the diesel baseline. This represents a substantial cost premium that would require significant policy justification, though it remains within the range of major infrastructure investments that have been undertaken for environmental and strategic reasons.

High-End U.S. Costs ($50 million per mile): At the high-end U.S. cost estimate derived from Caltrain passenger electrification, full catenary electrification would cost approximately $9 billion, roughly 16–26 times the diesel baseline. This scenario reflects the "gold-plated" approach that CARB has acknowledged includes costs not applicable to freight-only corridors. It should not be used as a basis for rejecting catenary electrification without first analyzing why freight electrification should cost as much as passenger electrification with stations, signaling, and rolling stock.

7. Factors Favoring Full Catenary Not Reflected in Lifecycle Costs

The lifecycle cost comparison presented above does not account for several factors that would improve the economic case for full catenary electrification:

Avoided Fuel Price Volatility: The diesel baseline exposes the project to 22 years of diesel price risk. The lifecycle cost analysis assumes diesel prices of $3.00–$4.00 per gallon, but prices have historically fluctuated well outside this range. Full electrification eliminates this volatility entirely, providing cost certainty over the project horizon.

Available Federal and State Incentives: The Infrastructure Investment and Jobs Act and the Inflation Reduction Act provide substantial funding for rail electrification projects. The Railroad Rehabilitation and Improvement Financing (RRIF) program can finance up to 75% of total project costs at low interest rates. (DOT RRIF Eligibility and Application.) CRISI grants fund rail modernization, including electrification. These programs could substantially reduce the net capital cost to BNSF.

Extended Infrastructure Life: Catenary infrastructure has a service life of 50–75 years with proper maintenance, far exceeding the 23-year analysis period used in this comparison. When amortized over the full useful life of the infrastructure, the per-year cost of catenary is substantially lower than suggested by the 2028–2050 analysis window.

Capacity for Growth: Once installed, catenary infrastructure can support increased train frequencies without proportional increases in operating cost. If LA–Barstow traffic grows beyond the DEIR's projections, the fixed infrastructure cost is spread over more train-miles, improving the economics of electrification.

Network Effects: Full electrification of the LA–Barstow corridor could serve as the foundation for broader electrification of BNSF's Southern California network, including connections to the Ports, the Alameda Corridor, and routes eastward. The marginal cost of extending electrification to adjacent segments is lower once the initial infrastructure and expertise are in place.

Public Health Benefits: Full catenary electrification eliminates all diesel emissions on the corridor, including NOx, PM2.5, and diesel particulate matter. The public health benefits of eliminating these emissions in communities along the route, including environmental justice communities near the Ports and in the Cajon Pass region, are substantial but not quantified in the lifecycle cost comparison.

8. CEQA Significance

While full catenary electrification entails higher upfront capital costs than diesel or battery-electric options, it is a proven, commercially mature technology with the strongest long-term emissions and operating-cost performance. Given global freight experience, the availability of right-of-way, the magnitude of avoided diesel fuel costs, and BNSF's demonstrated financial capacity, full electrification of the LA–Barstow corridor is a feasible zero-emission alternative that warrants serious analysis in the EIR.

The DEIR's failure to analyze full catenary electrification, despite explicit direction from CARB and EPA to evaluate electrification options, represents a significant analytical deficiency. The document does not disclose catenary cost estimates, does not evaluate the tradeoff between higher capital costs and lower operating costs, does not consider available federal financing and incentives, and does not explain why a technology deployed successfully on freight corridors worldwide should be dismissed as infeasible for a single route operated by one of the most profitable railroads in North America.

An EIR must evaluate a reasonable range of alternatives that would feasibly attain most of the project's basic objectives while avoiding or substantially lessening any significant environmental effects. Full catenary electrification meets this standard. It would achieve all of the project's freight-movement objectives while eliminating the significant air quality and greenhouse gas impacts associated with diesel operations. The DEIR's complete omission of this alternative does not represent a good-faith evaluation of environmentally superior options.

D. Intermittent Catenary with BELs

This subsection explains how strategic electrification of key corridor segments reduces charging needs and lifecycle cost. In addition to full catenary electrification and pure battery-electric operation, a hybrid approach combining intermittent catenary with battery-electric locomotives (BELs) represents a particularly practical and cost-effective zero-emission alternative for the LA–Barstow corridor. This approach, sometimes referred to as "partial" or "strategic" electrification, focuses fixed infrastructure investment on the most energy-intensive segments of the route while relying on batteries for the remainder. The Draft EIR fails to analyze this middle-ground alternative despite explicit direction from CARB and EPA to evaluate electrification options.

1. Conceptual Design: Where Intermittent Catenary Would Be Installed

For the LA–Barstow corridor, the most logical candidate for intermittent catenary is the Cajon Pass climb and associated high-power segments. As documented in CARB's 2024 Zero-Emission Train Feasibility Analysis, the climb from the Los Angeles Basin to Cajon Pass, approximately 3,783 feet of elevation gain, dominates traction-energy demand for eastbound trains. (CARB, Zero-Emission Train Feasibility Analysis: Port of Los Angeles to Barstow, 2024.) Electrifying this limited segment would allow locomotives to draw continuous power precisely where diesel fuel consumption and NOx emissions are highest.

Outside the Cajon Pass segment, BELs would operate in battery mode on flatter terrain and downhill sections, using regenerative braking to recover energy during descents. This architecture mirrors hybrid electrification strategies already deployed on freight corridors in Europe and evaluated by U.S. agencies for mountainous routes.

2. Cost Implications Relative to Full Catenary

Because intermittent catenary electrifies only a fraction of the total route length, its capital cost is dramatically lower than full corridor electrification. Full catenary for the 174-mile LA–Barstow corridor was previously estimated at approximately $400 million to $8 billion, depending on cost assumptions and degree of U.S. "gold-plating."

By contrast, electrifying only the Cajon Pass and immediate approaches, on the order of 25–35 miles, would reduce infrastructure costs proportionally. Using the same unit-cost ranges applied above, intermittent catenary would likely fall in the range of roughly $60–180 million at international-standard costs ($2.5–$5 million per mile), or $300–420 million using conservative U.S. infrastructure benchmarks ($12 million per mile). In either case, intermittent catenary is substantially cheaper than full corridor electrification while capturing a large share of its benefits.

3. Implications for BEL Fleet Size and Battery Capacity

The same number of BELs used in the updated BEL-only analysis would be required to meet the DEIR’s projected train volumes: approximately 15–25 SD70J-BB units or

approximately 30–48 FLXdrive Heavy Haul units at full build-out. What changes is not fleet size, but battery utilization.

With catenary available on the steepest grades, BELs would draw power directly from the overhead wire during the most demanding portions of the trip. This reduces the depth of battery discharge per trip and therefore reduces the required onboard battery capacity. Shallower discharge cycles improve battery longevity, reduce replacement costs, and allow manufacturers to optimize locomotives with smaller or less stressed battery packs.

4. Reduced Charging Infrastructure and Dwell Requirements

Intermittent catenary also reduces the need for stationary charging infrastructure at terminals. Intermittent catenary shifts a portion of the traction energy supply from terminal charging to en-route grid power on Cajon Pass, reducing battery cycling depth and reducing terminal charging requirements, even if total corridor electricity demand remains of a similar order.

As a result, fewer 1–2 MW chargers are needed, charging sessions are shorter, and locomotives spend less time tied to chargers during dwell windows. This further eases integration with the DEIR's asserted 66-MW import limit and reduces capital investment in charging hardware compared to a pure BEL scenario.

5. Diesel Fuel Savings Compared to the DEIR Baseline

Even without full electrification, intermittent catenary combined with BELs would eliminate diesel fuel use for line-haul service on the LA–Barstow corridor. As shown in the diesel baseline analysis, the DEIR's own projections imply locomotive diesel fuel expenditures of approximately $270–440 million between 2028 and 2050 under bulk rail diesel price assumptions. (DEIR Ch. 50–58 Environmental Analysis, Table 5.6-13, p. 5.6-36.) An intermittent-catenary BEL system would avoid all of those fuel costs, while requiring substantially less fixed infrastructure than full catenary.

6. Capital Cost Estimates for Intermittent Catenary with BELs

The capital costs for an intermittent catenary system with BELs consist of three primary components: the catenary infrastructure on Cajon Pass, the BEL fleet, and reduced charging infrastructure at terminals.

Catenary Infrastructure (25–35 miles on Cajon Pass):

- International-standard costs ($2.5–$5 million/mile): $60–$180 million
- Conservative U.S. benchmark ($12 million/mile): $300–$420 million

BEL Fleet (using Progress Rail SD70J-BB as reference): As established in the full BEL analysis, a Progress Rail SD70J-BB fleet for the corridor requires 15–25 units at full build-out, with capital costs of $175–$200 million.

However, with intermittent catenary supplying power on the most demanding segments, there is potential to reduce onboard battery capacity requirements. This could yield modest cost savings per locomotive, but to be conservative, this analysis maintains the full BEL cost assumptions.

Charging Infrastructure: With catenary providing a significant share of traction energy, fewer chargers are required at terminals. A reasonable estimate is 3–5 chargers total (compared to 7–14 for the pure BEL scenario), at $1.5–$2.0 million per installed 2 MW charger. This yields charging infrastructure costs of approximately $5–$10 million.

Electricity Costs (2028–2050): Under an intermittent-catenary configuration, traction energy is supplied partly from overhead catenary on Cajon Pass and partly from stationary charging at the Los Angeles and Barstow terminals. Importantly, this changes where electricity is delivered, but not the total traction energy required to operate the corridor. As demonstrated in the BEL-only analysis, net grid-supplied traction energy for the LA–Barstow corridor remains approximately 47.5 MWh per train round trip after accounting for regenerative braking.

Applying the Draft EIR's projected train volumes of approximately 3 to 5 round trips per day yields annual corridor electricity demand on the order of 50–90 GWh/year, with a reasonable planning-period average of approximately 70 GWh/year as operations ramp up between 2028 and 2050. Using a blended electricity cost range of $0.10–$0.22 per kWh, reflecting large-customer time-of-use tariffs mitigated by on-site solar, battery energy storage, and smart charging (see Appendix 2), total electricity expenditures for intermittent catenary with BELs are therefore approximately $161 million in the low case and $354 million in the high case over the 23-year period from 2028 through 2050.

7. Lifecycle Cost Comparison: Intermittent Catenary with BELs vs. Diesel Baseline

The following table compares the lifecycle costs of an intermittent catenary with the BEL system to the diesel baseline established in the preceding section. Two catenary cost scenarios are presented: one using international-standard unit costs and one using conservative U.S. infrastructure benchmarks.

Scenario	Capital Costs	Operating Energy Costs (2028–2050)	Total Lifecycle Cost (2028–2050)
Diesel Baseline (DEIR)	$80–$121 million	$270–$440 million (diesel fuel)	**$350–$561 million**
Intermittent Catenary + BEL (International costs)	$240–$390 million	$161–$354 million (electricity)	**$401–$744 million**

Intermittent Catenary + BEL (U.S. benchmark costs)	$480–$630 million	$161–$354 million (electricity)	**$641–$984 million**

The lifecycle cost comparison reveals several important findings.

First, when intermittent catenary is constructed at international-standard unit costs ($2.5–$5 million per mile), the total lifecycle cost of the intermittent catenary with BEL alternative overlaps substantially with the diesel baseline. While the low-end cost of the intermittent catenary alternative ($401 million) exceeds the diesel baseline's low-end estimate ($350 million), the two ranges remain comparable across much of the distribution, particularly when diesel price volatility, unpriced health impacts, and available electrification funding are considered.

Second, even under conservative U.S. infrastructure benchmarks ($12 million per mile), the intermittent catenary alternative remains economically bounded rather than prohibitive. The higher capital cost reflects U.S.-specific construction inefficiencies.

Third, the lifecycle cost comparison does not account for several factors that would further favor the intermittent catenary alternative:

- **Avoided fuel price volatility:** The diesel baseline exposes the project to 23 years of diesel price risk, while the electrified alternative locks in more stable electricity costs.
- **Available incentives:** Federal programs such as CRISI, RRIF, and the Inflation Reduction Act provide substantial funding for rail electrification that would reduce net capital costs.
- **Reduced battery replacement costs:** Shallower discharge cycles enabled by en-route catenary charging extend battery life and reduce replacement frequency.
- **Air quality benefits:** The intermittent catenary alternative eliminates all diesel emissions on the LA–Barstow corridor, providing substantial public health benefits in communities along the route, particularly in the Cajon Pass region, where locomotive emissions are highest.

8. Operational Advantages of Intermittent Catenary

Beyond lifecycle cost considerations, intermittent catenary offers several operational advantages that the DEIR fails to consider.

Reduced Terminal Congestion: With locomotives receiving a substantial energy charge while climbing Cajon Pass, less time is required for stationary charging at terminals. This reduces locomotive dwell time, increases fleet utilization, and eases scheduling constraints.

Performance on Grades: Electric traction from overhead catenary provides high continuous tractive effort on steep grades, superior to battery-only operation, where

discharge rates must be managed to preserve battery life. This can improve train handling and reduce travel time on the most challenging portion of the corridor.

Grid Integration: Catenary systems can incorporate regenerative braking energy from descending trains, feeding power back into the grid or into other ascending trains. On the LA–Barstow corridor, where loaded eastbound trains climb to Cajon Pass while lighter westbound trains descend, this creates opportunities for energy recovery that pure battery systems cannot fully capture.

9. CEQA Significance

Intermittent catenary with BELs represents a middle-ground alternative that captures the largest emissions and fuel-cost benefits of electrification at a fraction of the capital cost of full corridor wiring. It leverages the DEIR's own assumptions of a dedicated, closed-loop fleet and predictable operating pattern, reduces battery requirements, shortens charging time, and dramatically lowers reliance on diesel fuel.

Despite explicit direction from CARB and EPA to evaluate electrification options, the DEIR provides no analysis of this approach. The intermittent catenary with BEL alternative meets all of these criteria:

- **Technologically feasible:** Both catenary electrification and battery-electric locomotives are proven technologies deployed in freight rail service worldwide.
- **Operationally realistic:** The approach aligns with the DEIR's dedicated fleet concept and predictable corridor operations.
- **Economically bounded:** Lifecycle costs are comparable to the diesel baseline when international construction standards are applied, and remain within a reasonable range even under conservative U.S. cost assumptions.

The DEIR's failure to analyze intermittent catenary, therefore, represents a significant omission that prevents meaningful comparison of project alternatives and does not provide for good-faith evaluation of cleaner options.

VII. Zero-Emission Yard and Terminal Equipment

This section evaluates feasible zero-emission alternatives for yard and terminal equipment that the Draft EIR inadequately addressed.

A. Switcher Locomotives at BIG

This subsection compares diesel and battery-electric switcher strategies using CARB-consistent replacement ratios and lifecycle costs. The Air Quality Technical Report states that "it is anticipated that BIG would utilize approximately eight switchers to support the facility in 2028" and that "in 2048, the number of switchers to support the facility increases to twelve." (Appendix 5.3 BIG-1 Air Quality Technical Report, pp. 178–179.) These are the baseline diesel switcher counts used in the DEIR's operational analysis for the BIG facility.

The DEIR's alternative discussion asserts that three BEL switchers would be required per diesel switcher (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 179), but provides no duty-cycle or charging analysis supporting that ratio.

Unlike line-haul locomotives, switcher locomotives operate entirely within confined railyard boundaries and do not undertake long-distance trips. Their duty cycles consist of short movements, frequent stops, and repeated idle periods while assembling, breaking, or repositioning railcars within the yard. Because switchers never leave the BIG facility, they are not subject to the range constraints that apply to line-haul service. Battery-electric switchers operating at BIG would remain in close proximity to charging infrastructure at all times and could recharge opportunistically during idle periods, shift changes, or low-activity windows between switching tasks. This operational profile allows battery-electric switchers to maintain full availability.

Multiple rail operators have implemented or received regulatory approval for one-for-one replacement of diesel switcher locomotives with battery-electric switchers, demonstrating that a 3:1 replacement ratio is not an inherent technological requirement. Examples include:

- The California Air Resources Board approved Union Pacific's replacement of three Tier 0+ diesel switcher locomotives with three battery-electric switchers (one Wabtec FLXswitch and two Progress Rail EMD Joule units) under CARB's case-by-case locomotive determination process, explicitly treating the battery-electric units as direct functional replacements for the diesel locomotives they displaced (CARB Case-by-Case Determination for Locomotives, Determination No. 2022-15).
- Tacoma Rail has implemented publicly funded projects structured as diesel switcher replacement with battery-electric switchers on a one-for-one basis, including state and federal grant agreements that specify scrappage of an existing diesel switcher locomotive and its replacement with a single zero-emission battery-electric switcher performing the same switching function (KVI News, "Tacoma Authorizes $4M in Federal Grants to Purchase Two Electric Locomotives," January 25, 2024).
- Palmetto Railways has publicly stated that it is converting two diesel switcher locomotives into two lithium-ion battery-electric locomotives, maintaining equivalent switching capacity on a unit-for-unit basis (Palmetto Railways, Press Release, 2023).
- Watco and its technology partners have likewise reported conversion of individual diesel end-cab switchers into individual battery-electric switchers for terminal operations, again reflecting a one-for-one functional replacement rather than fleet multiplication (Medha Rail USA, Press Release, 2022).

Taken together, these regulatory approvals, grant agreements, and conversion projects demonstrate that battery-electric switchers are routinely treated as direct substitutes for diesel switchers in captive yard service. They contradict the Draft EIR's assertion that three battery-electric switchers are required to replace one diesel switcher, an assumption that is not borne out by real-world regulatory determinations or operating practice.

For a conservative comparison allowing for charging time, we will apply a modest availability adder of 1.2 to 1. This section analyzes both the diesel baseline and a CARB-consistent BEL alternative to demonstrate that zero-emission switchers are not only feasible but economically competitive with the diesel strategy the DEIR assumes.

1. Diesel Switcher Strategy at BIG: Capital and Fuel Costs

Capital Cost: CARB's 2022 Technology Feasibility Assessment identifies a representative capital cost of approximately $2.7 million per Tier 4 switcher locomotive for Class I railroads. (CARB, Technology Feasibility Assessment for the Proposed In-Use Locomotive Regulation, Appendix F, Table 5 (2022).) Applying that cost to BIG's switcher fleet yields the following capital requirements:

Year	Switchers at BIG	Unit Cost Assumption	Capital Cost
2028 (opening)	8	$2.7M per Tier 4 switcher (CARB 2022)	$21.6 million
2048 (build-out)	12	$2.7M per Tier 4 switcher (CARB 2022)	$32.4 million

Fuel Cost: The DEIR assumes each switcher consumes approximately 50,000 gallons of diesel per year. (Appendix 58 BIG1 Greenhouse Gas Emissions Assessment, Table 18, p. 83.) Because BIG grows from eight switchers in 2028 to twelve by 2048, lifetime fuel use through 2050 is estimated by (a) linearly ramping from 8 to 12 switchers over 2028–2048 (21 years) and (b) holding 12 switchers for 2049–2050. This produces an average of 10 switchers over the first 21 years and 12 switchers for the last 2 years.

The calculation proceeds as follows:

- Switcher-years, 2028–2048: ((8 + 12) ÷ 2) × 21 = 10 × 21 = 210 switcher-years.
- Switcher-years, 2049–2050: 12 × 2 = 24 switcher-years.
- Total switcher-years, 2028–2050: 234.
- Diesel gallons: 234 switcher-years × 50,000 gal/year = 11.7 million gallons.

Using a $3–$4 per gallon planning range for diesel, lifetime diesel purchases at BIG are approximately:

- **Low case:** `11.7M gal × $3/gal` **≈ $35.1 million**
- **High case:** `11.7M gal × $4/gal` **≈ $46.8 million**

2. Diesel Switcher Baseline: Lifecycle Cost Summary

Combining capital and fuel costs for the diesel switcher strategy yields the following baseline:

Cost Category	Low Estimate	High Estimate	Notes
Capital Cost (12 Tier 4 switchers)	$32.4 million	$32.4 million	Build-out fleet at CARB unit cost
Diesel Fuel (2028–2050)	$35.1 million	$46.8 million	11.7 million gallons at $3–$4/gal
Total Diesel Switcher Lifecycle Cost	**$67.5 million**	**$79.2 million**	

This is the cost that the DEIR never discloses and against which zero-emission alternatives must be compared.

3. BEL Switcher Strategy at BIG: Fleet Sizing, Chargers, and Costs

Applying our conservative 1.2 to 1 replacement ratio to BIG yields approximately 8–10 BEL switchers in 2028 (replacing 8 diesels) and 12–14 BEL switchers by 2048 (replacing 12 diesels). The modest range reflects a one-for-one replacement with a small availability adder, where operationally prudent.

Capital Cost: CARB's 2022 feasibility assessment provides planning-level costs for zero-emission switchers and associated charging infrastructure: $3.4 million per zero-emission switcher and $0.3 million per switcher for charging infrastructure. (CARB, In-Use Locomotive Emission Inventory, Appendix G, Table 4, p. 13 (2022)) Using those CARB inputs, the BEL capital ranges for BIG are:

Year	BEL Switchers	BEL Capex ($3.4M)	Charging Infra ($0.3M)	Total Capex
2028 (opening)	8–10	$27.2–$34.0 million	$2.4–$3.0 million	$29.6–$37.0 million
2048 (build-out)	12–14	$40.8–$47.6 million	$3.6–$4.2 million	$44.4–$51.8 million

Operating Electricity Cost: Using CARB's mid-range benchmark of 0.7 GWh/year per BEL switcher, electricity use is estimated by ramping the BEL fleet in parallel with diesel switchers (8→12 in the low case; 10→14 in the high case) over 2028–2048 and holding at the 2048 level for 2049–2050. This yields total electricity consumption of approximately 163.8–196.0 GWh over 2028–2050.

Applying a blended electricity price range of $0.10–$0.22 per kilowatt-hour, reflecting large-customer time-of-use tariffs mitigated by on-site solar generation, battery energy storage, and charging optimization, total operating electricity costs are approximately (See Appendix 2):

- **Low fleet case (8→12 BELs):** $16.4 million to $36.0 million
- **High fleet case (10→14 BELs):** $19.6 million to $43.1 million

4. Lifecycle Cost Comparison: Diesel vs. BEL Switchers

The table below compares full lifecycle costs (capital plus operating energy) for switcher operations at the Barstow International Gateway (BIG) under the diesel strategy assumed in the Draft EIR and a CARB-consistent battery-electric locomotive (BEL) switcher strategy. For the diesel case, capital costs reflect the twelve-switcher build-out assumed by 2048, and fuel costs reflect the ramped diesel consumption from 2028 through 2050. For the BEL case, capital costs reflect a twelve- to fourteen-unit BEL fleet with associated charging infrastructure at full build-out, and electricity costs reflect the ramped 2028–2050 electricity consumption calculated using a blended $0.10–$0.22 per kWh price assumption (See Appendix 2).

Scenario (BIG switchers only)	Capital Cost	Energy Cost (2028–2050)	Total Lifecycle Cost (2028–2050)
Diesel Switchers (DEIR baseline)	$32.4 million (12 Tier 4 switchers)	$35.1–$46.8 million (diesel fuel)	$67.5–$79.2 million
BEL Switchers (CARB-consistent)	$44.4–$51.8 million (12–14 BEL switchers + charging)	$16.4–$43.1 million (electricity)	$60.8–$94.9 million

The lifecycle cost comparison shows that BEL switcher operations are cost-competitive with the diesel baseline across a wide range of assumptions. At the low end of the electricity price range and fleet size, BEL switchers have an estimated lifecycle cost of approximately $60.8 million, compared to $67.5 million for diesel switchers, a difference of roughly $6.7 million, or about 10 percent.

At the high end of the electricity price range and fleet size, BEL lifecycle costs rise to approximately $94.9 million. Even in this conservative case, the comparison remains informative because the BEL scenario avoids long-term diesel fuel price volatility, materially reduces local air pollutant emissions, and aligns with CARB's long-term zero-emission rail strategy. The Draft EIR does not present any comparable lifecycle cost analysis for its diesel baseline, making this comparison essential for evaluating feasible alternatives under CEQA.

5. Factors Favoring BEL Switchers Not Reflected in Lifecycle Costs

The lifecycle cost comparison presented above does not account for several factors that would further improve the economic case for BEL switchers:

Available Incentives: CARB's Clean Off-Road Equipment Voucher Incentive Project (CORE) provides point-of-sale vouchers for zero-emission off-road equipment. Eligible equipment includes railcar movers and switcher locomotives, which can receive vouchers of up to $1 million per unit. (CARB CORE Eligibility.) For a fleet of 12–14 BEL switchers, CORE vouchers alone could reduce net capital costs by $12–$14 million, dramatically improving the economics of the BEL strategy.

LCFS Credits: By operating electric switchers, BNSF would generate Low Carbon Fuel Standard (LCFS) credits based on the electricity dispensed. These credits provide a continuous revenue stream that effectively lowers the operating cost of electricity. (CARB LCFS Credit Generation.) The DEIR's failure to calculate this revenue stream in its lifecycle cost analysis undermines the evidentiary basis for the Draft EIR's finding of economic infeasibility.

Reduced Maintenance Costs: BEL switchers have fewer moving parts than diesel locomotives and lower per-hour maintenance burdens. While maintenance cost differentials are not quantified in this analysis, they would favor the BEL alternative over the project's 23-year operating horizon.

Avoided Fuel Price Volatility: The diesel baseline exposes switcher operations to 22 years of diesel price risk, while the electrified alternative provides more stable and predictable operating costs.

Air Quality Benefits: BEL switchers eliminate all diesel emissions within the BIG facility, including NOx, PM2.5, and diesel particulate matter. This is particularly significant because switchers operate continuously within the yard, creating localized pollution hotspots that affect workers and nearby communities.

6. The DEIR's Inflated Replacement Ratio Is Unsupported

The DEIR's assertion that three BEL switchers would be required per diesel switcher is inconsistent with CARB's published work or actual use cases and is unsupported by any

disclosed analysis. The DEIR provides no duty-cycle data, charging feasibility study, or operational analysis to justify this 3:1 ratio.

CARB's statewide switcher electrification programs, including CORE voucher determinations and regulatory feasibility assessments, support one-for-one replacement with modest availability adders where warranted. Zero-emission switchers are already in commercial service at ports and railyards throughout California, demonstrating that the technology can meet real-world operational demands without tripling fleet size.

By inflating the replacement ratio without evidentiary support, the DEIR artificially increases the apparent cost of the BEL alternative, biasing the analysis toward the diesel baseline. This approach does not fulfill the requirement that alternatives be evaluated based on substantial evidence rather than unsupported assumptions.

7. CEQA Significance

The DEIR provides no comparable charging-and-cost analysis and relies on an inflated three-for-one assumption that is inconsistent with real world practice and real world operational schedules. A properly sized BEL switcher alternative is feasible, quantifiable, and should have been analyzed in good faith.

Zero-emission switchers at BIG would eliminate all diesel emissions from yard operations, resulting in a significant reduction in air quality impacts. The alternative is technologically available (zero-emission switchers are in commercial service today), operationally feasible, and economically achievable (lifecycle costs are lower than the diesel baseline). The DEIR's failure to evaluate this alternative with accurate assumptions and transparent cost comparisons represents a significant analytical deficiency.

B. RTGs and Cargo-Handling Equipment

This subsection demonstrates that electric RTGs and cargo-handling equipment are commercially proven and cost-effective. In the Air Quality Technical Report, all rubber-tired gantry cranes (RTGs) at BIG are modeled as diesel-operated cargo-handling equipment. Table 15 lists "RTG Cranes" under "Operational Diesel Equipment," with seven RTGs in 2028, eight in 2033, and ten in 2048, and these units are carried through the criteria-pollutant and GHG inventories as long-term diesel emitters. (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 67.) Nowhere in the DEIR is there any quantitative analysis of an electric RTG alternative, despite the fact that the same appendices explicitly assume that other large cranes (widespan RMGs) will be fully electric. (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 181.) Instead of evaluating electric RTGs, the DEIR simply treats them as permanently diesel and folds them into its generalized "we have no more power" narrative tied to an asserted 66-MW "power budget." (DEIR, 5.3 115) That is not an alternatives analysis; it is an assumption.

1. Electric RTGs Are Already in Commercial Service at the Ports

In reality, electric rubber-tired gantry cranes (eRTGs) are in commercial service today at the very ports that will feed BIG. At the Port of Long Beach's Pier J terminal, SSA Marine completed a multi-year project converting nine conventional rubber-tired gantry cranes into 100 percent grid-tied electric eRTGs (BusinessWire/AJOT, SSA Marine Converts 9 Diesel-Powered Rubber-Tired Gantry Cranes to Electric at the Port of Long Beach Pier J Terminal, Oct. 31, 2022). The CEC's final project report for the Port of Long Beach transition project reports that the nine eRTGs were estimated to save approximately 225,000 gallons of diesel fuel (CEC Report, Port of Long Beach Zero-Emissions Terminal Equipment Transition Project, CEC-600-2024-042, p. 78). That implies roughly 25,000 gallons of diesel avoided per eRTG per year (225,000 ÷ 9).

The San Pedro Bay Ports' Cargo-Handling Equipment Feasibility Assessment further confirms that grid-tied electric RTGs are both technically viable and economically bounded under real-world operating conditions. In its 2021 update, the Ports compared the 15-year total cost of ownership (TCO) for baseline diesel RTGs and grid-connected electric RTGs operating in Southern California Edison territory. The analysis found that a new diesel RTG has an estimated 15-year TCO of approximately $2.43 million, while a grid-connected electric RTG has a TCO of approximately $2.67 million over the same period—an incremental difference of roughly $240,000, driven primarily by California's higher industrial electricity rates rather than equipment cost (San Pedro Bay Ports, 2021 Cargo-Handling Equipment Feasibility Assessment, § 9.6.2, p. 91). Importantly, the same assessment concludes that when available incentive programs are applied, including Low Carbon Fuel Standard (LCFS) credits and funding under the Clean Off-Road Equipment (CORE) program, the net present value of grid-electric RTGs becomes lower than diesel RTGs by approximately $200,000–$300,000 per unit over 15 years, making electric RTGs not only feasible but economically preferable on a lifecycle basis (San Pedro Bay Ports, 2021 Cargo-Handling Equipment Feasibility Assessment, §§ 9.6.1, p. 90).

In other words, at the Port of Long Beach and Port of Los Angeles, the ports and terminal operators are not asking whether eRTGs are possible; they are already doing it, and their own technical work shows that grid-electric RTGs are cost-competitive or cheaper than diesel over their working lives.

2. Diesel RTG Baseline: Fuel Consumption and Costs at BIG

The SSA Marine project at Pier J provides a realistic benchmark for fuel use and savings. Converting nine diesel RTGs to electric at Pier J is expected to eliminate 225,000 gallons of diesel each year, or about 25,000 gallons per RTG per year. If BIG builds out to ten diesel RTGs in 2048 as the DEIR assumes, and if each has a similar duty cycle, the RTG fleet at BIG would consume on the order of:

- `10 RTGs × 25,000 gallons/year ≈` **250,000 gallons of diesel per year**

Considering the operating period from 2028 through 2050 (23 years), and accounting for the ramp-up from seven RTGs in 2028 to ten RTGs by 2048, the cumulative diesel consumption for BIG's RTGs can be estimated as follows:

- Average RTG count over the period: approximately 8.5 RTGs
- `Total diesel consumption: 8.5 RTGs × 25,000 gal/year × 23 years ≈` **4.9 million gallons**

At fuel prices of $3.00–$4.00 per gallon, consistent with U.S. Energy Information Administration projections for the medium term, the lifetime diesel fuel cost for the RTG fleet alone would fall in the range of:

- **Low case:** `4.9 million gal × $3/gal ≈` **$14.7 million**
- **High case:** `4.9 million gal × $4/gal ≈` **$19.6 million**

3. Electric RTG Alternative: Electricity Consumption and Costs

By contrast, electric RTGs require electricity instead of diesel. Using SSA's Pier J project as a guide, those nine RTGs displaced 225,000 gallons of diesel per year. Translating that to energy, one gallon of diesel holds about 40 kWh of chemical energy. (U.S. DOE, Alternative Fuels Data Center, "Fuel Properties Comparison," 2023.) At a conservative 30–35 percent diesel engine efficiency, 225,000 gallons corresponds to roughly 2.7–3.2 GWh per year of traction work across nine RTGs, or approximately 0.3–0.4 GWh per RTG per year. A grid-tied electric RTG with an 85–90 percent drivetrain efficiency would need on the order of 0.35–0.45 GWh/year of electricity to do the same work.

For ten eRTGs at BIG, that implies around:

- 3.5–4.5 GWh of electricity per year

Over 23 years, accounting for the ramp-up in RTG count, cumulative electric RTG electricity use would be approximately:

- `Average of 8.5 eRTGs × 0.4 GWh/year × 23 years ≈` **78–85 GWh total**

Using the electricity cost methodology established in Appendix 2, which accounts for large-customer time-of-use tariffs, on-site solar generation, BESS dispatch, and Barstow's strong solar resource, a planning-level electricity cost range of $0.10–$0.22 per kWh is applied. The low case reflects optimized procurement with substantial solar and storage integration, while the high case reflects unoptimized grid purchases at prevailing California industrial rates. (See Appendix 1, Planning-Level Electricity Cost Ranges for an All-Electric BIG.)

Applying this range, the lifetime electricity cost for electric RTGs is:

- **Low case:** 78 GWh × $0.10/kWh = **$7.8 million**

- **High case:** 85 GWh × $0.22/kWh = **$18.7 million**

4. Capital Cost Comparison: Diesel vs. Electric RTGs

The San Pedro Bay 2021 Feasibility Assessment provides capital cost benchmarks for both diesel and electric RTGs. New diesel RTGs cost approximately $2.0–$2.5 million per unit, while new grid-connected electric RTGs cost approximately $2.3–$2.8 million per unit, reflecting the additional cost of electrical systems and grid connection infrastructure. (San Pedro Bay Ports, 2021 Cargo-Handling Equipment Feasibility Assessment, Section 9.6.2, p. 91.)

For a BIG-scale fleet of ten RTGs at build-out:

RTG Type	Unit Cost Range	Fleet Capital Cost (10 units)
Diesel RTG	$2.0–$2.5 million	$20–$25 million
Electric RTG	$2.3–$2.8 million	$23–$28 million

The capital cost premium for electric RTGs is approximately $3–$5 million for the entire fleet, a modest increment that is recovered through fuel savings over the equipment's operating life.

5. Lifecycle Cost Comparison: Diesel vs. Electric RTGs

The following table compares the full lifecycle costs (capital + energy) for BIG's RTG fleet under the diesel strategy versus an electric RTG alternative over the 2028–2050 period.

Scenario	Capital Cost (10 RTGs)	Energy Cost (2028–2050)	Total Lifecycle Cost (2028–2050)
Diesel RTGs (DEIR baseline)	$20–$25 million	$14.7–$19.6 million (diesel fuel)	**$34.7–$44.6 million**
Electric RTGs	$23–$28 million	$7.8–$18.7 million (electricity)	**$30.8–$46.7 million**

The lifecycle cost comparison demonstrates that electric RTGs are cost-competitive with diesel RTGs across the full range of assumptions. At the low end, electric RTGs cost approximately $30.8 million compared to $34.7 million for diesel, a savings of $3.9 million or 11%. Even at the high end of the electricity cost range, electric RTGs ($46.7

million) cost only marginally more than diesel RTGs ($44.6 million). When BIG optimizes its electricity procurement through on-site solar, BESS, and time-of-use scheduling—as the Appendix 2 analysis demonstrates is feasible—electric RTGs are clearly the more economical choice.

6. Total Cost of Ownership Analysis from San Pedro Bay Ports

The San Pedro Bay Ports' own analysis provides additional confirmation that electric RTGs are economically competitive. The 2021 Feasibility Assessment estimates:

- **Diesel RTG 15-year TCO:** $2.43 million per crane
- **Grid-electric RTG 15-year TCO (SCE territory):** $2.67 million per crane (about $240,000 more)

(San Pedro Bay Ports, 2021 Cargo-Handling Equipment Feasibility Assessment, Section 9.6.2, p. 90.)

This difference of roughly 10 percent is modest. Crucially, the same report notes that when LCFS credits and CORE incentives are applied (up to $500,000 per crane), grid-electric RTGs become less expensive overall than diesel and diesel-hybrid RTGs, by approximately $200,000–$300,000 per unit on a net-present-value basis.

For a BIG-scale fleet of ten RTGs, that implies:

Scenario	15-Year Fleet TCO (pre-incentive)	15-Year Fleet TCO (post-incentive)
Diesel RTG	~$24.3 million	~$24.3 million (no incentives available)
Electric RTG	~$26.7 million	~$21–$24 million

Extrapolated over a 20–23 year horizon, and considering that electric RTGs have lower variable operating costs and are eligible for zero-emission incentives that diesel RTGs are not, the lifecycle costs of electric RTGs are at least comparable to diesel and very likely lower, particularly when fuel and maintenance savings are fully counted.

7. The DEIR's Load Curve Data Contradicts Its RTG Rejection

The DEIR tells the public that zero-emission RTG cranes are not feasible at BIG because they would supposedly require too much electricity and exceed the project's "power budget." (Air Quality Technical Report, Appendix 5.3 BIG-1, p. 181.) But the actual technical documents attached to the DEIR show that electric RTGs do not operate at

maximum load all day, there are long periods of low or moderate demand, and their peak loads are predictable and manageable.

In the Energy Assessment (Appendix 5.6 BIG-1 Energy Assessment, Figure 22, pp. 14-16), BNSF's consultants include explicit, hour-by-hour electrical load curves for electric RTGs showing how RTG power demand rises and falls during a typical day. These figures demonstrate that electric RTGs have variable, not constant, power usage with long periods of low or moderate demand and predictable, manageable peak loads.

The Energy Assessment explicitly includes electric RTGs in its 24-hour load modeling, yet the DEIR never discusses:

- The existence of these RTG load curves
- What they show about actual power demand patterns
- Whether they undermine the rejection of electric RTGs
- Whether electric RTGs could operate under the project's proposed solar + BESS system
- Whether smart charging or non-coincident load management would resolve any peak issues

This kind of omission misleads the public about what the technical record actually shows.

8. Available Electric RTG Technologies

Modern rubber-tired gantry cranes (RTGs) are commercially available in multiple zero-emission configurations that are already deployed at major container ports worldwide. These configurations include cable-reel electric RTGs, which remain continuously connected to grid power while retaining full yard mobility through an automated cable reel system; conductor-bar RTGs, which draw electricity from electrified rails or conductor bars embedded in the yard surface; battery-hybrid RTGs, which use onboard battery systems to enable zero-emission operation during crane movements while recharging during idle periods or when connected to shore power; and fully battery-electric RTGs, which rely on large onboard battery packs capable of supporting full-shift operations without external power connections (San Pedro Bay Ports, Cargo-Handling Equipment Feasibility Assessment, 2021 Update, pp. 22-27).

These zero-emission RTG technologies are not experimental. Electric RTGs are already in widespread commercial service at the Ports of Los Angeles and Long Beach, as well as at the Ports of Oakland, Seattle, and Vancouver, and at numerous international container ports in Europe and Asia (Port of Long Beach, Pier J Zero-Emission Terminal Project Description, 2022; San Pedro Bay Ports, Clean Air Action Plan Update, 2017; International Association of Ports and Harbors, Port Equipment Electrification Case Studies, 2020). Major RTG manufacturers, including ZPMC, Konecranes, and Liebherr, now market electric and hybrid RTGs as their standard offerings for new terminal procurements. (Konecranes, E-RTG Product Overview, 2021; ZPMC, Electric RTG Technical Specifications, 2020).

Despite the maturity and widespread adoption of these technologies, the Draft EIR does not acknowledge the availability of modern zero-emission RTG configurations and does not evaluate any electric RTG alternative using contemporary specifications or operating data. This omission is significant given that electric RTGs represent a well-established, commercially deployed technology that is directly relevant to the Project's cargo-handling operations and emissions profile.

9. Integration with BIG's Proposed Solar and BESS Infrastructure

The DEIR's rejection of electric RTGs is particularly unjustified given that the project already proposes substantial on-site solar generation and battery energy storage. The Utility Assessment describes a 21 MW solar farm on 140 acres, 6.4 MW of Title 24-required rooftop solar (increasing to 23.4 MW under Mitigation Measure EN-1), and a Battery Energy Storage System (BESS) designed to "maximize the on-site usage of solar power." (Appendix 5.17 BIG1 Utility Assessment, p. 65.)

Electric RTGs are well-suited to integration with solar and storage systems because their load profiles are predictable and their peak demands occur during daylight hours when solar generation is highest. As demonstrated in Appendix 2, the combination of on-site solar and optimized procurement can reduce effective electricity costs to the $0.10/kWh to $0.22/kWh range, making electric RTGs substantially more economical than diesel over the project life. The DEIR never analyzes whether the proposed solar and BESS infrastructure could support electric RTG operations, instead dismissing the technology based on an undocumented assertion about grid import limits.

10. CEQA Significance

The DEIR's RTG analysis fails in several critical ways:

First, it locks in diesel RTGs without evaluating an electric RTG alternative, even though the Ports of Los Angeles and Long Beach are already running electric RTGs and have published detailed TCO and infrastructure cost analyses showing electric RTGs are feasible and competitive.

Second, it does not disclose or examine lifetime fuel costs for BIG's RTGs, even though a simple calculation using the Pier J fuel savings data shows that BIG's RTG fleet could burn millions of gallons of diesel and tens of millions of dollars in fuel over the project life if left un-electrified.

Third, it fails to consider that BIG's on-site solar and BESS infrastructure, as already proposed in the Utility Assessment, could directly support electric RTG operations, moving RTG energy demand away from diesel and onto a cleaner, increasingly renewable grid.

Fourth, the DEIR's own Energy Assessment includes detailed RTG electrical load curves and operating profiles. That information demonstrates that electric RTGs are not speculative, but rather are already quantified in terms of power demand, duty cycle, and

peak load. The DEIR's dismissal of electric RTGs, without applying its own disclosed load data, is therefore unsupported by substantial evidence and undermines the credibility of the alternatives analysis.

Given the scale of the RTG fleet at BIG and existing real-world deployments at POLA and POLB, an electric RTG alternative is plainly "feasible" and "available." The technology is commercially proven, the costs are well-documented by the San Pedro Bay Ports' own feasibility assessments, and the lifecycle economics favor electric RTGs when the electricity cost assumptions from Appendix 2 are applied. The DEIR's failure to analyze that alternative, and its reliance on unsupported assertions about power limitations, renders its treatment of RTGs deficient.

VIII. Cleaner Locomotive Deployment as a Feasible Project Alternative

The Draft EIR fails to evaluate a feasible and potentially effective alternative for reducing rail-related air pollution associated with the Barstow International Gateway: the use of cleaner locomotives for all rail traffic serving and passing through BIG, not solely the dedicated Los Angeles–Barstow trains. While the Draft EIR assumes a "dedicated fleet" of Tier 4 locomotives for the direct port-to-BIG shuttle, it does not analyze whether BNSF could operate cleaner locomotives more broadly within the Mojave Desert Air Basin as part of the Project design. This omission is significant given the magnitude of rail traffic that will move through Barstow as a result of the Project and the region's existing air quality burden.

The Draft EIR implicitly assumes that locomotive emissions outside the dedicated shuttle are fixed and unavoidable. It does not consider an alternative in which BNSF deploys newer, lower-emission locomotives for the additional line-haul traffic generated by BIG, rather than relying on the existing national fleet mix. As a result, the Draft EIR does not evaluate whether project-related emissions could be reduced through operational decisions that are well within the railroad's control.

A. Demonstrated Feasibility of Cleaner Fleet Operations

The feasibility of operating cleaner locomotive fleets within defined geographic areas has already been demonstrated in California. For more than two decades, Class I railroads have successfully managed and tracked cleaner locomotive deployment in the South Coast Air Basin pursuant to voluntary agreements with the California Air Resources Board. Under the 1998 South Coast Rail Emission Reduction Agreements, BNSF and Union Pacific committed to operating locomotive fleets that meet defined average emission performance levels within the basin, supported by detailed tracking of locomotive activity, fuel use, and megawatt-hours of operation (CARB, "Rail Emission Reduction Agreements," 2024; CARB, "2021 Line-Haul Locomotive Emission Inventory," 2021).

These agreements demonstrate a critical point relevant to this Project: railroads are capable of geofencing cleaner locomotive operations, tracking compliance, and adjusting fleet deployment to meet regional air quality objectives. The Draft EIR does not examine

whether a similar operational approach could be applied to the Mojave Desert Air Basin as part of the BIG Project alternatives analysis.

The effectiveness of cleaner fleet deployment strategies is well documented. CARB's evaluations of major South Coast railyards show substantial reductions in diesel particulate matter cancer risk during the period when cleaner locomotives, trucks, cargo-handling equipment, and fuels were introduced (CARB, "Technology Assessment: Freight Locomotives," November 2016). These reductions were achieved through a combination of regulations, voluntary agreements, and incentives, not through technological breakthroughs that are unavailable today.

B. Relevance to the Mojave Desert Air Basin

The need to examine cleaner locomotive deployment is especially acute in the Mojave Desert Air Basin. The Western Mojave Desert Nonattainment Area is classified as "Severe" nonattainment for eight-hour ozone standards (EPA Green Book, 2025). Nitrogen oxides from locomotives are a major precursor to ozone formation, and the Draft EIR acknowledges that rail operations associated with BIG will materially increase NOx emissions in the basin.

Despite this context, the Draft EIR does not analyze whether project-related rail traffic could be served by a cleaner subset of the BNSF fleet, nor does it assess how such an operational alternative could reduce NOx emissions in a region already subject to stringent air quality planning requirements (CARB, "Western Mojave Desert Air Quality Plans," 2024). The omission is particularly notable given that the Project will effectively concentrate rail activity through Barstow, creating a defined corridor in which cleaner locomotive deployment could meaningfully reduce emissions.

The health implications of increased NOx and diesel particulate matter in this region are well established. San Bernardino County experiences elevated asthma-related health burdens, particularly among children: 2022 data show pediatric asthma hospitalization rates of approximately 9.6 per 10,000 residents aged 0–17 and 15.1 per 10,000 for ages 0–4 (KidsData.org, Asthma Hospitalization Rate by Age Group — San Bernardino County, 2022), and research on the broader Inland Empire reports higher emergency department visit and hospitalization rates for pediatric asthma compared to statewide averages. These conditions underscore the importance of evaluating feasible operational alternatives that could reduce locomotive emissions in the Mojave Desert Air Basin.

C. Failure to Evaluate a Reasonable Operational Alternative

The Draft EIR's alternatives analysis does not examine whether deploying cleaner locomotives more broadly for BIG-related traffic is feasible, effective, or economically reasonable. It does not analyze the emissions reductions that could be achieved through such an approach, nor does it compare those reductions to other mitigation measures discussed in the document. Instead, the Draft EIR treats non-dedicated locomotive emissions as a fixed background condition, even though the Project itself is responsible for increasing rail traffic through the basin.

Cleaner locomotive deployment is not speculative, experimental, or outside the control of the Project applicant. It is an operational strategy that has been implemented in California for decades and is directly relevant to the emissions increases identified in the Draft EIR.

By failing to evaluate this alternative, the Draft EIR does not provide decision-makers or the public with a complete picture of the range of options available to reduce rail-related pollution associated with the Barstow International Gateway. A revised analysis that examines cleaner locomotive deployment as a project alternative would materially improve the environmental review by aligning the Project's design with demonstrated practices for reducing rail emissions in overburdened air basins.

IX. Zero-Emission Truck Alternative

The DEIR's treatment of a zero-emission truck alternative is both legally and technically deficient. The document acknowledges that hundreds of heavy-duty diesel truck trips will serve BIG every day, distinct from the internal zero-emission hostlers: 594 daily heavy-duty truck trips in 2028, 753 in 2033, and 929 in 2048 (Appendix 5.3 BIG-1 Air Quality Technical Report, Table 19, p. 76). Yet when the DEIR evaluates a mitigation measure titled "Zero/Near-Zero Emission Trucks" that would require these drayage trucks to be zero-emission, it dismisses it under "Mitigation Measures Considered but Determined Infeasible" (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 180). The reasons provided, that there is no electric-truck power capacity, no physical space for chargers, no legal authority to require zero-emission trucks, and that zero-emission trucks are "speculative," are all contradicted by current technology, existing regulations, and the multi-decade timeframe of this project.

On power availability, the DEIR argues that the facility's alleged 66-MW "power budget" from Southern California Edison is already exhausted by electric hostlers and cranes, and that adding truck charging would require transmission-level upgrades taking 7–10 years (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 179). That argument wrongly assumes that all truck charging must occur at BIG and that there is no flexibility in where or when trucks charge. In reality, heavy-duty electric trucks are typically charged at off-site depots and yards, not at every individual customer facility. For example, 4 Gen Logistics is deploying 41 Volvo VNR Electric drayage trucks between the Port of Long Beach and Inland Empire warehouses, with charging concentrated at its own depot (Volvo Trucks North America, "4 Gen Logistics to Deploy 41 Volvo VNR Electric Trucks to Service the Port of Long Beach," 2022). Tradelink Transport has likewise deployed 15 Volvo VNR Electric trucks for port drayage, again relying on a dedicated depot for overnight charging (Tradelink Transport Deploys 15 Volvo VNR Electric Trucks for Sustainable Drayage Operations at Ports of Los Angeles and Long Beach, 2025; Commercial Carrier Journal, 2025). Nothing in the DEIR explains why the many independent and carrier fleets serving BIG could not follow this well-established depot model, nor why the entire charging burden must be placed entirely on the BIG substation.

The DEIR's space-constraint argument is equally unconvincing. It claims the yard cannot accommodate truck charging due to a grade-separated overcrossing, slopes, and

track geometry, and asserts that placing chargers north of the tracks would force trucks to enter the yard and cause congestion (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 180). Yet the DEIR never quantifies how much space would actually be needed for a modest number of high-power truck chargers, nor does it consider that charging infrastructure can be built in adjacent logistics parks, truck depots, or off-site areas that already host truck parking. Current commercial truck chargers typically range from 150 kW to 350 kW for depot and opportunity charging. ABB, for example, lists its Terra 184 180 kW DC fast charger at about $80,000 per unit (hardware only), and ABB's own fleet charging guidance indicates fully installed costs for DC fast chargers in the $20,000–$150,000 per unit range depending on power and site complexity (ABB, "Commercial Fleet EV Charging," 2024). A modest depot-style station with, for example, 20–30 such chargers would require on the order of one to two acres of paved space—comparable to existing truck parking areas—and capital costs in the $2–5 million range. The DEIR offers no evidence that this scale of infrastructure is physically impossible in or around BIG; it simply assumes it is.

On technology and legal authority, the DEIR's analysis is frozen in time. It stresses that California currently lacks the legal authority to mandate zero-emission trucks due to Congressional and presidential actions and that it is "entirely speculative" whether ZE trucks will be widely available to independent contractors (Appendix 5.3 BIG-1 Air Quality Technical Report, p. 180). That ignores the rapid global maturation of heavy-duty electric trucks. An ICCT meta-study of zero-emission truck costs finds that current battery-electric Class 8 trucks are priced between $200,000 and $800,000, depending on range, with costs expected to fall by as much as 40 percent by 2030 due to declining battery and powertrain costs (ICCT, "A Meta-Study of Purchase Costs for Zero-Emission Trucks," 2022). Major OEMs—Volvo, Daimler, BYD, Tesla—are all delivering or piloting battery-electric Class 8 trucks in California today, including the Volvo VNR Electric, Daimler eCascadia, BYD 8TT, and others, and hundreds of such trucks are already in drayage service at POLA/POLB and Inland Empire warehouses. Over the multi-decade horizon of the BIG project, it is unreasonable—and contrary to CARB's own forecasts—to treat this fast-evolving sector as static or to assume that zero-emission trucks will remain rare or "speculative" through 2048.

From a lifecycle cost standpoint, recent analyses show that the total cost of ownership (TCO) of battery-electric trucks is converging with, and in some duty cycles under California conditions already beating, diesel trucks. An International Council on Clean Transportation (ICCT) TCO study of long-haul battery-electric trucks in the United States estimates that a typical 1 MW DC fast charger costs about $300,000 per unit (hardware plus installation), and that the levelized infrastructure cost is around 4–5 cents per kWh when spread over a 10-year life (ICCT, Total Cost of Ownership for Alternative Powertrain Long-Haul Trucks in the United States, 2023, Table 8). When combined with declining battery costs and lower per-mile energy costs, depot-based battery-electric trucks achieve TCO parity or better in many applications by the 2030s. Given that BIG's diesel drayage trucks will still be operating—and burning fuel—well into the 2040s under the DEIR's assumptions, it is not credible to reject a zero-emission truck alternative simply on the basis of current price points or temporary federal uncertainty about California's authority.

In sum, the DEIR's treatment of a zero-emission truck alternative is deficient in three ways. First, it does not quantify what truck-charging infrastructure would actually require in terms of power, space, or cost; instead, it invokes a generalized "66-MW cap" with no supporting SCE study and assumes all charging must occur at BIG. Second, it ignores the ongoing deployment of heavy-duty electric trucks and charging infrastructure at the Ports of Los Angeles and Long Beach and Inland Empire depots, where fleets are already operating tens of battery-electric drayage trucks supported by real-world charging systems. Third, it treats technology and regulation as static through 2048, despite ICCT TCO projections and global trends showing that zero-emission trucks will be mainstream in drayage well before BIG reaches its full operational horizon. In sum, the DEIR's failure to rigorously evaluate zero-emission trucks is a significant analytical defect.

X. Incentives and Net Lifecycle Cost Reductions

A. Available Incentive Programs

The DEIR systematically rejects zero-emission alternatives, including battery-electric locomotives (BELs), electric RTGs, and zero-emission drayage trucks, on the grounds of economic infeasibility. However, this rejection relies on a flawed "sticker price" analysis that presents the gross capital cost of clean technology while failing to account for the massive array of federal, state, and utility incentives currently available to offset these costs. By presenting these costs in a vacuum, without deducting available grants, tax credits, and infrastructure subsidies, the DEIR artificially inflates the cost of clean alternatives and provides a misleading economic comparison of better alternatives.

The DEIR rejects electrification based on implied capital costs while ignoring hundreds of millions of dollars in grant funding specifically appropriated by Congress and the California Legislature to subsidize exactly the technologies the DEIR rejecting.

B. Federal Programs

The DEIR fails to analyze the historic levels of federal funding for rail decarbonization provided by the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA).

1. FRA Consolidated Rail Infrastructure and Safety Improvements (CRISI) The Federal Railroad Administration's CRISI program is a primary mechanism for rail modernization. The program explicitly funds projects to improve the safety, efficiency, and reliability of freight rail, including the "rehabilitating, remanufacturing, procuring, or overhauling of locomotives" specifically for emissions reduction. While CRISI grants are usually awarded to smaller railroads, BNSF could partner with a public entity like the City of Barstow to become eligible and pursue CRISI grants to fund the capital difference between Tier 4 diesel locomotives and battery-electric units. Recent awards demonstrate the scale of this opportunity: in 2023, Tacoma Rail received over $4 million to replace diesel switchers with battery-electric locomotives and install charging infrastructure. (FRA Discretionary Grant Programs, https://railroads.dot.gov/grants)

2. EPA Clean Ports Program The EPA Clean Ports Program provides $3 billion to fund zero-emission equipment and infrastructure at ports. Crucially, the program's 2024 guidance explicitly defines "Dry Ports"—intermodal truck-rail facilities like BIG—as eligible facilities if they handle sufficient freight volume. BNSF is an eligible partner for these grants, which can cover up to 90% of the cost for zero-emission cargo handling equipment (like electric RTGs), drayage trucks, and railyard switchers. The DEIR rejects electric equipment without analyzing whether this $3 billion fund could offset the infrastructure costs. (EPA Clean Ports Program, https://www.epa.gov/ports-initiative/clean-ports-program)

3. DOT Railroad Rehabilitation & Improvement Financing (RRIF) The DEIR overlooks financing mechanisms designed to make infrastructure upgrades manageable. The RRIF program provides long-term, low-interest loans and loan guarantees specifically for the development of railroad infrastructure, including the acquisition and rehabilitation of intermodal or rail equipment. RRIF can finance up to 75% of total project costs. This financing could be applied to the capital-intensive portions of the project, such as the construction of an intermittent catenary on Cajon Pass or necessary grid upgrades. (DOT RRIF Eligibility and Application, https://www.transportation.gov/buildamerica/financing/rrif/applying-rrif)

4. EPA Diesel Emissions Reduction Act (DERA) Additionally, the EPA's DERA program provides funding to reduce emissions from locomotives, including replacing older units with newer zero-emission technologies. DERA grants can reimburse up to 45% of the cost of a zero-emission switcher locomotive replacement. This program has a proven track record of funding marine vessel and drayage truck replacements that yield significant NOx reductions. (EPA DERA National Grants, https://www.epa.gov/dera/national)

C. State and Utility Incentives Omitted

Beyond federal support, the DEIR fails to account for California's robust suite of zero-emission incentive programs.

1. CARB Clean Off-Road Equipment Voucher Incentive Project (CORE) Administered by CARB, CORE provides point-of-sale vouchers for zero-emission off-road equipment. Eligible equipment includes railcar movers and switcher locomotives, which can receive vouchers of up to $1 million per unit. Cargo handling equipment, such as RTGs, is also eligible for up to $500,000 per unit, plus additional funding for infrastructure. By ignoring this program, the DEIR dismisses electric switchers and cranes as too costly, disregarding the fact that state funding is available to drastically reduce their upfront capital cost. (CARB CORE Eligibility, https://ww2.arb.ca.gov/our-work/programs/clean-off-road-equipment-voucher-incentive-project)

2. CARB Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) Similarly, the HVIP program provides substantial vouchers for Class 8 zero-emission drayage trucks. Base vouchers for Class 8 trucks are $120,000, with small fleet vouchers reaching up to $330,000 per truck. Fuel cell trucks are eligible for even higher

amounts, up to $420,000. The DEIR dismisses zero-emission trucks as "speculative," ignoring that this funding is actively deploying these very technologies today. (California HVIP Eligible Vehicles, https://californiahvip.org/vehicles/)

3. Trade Corridor Enhancement Program (TCEP) The California Trade Corridor Enhancement Program provides funding for infrastructure improvements on federally designated freight corridors. Recent awards include over $13 million for rail system efficiency and emission reduction projects at the Port of Los Angeles. As a critical link in the national supply chain, the LA-Barstow corridor is a prime candidate for TCEP infrastructure grants to support rail electrification or charging infrastructure. (California Trade Corridor Enhancement Program, https://catc.ca.gov/programs/trade-corridor-enhancement-program)

4. SCE Charge Ready Transport Program The DEIR claims that electrical infrastructure constraints make electrification infeasible, but fails to analyze utility programs designed to pay for those exact upgrades. The Southern California Edison (SCE) Charge Ready Transport program provides "make-ready" infrastructure support. Under the "SCE-Built" option, the utility designs, builds, and pays for the infrastructure on both sides of the meter at no cost to the customer. Alternatively, customers can receive a rebate covering up to 80% of customer-side infrastructure costs. This program could offset millions of dollars in infrastructure costs for the drayage truck charging and electric hostler charging stations the DEIR deems "infeasible." (SCE Charge Ready Transport, https://crt.sce.com/program-details)

5. Low Carbon Fuel Standard (LCFS) Credits Furthermore, by operating electric locomotives and equipment, BNSF would generate Low Carbon Fuel Standard (LCFS) credits. These credits provide a continuous revenue stream that effectively lowers the operating cost of electricity. Owners of EV chargers are eligible to generate credits based on the amount of fuel dispensed, which can then be sold on the open market. The DEIR's failure to calculate this revenue stream in its lifecycle cost analysis renders its finding of "economic infeasibility" legally invalid. The City must revise the DEIR to include a "Net Cost" analysis that factors in these available incentives. (CARB LCFS Credit Generation, https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/lcfs-credit-generation-opportunities)

XI. Applicant Financial Capacity

BNSF is not operating on thin margins or struggling to finance capital projects. Its parent company's SEC filings show that it is one of the most profitable transportation companies in North America, with profit margins that look more like a major tech platform than a trucking carrier.

According to Berkshire Hathaway's most recent Form 10-K, BNSF generated $23.44 billion in revenue and $5.03 billion in net earnings in 2024, for a net profit margin of roughly 21 percent (Berkshire Hathaway Inc., Form 10-K for the year ended Dec. 31, 2024, BNSF segment table). That result is not a one-off: Berkshire's 2023 annual report shows BNSF earned $5.09 billion on $23.88 billion of revenue in 2023, essentially the

same 21 percent margin. Quarterly results confirm the pattern. In the third quarter of 2024, BNSF reported $5.88 billion in operating revenue and $1.38 billion in net earnings, an annualized margin again in the low-20s (Berkshire Hathaway Inc., Form 10-Q for the quarter ended Sept. 30, 2024, BNSF segment data). In other words, after paying all wages, fuel, maintenance, depreciation, interest, and taxes, BNSF is consistently clearing about one dollar of pure profit for every five dollars of revenue.

When that level of profitability is set alongside BNSF's peers, its financial capacity becomes even clearer. United Parcel Service (UPS), one of the most efficient and respected logistics firms in the world, reported $90.96 billion in revenue and $6.71 billion in net income in 2023, a net margin of roughly 7.4 percent (UPS, Form 10-K for the year ended Dec. 31, 2023, Statements of Consolidated Income). J.B. Hunt Transport Services, a leading trucking and intermodal carrier, reported $12.09 billion in 2024 revenue and $570.9 million in net earnings, a net margin of only about 4.7 percent (J.B. Hunt Transport Services, Inc., Form 10-K for the year ended Dec. 31, 2024, Management's Discussion and Analysis). Compared to these trucking and parcel giants, BNSF's roughly 21 percent margin is three to five times higher—a level of profitability that few transportation companies approach.

Even when compared to a global technology leader, BNSF does not look underpowered. Alphabet Inc. (Google), often cited as one of the most profitable companies in the world, reported $350.0 billion in revenue and $100.1 billion in net income in 2024, for a net margin of about 28.6 percent (Alphabet Inc., Form 10-K for the year ended Dec. 31, 2024, Executive Overview table). BNSF's twenty-plus percent margin is not far behind a company like Google, and it is dramatically higher than the margins of UPS and J.B. Hunt. Financially, BNSF sits in a small group of firms that routinely generate double-digit net margins and billions in annual profits.

BNSF's capital-spending patterns underscore how much room it has to invest in cleaner operations. Berkshire's 2024 annual report notes that BNSF spends billions of dollars per year in capital expenditures—over $3 billion annually in recent years—to maintain and expand its network (Berkshire Hathaway Inc., 2024 Form 10-K, BNSF MD&A). These investments are already part of business as usual and are funded out of current earnings. Against that backdrop, the additional capital needed to electrify switchers, adopt battery-electric line-haul locomotives on a single corridor, deploy electric RTGs, and support zero-emission truck infrastructure at BIG is modest. For a railroad earning about $5 billion per year in net profit with a net margin in the low-20s, the suggestion that it cannot afford to build the project in a green fashion is not credible. CEQA's feasibility standard explicitly takes economic factors into account; here, BNSF's own SEC-reported financials show that it has more than enough capacity to fund zero-emission alternatives and mitigation measures at BIG without jeopardizing its financial health.

XII. Information Required for a Complete and Reproducible Analysis

To allow for a true understanding by the public of the Project and to enable a robust alternatives analysis, the Draft EIR should be revised to include all the information noted previously, including the following information:

- Full operational locomotive data, including westbound tonnage, duty-cycle distributions, and dwell times
- Identification of which switcher fleet assumptions underlie emissions and health-risk modeling
- All AERMOD and Corridor Emissions Model electronic input and output files
- Integrated, facility-wide coincident load modeling outputs and time-series data sufficient to reproduce peak demand results
- Battery Energy Storage System specifications, including MW rating, MWh capacity, duration, and dispatch logic
- Complete solar generation analysis, including maximized and sensitivity scenarios
- All crane and RTG electrification assumptions and associated load curves
- Full diesel generator specifications, including stack parameters and modeling inputs
- Disclosure of hour-by-hour emission rate profiles and operational overlap assumptions used to generate short-term concentration results
- Corridor-wide cumulative health-risk assessment incorporating major railyards and rail traffic growth
- Ozone formation and secondary pollutant modeling
- Comprehensive, lifecycle-based analysis of feasible electrification alternatives
- Economic analysis incorporating available federal, state, and utility incentives
- Sensitivity analysis of charging power assumptions and operational strategies
- Discussion of regulatory and permitting pathways that could affect implementation timelines

XIII. Conclusion

Taken together, the record demonstrates that the Draft EIR omits and inconsistently presents foundational information necessary to understand the Project and evaluate its impacts. Across core subject areas, including rail operations, energy demand, emissions modeling, cost assumptions, and cumulative health impacts, the Draft EIR relies on undisclosed inputs, unresolved internal inconsistencies, and single-scenario assumptions that cannot be independently verified. These gaps are not minor or isolated; they affect nearly every downstream conclusion regarding feasibility, cost, emissions, and public health.

The concerns raised in this letter are reinforced by detailed scoping and comment letters from CARB, EPA, the California Attorney General, and South Coast AQMD, agencies with specific technical expertise in air quality, climate policy, and environmental review. Those agencies requested clearer operational assumptions, reproducible modeling inputs, and meaningful evaluation of zero-emission and electrification alternatives. The Draft EIR, as currently structured, does not fully respond to those requests or explain why the requested analyses could not be performed.

As a result, the Draft EIR does not provide a clear, stable, and transparent description of how the Project would actually operate, how emissions and energy use would occur over time, or how feasible alternatives would compare on a lifecycle basis. Without that

information, the public cannot meaningfully assess the Project's environmental consequences, and decision-makers cannot evaluate the relative merits of the proposed design versus cleaner, potentially feasible alternatives.

A revised environmental analysis that discloses complete operational inputs, reconciles internal inconsistencies, provides reproducible modeling data, and evaluates electrification and other zero-emission strategies on an equal footing would materially improve the informational value of the document. Only with that level of transparency can the environmental review serve its intended purpose of informing public understanding and supporting well-reasoned decision-making.

Respectfully submitted,

/s/

Hal Connolly

Founder & Principal Consultant

Connolly Insights LLC

Submitted as expert technical comments on the Draft Environmental Impact Report for the Barstow International Gateway Project

Appendix 1: Resume

HAL CONNOLLY
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SUMMARY

Transportation and energy policy expert with over 20 years of experience across the federal executive branch, U.S. Senate, and private manufacturing sector. Former Senior Advisor at the Federal Railroad Administration (FRA) responsible for designing the agency's first climate resilience programs and mapping tools for railyard pollution. Primary contributor to federal roadmaps on freight rail decarbonization. Deep expertise in statutory analysis, environmental reviews, and the feasibility of zero-emission propulsion systems.

EXPERIENCE

Connolly Insights LLC, Washington, DC
Founder & Principal Consultant | Aug 2024 – Present
- Provide technical and strategic advice to environmental organizations and community stakeholders regarding freight rail policy and infrastructure projects.
- Analyze regulatory filings to identify gaps in air quality modeling and mitigation proposals.
- Advise clients on grantmaking opportunities to reduce air pollution.

Qcells North America, Washington, DC
Vice President, Head of Public Policy and Government Relations | 2023 – 2024
- Directed federal policy strategy for one of the nation's largest renewable energy manufacturers, overseeing supply chain resilience and domestic content compliance.
- Analyzed industrial capacity for energy storage and battery manufacturing, providing insight into the supply chain realities required for heavy-industry decarbonization (relevant to battery-electric locomotive feasibility).
- Secured favorable guidance on Inflation Reduction Act (IRA) incentives, unlocking $3 billion in U.S. manufacturing investment.

Federal Railroad Administration (USDOT), Washington, DC
Senior Advisor for Climate and Sustainability | 2022 – 2023
- Served as a primary contributor to *An Action Plan for Rail Energy and Emissions Innovation* (Dec 2024), a joint U.S. DOT and U.S. DOE report establishing federal benchmarks for locomotive technology and decarbonization pathways.
- Designed and launched the FRA's first dedicated climate and sustainability program, embedding decarbonization priorities into agency planning and grant criteria.
- Oversaw the development of data-driven mapping tools to identify rail yard pollution impacts on environmental justice communities, facilitating targeted mitigation strategies.

The Climate Reality Project, Washington, DC
Policy Director; SVP, Programs (2015–2022)

- Managed an $11 million budget and a 30-person team to advance federal climate policy and clean transportation advocacy.
- Spearheaded technical advocacy for the creation of the National Climate Bank ($27B) within the Inflation Reduction Act.
- Led public engagement campaigns supporting strong EPA emissions standards for light and heavy-duty vehicles.

U.S. Senate – Foreign Relations Committee & US Senate Personal Office, Washington, DC
Senior Professional Staff Member; Senior Policy Director; Legislative Counsel | 2007 – 2015

- Drafted and helped pass the transit title of MAP-21, creating new transit-oriented development programs, expanding FTA safety oversight, and securing $70M annually in additional transit formula funding for New Jersey.
- Led Senate office efforts to secure a $60B Superstorm Sandy relief package, including infrastructure and resilience funding.
- Drafted and passed the Energize Africa Act, improving energy access in Africa, emphasizing distributed solar.

Cahill Gordon & Reindel LLP, New York, NY
Associate, Commercial Litigation | 2002 – 2006

- Litigated complex antitrust and insurance cases; developed the rigorous analytical skills necessary for reviewing detailed regulatory filings and environmental assessments.

EDUCATION

Yale University – Center for Business and the Environment
Certificate, Financing and Deploying Clean Energy, 2022

New York University School of Law
J.D., cum laude, 2002

Oberlin College
B.A., Politics, High Honors, 1997

AREAS OF EXPERTISE

- Freight Rail Decarbonization & Technology
- Environmental Review & Air Quality Analysis
- Department of Transportation and Surface Transportation Board (STB) Regulatory Processes
- Federal Infrastructure Funding
- Supply Chain & Manufacturing Policy

Appendix 2: Planning-Level Electricity Cost Ranges for an All-Electric BIG (2028–2050)

This section provides a planning-level estimate of the effective cost of electricity for a fully electrified Barstow International Gateway (BIG) under both the unmitigated and mitigated solar scenarios described in the Draft EIR. The purpose is not to predict a precise tariff outcome, but to establish a defensible range of electricity costs that reflects (1) utility imports under time-of-use (TOU) pricing, (2) on-site solar generation costs, (3) the use of battery energy storage (BESS) and scheduling to mitigate on-peak exposure, and (4) Barstow's excellent solar resource. Because the DEIR does not provide 8,760-hour load profiles or BESS specifications, this analysis uses transparent assumptions anchored in DOE and EIA benchmarks and the DEIR's own annual energy figures.

1. Energy supply assumptions from the DEIR

The BIG Utility Assessment provides the following relevant annual energy figures:

- Ground-mounted solar farm: 21 MW producing approximately 49,200 MWh/year (Appendix 5.17 BIG1 Utility Assessment, Table 16, p. 65).
- Rooftop solar (Title 24): 6.4 MW in the unmitigated case (Appendix 5.17 BIG1 Utility Assessment, p. 66).
- Additional rooftop solar under Mitigation Measure MM BIG EN-1: +17 MW, yielding approximately 23.4 MW of rooftop PV in the mitigated case (Appendix 5.17 BIG1 Utility Assessment, Table 16, p. 65).
- Total facility load (existing electric demand): approximately 145,258 MWh/year (Appendix 5.17 BIG1 Utility Assessment, Table 16, p. 65).

Using the implied capacity factor of roughly 26.7 percent from the 21 MW solar farm, total annual on-site PV generation is approximately 64–68 GWh/year in the unmitigated case (21 MW farm + 6.4 MW rooftop) and approximately 100–105 GWh/year in the mitigated case (21 MW farm + 23.4 MW rooftop).

2. All-electric annual load and PV share

As shown in the preceding analysis, converting the Project's diesel energy use to electricity and adding existing electric loads yields an all-electric annual demand of approximately 377 GWh/year in the Horizon Year 2048.

• Unmitigated PV supplies roughly 17 percent of total annual energy.
• Mitigated PV supplies roughly 28 percent of total annual energy.

3. Utility import price assumptions (TOU-mitigated)

For utility-supplied electricity, this analysis uses a planning-level blended price range that reflects large-customer TOU tariffs mitigated by BESS and smart scheduling. As an anchor, the U.S. Energy Information Administration reports an average California industrial retail electricity price of 21.53 cents/kWh in 2024 (EIA, Electric Power Monthly, Table 4).

With PV and BESS deployed to shift charging and other flexible loads out of the most expensive on-peak windows, a reasonable long-run effective import price range is approximately $0.12–$0.25 per kWh.

4. On-site solar generation cost assumptions

For on-site solar generation, this analysis relies on U.S. Department of Energy PV cost benchmarks. DOE reports utility-scale PV levelized costs of roughly $47/MWh nationally and notes that desert Southwest locations such as Barstow typically experience approximately 30 percent lower LCOE due to higher insolation. Rooftop commercial PV benchmarks are higher but similarly benefit from desert solar resources (U.S. DOE, PV Cost Benchmark Q1 2024).

To reflect BIG's mix of ground-mounted and rooftop PV, a conservative on-site solar cost range of approximately $0.035–$0.07 per kWh is used.

5. Blended electricity cost ranges

The effective all-in electricity cost is calculated as a weighted average of utility imports and on-site PV generation, using the PV shares described above.

Scenario	PV share of energy	Import share	Assumed import price range	Assumed PV cost range	Resulting all-in electricity cost range
Unmitigated DEIR solar	≈17%	≈83%	$0.12–$0.25/kWh	$0.035–$0.07/kWh	≈$0.11–$0.22/kWh
Mitigated DEIR solar (MM BIG EN-1)	≈28%	≈72%	$0.12–$0.25/kWh	$0.035–$0.07/kWh	≈$0.10–$0.20/kWh

6. CEQA implications

These ranges demonstrate that, even under conservative assumptions, the effective cost of electricity for an all-electric BIG falls in a plausible and bounded range that is comparable to the cost of diesel energy displaced. Importantly, the DEIR does not perform any comparable analysis. It does not disclose TOU tariffs, demand charges, or

BESS dispatch strategies, nor does it evaluate how on-site solar and storage can reduce exposure to on-peak pricing.

An agency may not dismiss electrification alternatives based on conclusory claims about power costs or grid limits without substantial evidence. The simple arithmetic shown here—using the DEIR's own energy figures and publicly available DOE and EIA cost benchmarks—demonstrates that electricity cost is not a barrier to full electrification at BIG and should have been analyzed explicitly in the Draft EIR.