January 12th, 2026

Chris Heldreth
Community Development Director
City of Barstow
220 East Mountain View Street, Suite A
Barstow, California 92311
generalplan@barstowca.org

Re: Comments on City of Barstow General Plan and BNSF Barstow International Gateway (BIG) Draft Environmental Impact Report (SCH No. 2024020501)

Dear Mr. Heldreth,

Californians for Electric Rail is an all-volunteer association advocating for cleaner and more abundant passenger and freight rail via rail electrification. We have members throughout the state of California, including the South Coast Air Basin (SCAB), some of whom live near freight lines and/or highways that will be impacted by the BIG.

The Draft Environmental Impact Report for the Barstow International Gateway (BIG) finds significant air quality impacts for rail yard operations, yet recommends no mitigations related to the largest sources of emissions - trains and trucks. The DEIR dismisses electric trains and trucks as infeasible based on justification that does not hold up to scrutiny.

The DEIR finds that the BIG would increase criteria pollutant emissions in the Mojave Desert Air Basin area, considerably above acceptable thresholds, even with mitigations (Table 5.3-26). In particular, rail corridor emissions within the local area would significantly increase. Truck emissions are also projected to be substantial, with truck emissions alone nearly reaching MDAB thresholds.

Despite the DEIR's dismissal of truck electrification as infeasible, an increasing number of battery electric and other zero-emissions powertrain trucks are already in service in the SCAB to serve customers throughout the region. These trucks are able to operate from ports, logistics centers/warehouses, railyards, and other customers in the region with routes that span dozens of miles per trip. With one of the stated goals of BIG being to provide a consolidated location for easy transloading of goods directly on the site, it would be entirely within the range capabilities of the existing zero-emissions options to serve the Project, and there will undoubtedly be improvements in the future such that it could become more feasible for trucks in the wider High Desert area and even beyond to be able to make journeys to BIG on a charge. Therefore, it is imperative that at a bare minimum, the buildout of BIG provides spare conduit and switchgear

connections for a robust collection of charging infrastructure to be installed at later dates in the future.

The DEIR's dismissal of battery switcher locomotives also rests on erroneous assumptions. While there have not been any battery locomotives produced over 2.4 MWh, several manufacturers offer them along with 1.2-1.4 MW chargers. Smart chargers with dynamic load sharing are already proven in the road vehicle space, and that same technology could be used to allow charging to share a limited capacity to start with and grow as the fleet of zero emissions battery equipment grows and additional power projects are completed. Decreasing the size of each shift but with more shifts can also reduce the amount of vehicles needing to charge at once. Finally, batteries could be installed between the grid and chargers to smooth demand and provide resilience in case of a grid outage. As a large industrial customer, BNSF would not be subjected to the same level of dynamic pricing consumers face. Battery technology continues to improve, and despite concerns stated in the DEIR about commercial availability, dozens of battery switcher demonstration projects have launched around the country with promising results[1], including by Pacific Harbor Line, which operates at the ports, and by BNSF itself in 2022[2]. Outcomes of BNSF's battery switcher trial are highly relevant to the Project yet are omitted from the DEIR - why? While the DEIR discusses use of Tier 4 switchers, it is unclear whether this is a legally-binding commitment. The Final EIR should include battery electric switcher operations as a mitigation.

Additionally, while the DEIR finds that net emissions in the South Coast Air Basin (Table 5.3-25) would decrease, the decrease is entirely attributable to an inferred reduction in truck emissions. While reduced truck activity and rail modal shift would be an ideal outcome, that outcome is far from certain and subject to complex economic factors and operational choices by BNSF that are out of the scope of the Project. If BIG has no impact on truck modal shift, the induced rail corridor emissions change would exceed SCAB thresholds for NOx by 2x, according to the DEIR's own calculations.

The DEIR evaluates and erroneously dismisses various zero emissions alternatives for line haul locomotives, including the use of overhead catenary (OCS). However, this is a critical error and a missed opportunity to address significant impacts of the Project, particularly on the path from the San Pedro Bay Ports to the BIG site itself in Barstow. Contrary to the characterization provided in the DEIR, electrification is a proven solution for freight and is used in US-analogue applications in Russia, South Africa, and India (which has recently completed an undertaking to electrify virtually their entire network over the last decade[3] and runs double-stack container

[1] "Watco Electric Switchers Receive High Marks", *Railway Age*, 2023 https://www.railwayage.com/freight/short-lines-regionals/watco-electric-switchers-receive-high-marks/
[2] "Progress Rail to Supply BNSF with Zero Exhaust Emission Locomotives to Demonstrate in Southern California" Progress Rail, 2022 https://www.progressrail.com/en/Company/News/PressReleases/ProgressRailtoSupplyBNSFwithZeroExhaustEmissionLocomotivestoDemonstrateinSouthernCalifornia.html
[3] Mission 100% Electrification: Powering the Future of Indian Railways

trains on flatcars[4] which makes their double-stack trains appreciably taller than American double-stack trains), and by domestic Class I railroads historically (e.g. Milwaukee Road, Conrail).

It is perplexing to see the DEIR claim (p. 5.3-110) that "[c]atenary lines are impractical since this would involve laying thousands of miles of electrified lines the distance of the rail" given the proposal that some BIG traffic would be served via a shuttle service from the Ports using a dedicated fleet of Tier 4 locomotives (p. 3-54). Though it certainly is true that the entirety of the BNSF network spans tens of thousands of miles, that is not relevant for the Project. The Ports are not "thousands of miles" from Barstow, they are less than 200, a far more manageable and realistic distance for the installation of catenary. In previous studies by the Southern California Regional Rail Authority (Metrolink)[5] and SCAG,[6] Barstow has been identified as a logical endpoint for electrification of the BNSF Southern Transcon in the Southern California region because it is a location where rail operations already frequently add or remove locomotives from trains as they traverse the Cajon Pass. Thus, adding or removing electric locomotives there would not represent a substantial departure from current BNSF operations. However, those studies considered the case of electrification under the assumption that the traffic would be leaving the region.

In fact, BIG *bolsters* the case for electrification of the BNSF Southern Transcon from the Ports all the way to Barstow as Barstow would be the destination of Project trains, not merely a place where locomotives would be added or removed. The DEIR states that 15% of the BIG's containers would be delivered via a dedicated shuttle service to the ports using a dedicated fleet of Tier 4 locomotives. Providing this shuttle service using locomotives powered electrically via overhead contact system (OCS) rather than Tier 4 would cut GHG emissions and criteria pollutants in both SCAB and in the MDAB by at least 15%. Short-haul freight shuttle trains between the Ports of LA/Long Beach and the Barstow area are a practical use-case for a local fleet of 'captive' electric locomotives. Thus, zero-emissions locomotives are in fact a feasible mitigation for the air quality and GHG impacts of the Project and their use and inclusion needs to be studied in the EIR.

Additionally, it would be extremely beneficial for BNSF to also consider taking advantage of the provision of catenary from Barstow to the Ports to greatly reduce their emissions for all trains in the region by using locomotives that could operate in dual-modes, either battery-catenary (charging in motion on electrified segments, with smaller batteries than the pure battery concept discussed in the DEIR) or diesel-catenary. This would better amortize both the expense of catenary installation and maintenance as well as provide a broader use for the pool of locomotives for the captive fleet which would provide a more versatile and useful fleet.

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[4] "WAG9 VS WAG12 WITH DOUBLE STACK CONTAINER INDIAN RAILWAYS", YouTube.com. https://www.youtube.com/watch?v=3BbdDzkMYJs

[5] https://libraryarchives.metro.net/dpgtl/Metrolink/1992-Findings-SoCal-Accelerated-Rail-Electrification.pdf

[6] "Analysis of Freight Rail Electrification in the SCAG Region", SCAG. https://scag.ca.gov/sites/default/files/2024-05/crgmsais_-_analysis_of_freight_rail_electrification_in_the_scag_region.pdf

Rather than the thousands of miles of catenary claimed by the DEIR, this service would require substantially less. Electrifying the 22 mile Alameda Corridor[7] from the ports to Los Angeles, the 70-mile San Bernardino Subdivision from Los Angeles to San Bernardino[8], and the 81.4-mile Cajon Subdivision from San Bernardino to Barstow yard[9] would allow 100% zero-emissions operations of the proposed shuttle service using only 171 route miles of overhead catenary. Additional extensions of catenary to Union Pacific's Yermo railyard and BNSF's Newberry sidings would provide a convenient location allowing additional space for interchanging, and staging, diesel and electric locomotives, allowing transfer to diesel for long-haul transport on unelectrified lines (i.e. the rest of the BNSF network). In these areas, there is ample vacant land along the tracks for new staging yards and siding tracks, which would allow locomotive interchanges and additional block swaps while avoiding congestion at BIG and the existing Barstow yard. Future electrification along the BNSF Mojave Subdivision towards Hinkley, Boron and beyond is also possible, which would expand zero-emissions operations and provide further emissions reductions.

Of these segments, BNSF has already agreed to allow the California High-Speed Rail Authority to install 25 kV overhead catenary over about 22 route miles of track between downtown Los Angeles (Redondo Junction) and Fullerton. This infrastructure will be publicly financed and owned but could be utilized by BNSF at low cost. Electrification of the remainder of the San Bernardino Subdivision, which is shared right of way with Metrolink and Amtrak, is planned for passenger rail in the 2024 State Rail Plan[10], and with BNSF's participation, a similar cost-sharing agreement could be reached. The Alameda Corridor is publicly owned, enabling cost and risk sharing with public support. State and local funding (e.g. the Carl Moyer Program) is also available for zero-emissions rolling stock, further reducing costs to BNSF.

California is emerging as a hub of 25 kV overhead catenary rail electrification development in the United States. In 2024, Caltrain began carrying passengers in Stadler trainsets under 25 kV OCS between San Francisco and San Jose, on track shared with Union Pacific freight trains. Union Pacific also operates freight trains on Metrolink's Valley Subdivision corridor, which will host CHSRA 25 kV OCS wires between LA and Burbank in the future. Construction is slated to begin soon on 25 kV OCS electrification for both Brightline West (between Southern California

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[7] "Electrification of the Alameda Corridor and the San Pedro Bay Port Rail Network- Concept Paper", August 2023
https://calelectricrail.org/wp-content/uploads/2024/11/POLA-Alameda-Corridor-Electrification-concept-paper-BY-2023.08.29.pdf

[8] "A Vision of Electrified Rail in Southern California: Los Angeles to the Inland Empire- plus appendices", August 2023
https://calelectricrail.org/wp-content/uploads/2024/11/SoCal-IE-rail-electrification-BY-appendices-2023.08.29.pdf

[9] "Electrification of the BNSF Cajon Subdivision- plus appendices", January 2025
https://calelectricrail.org/wp-content/uploads/2025/04/Cajon-Sub-OCS-electrification-appendices-BYanity-2025.01.19.pdf

[10] 2024 California State Rail Plan, California Department of Transportation, 2024
https://dot.ca.gov/-/media/dot-media/programs/rail-mass-transportation/documents/california-state-rail-plan/2024-ca-state-rail-plan-a11y.pdf

and Las Vegas) and the initial operating segment of the California High Speed Rail project in the Central Valley.

2050 vision for passenger rail electrification, 2024 California State Rail Plan[10]

There is a wealth of global experience and proven off-the-shelf technology that the U.S. can utilize to address its transportation issues, particularly for rail electrification. While U.S. manufacturing capacity needs to be developed for locomotives and EMU rolling stock and OCS infrastructure, US railroads can tap international engineering, construction and management expertise; many technical papers and books on the latest OCS construction techniques are widely available.The economics and energy efficiency of OCS heavy/frequent freight rail electrification has proven in many applications around the world as having very positive return on investment, in large part due to a substantial reduction in operating and maintenance costs.

The operating and maintenance cost reduction is typically great enough long-term to offset the cost of OCS electrification while also driving improved bottom line results for rail operators (public and private). In terms of overall energy efficiency, conventional electric trains are three times more efficient than diesel or hydrogen, and about 1.2 times more efficient than battery-only trains[11]. According to a March 12, 2023 *Railway Age* article by Mike Iden[12], total 'input-to-wheel' energy conversion locomotive efficiency was calculated to be:

- Catenary wire electric- 90%
- Catenary wire electric with battery tender- 86%
- Battery electric- 77%
- Green hydrogen- 39%
- Diesel with battery tender- 36%

Electric locomotives are associated with lower fuel, maintenance, and other operating costs. Siemens and Alstom are mass producing heavy-duty 25 kV electric freight locomotive drivetrains in India that could be adapted to North American standards. Due to their mass production, it would be easier to find parts, maintenance/repair support from the manufacturers. Two-section Alstom WAG-12 with 12,000 hp (2 x 6,000 hp) or Siemens single-section 9000 hp (6.7 MW) electric locomotive drivetrains developed for Indian Railways should offer the equivalent performance needed by US freight railroads. Four of the 9000 hp units would translate to 26.8 MW total max draw per train (or assuming five rounded to an average max load of about 30 MW). European and Asian electric locomotive drivetrains will need to be converted to American frame/trucks. Frames or other components could be repurposed from existing diesel-electric freight locomotives[13].

Electrifying freight operations on the BNSF Cajon and San Bernardino subdivisions will likely require hundreds of MW of 'at-wheel' electric power, provided by traction power substations each with 150-200 MVA capacity. Efficient and cost-effective utilization of existing power grid infrastructure is key for economical rail electrification, so it is best for new traction power substations to be built as close as possible to existing major electric utility substations. Thankfully many existing large electric utility substations exist along the BNSF mainlines between LA, Fullerton, Riverside, San Bernardino, and the Barstow area. For example, five major existing electric utility substations exist along the Cajon Subdivision fortuitously happen to be adjacent to the track (shown on map below), and connected to existing large-scale solar energy generation and battery energy storage capacity via the regional grid. Californians for Electric Rail has published a Google Map showing existing electric utility substations adjacent to railroad tracks in Southern California, including BNSF's main lines[14]. While the substations may require some upgrades, and new adjacent traction power substations built next to them, the

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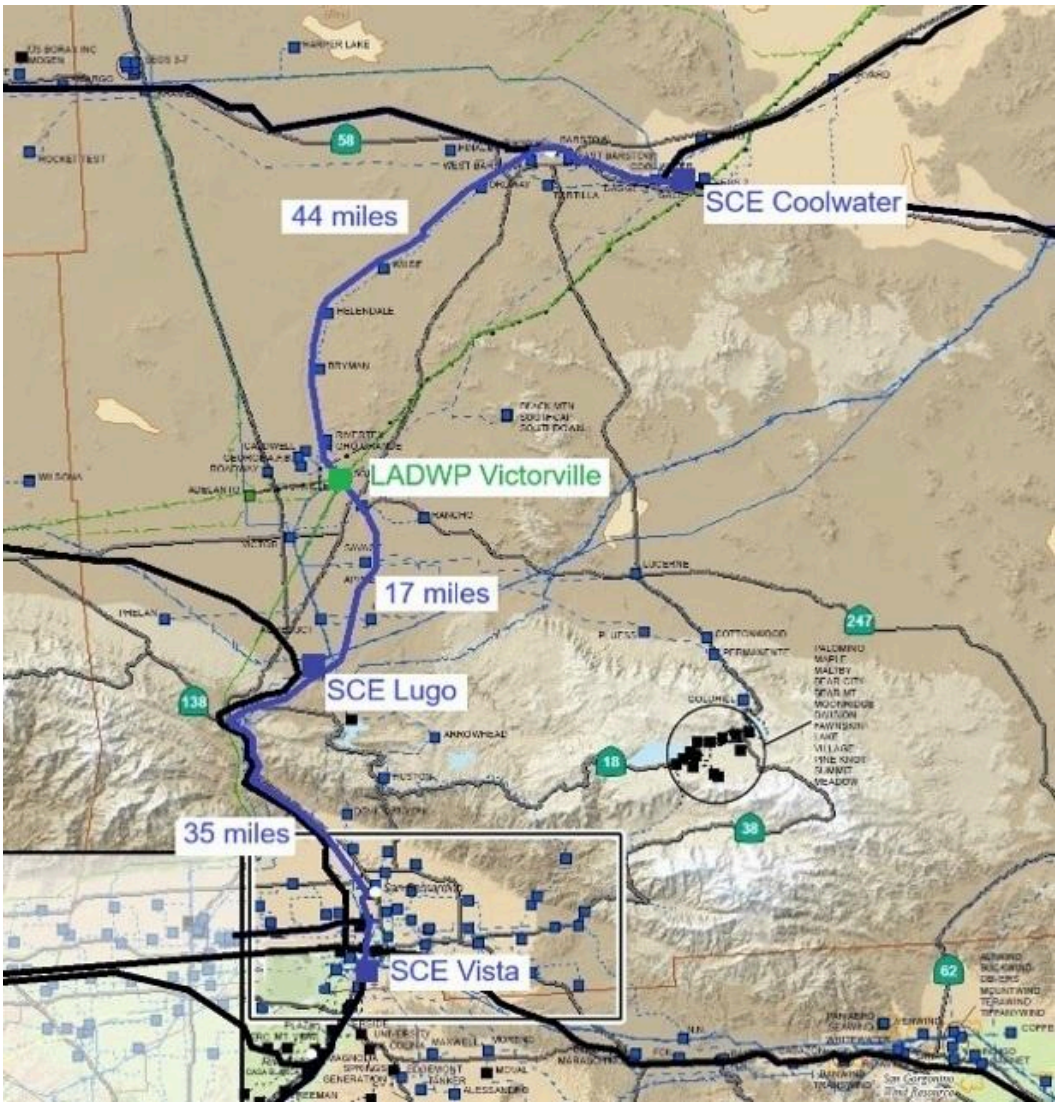
[11] https://www.rssb.co.uk/en/research-catalogue/CatalogueItem/T1145

[12] https://www.railwayage.com/mechanical/locomotives/follow-the-megawatt-hours-hydrogen-fuel-cells-batteries-and-electric-propulsion/

[13] https://railtec.illinois.edu/wp/wp-content/uploads/UIUC-Hay-Seminar_Iden_20240927.pdf

[14] Southern California rail electrification Google My Map: https://www.google.com/maps/d/u/1/edit?mid=15AjsVJEgHQqvnQmprJYIpt7Auq_xmTw&usp=sharing

basic power grid infrastructure is in place for powering an OCS electrification of the Cajon Subdivision. New electric power transmission lines sharing the Cajon Subdivision right-of-way, either buried cables (like the SOO Green[15] and CHPE[16] HVDC projects) or overhead AC power lines (combined with OCS[17]), could be a future revenue source for BNSF.

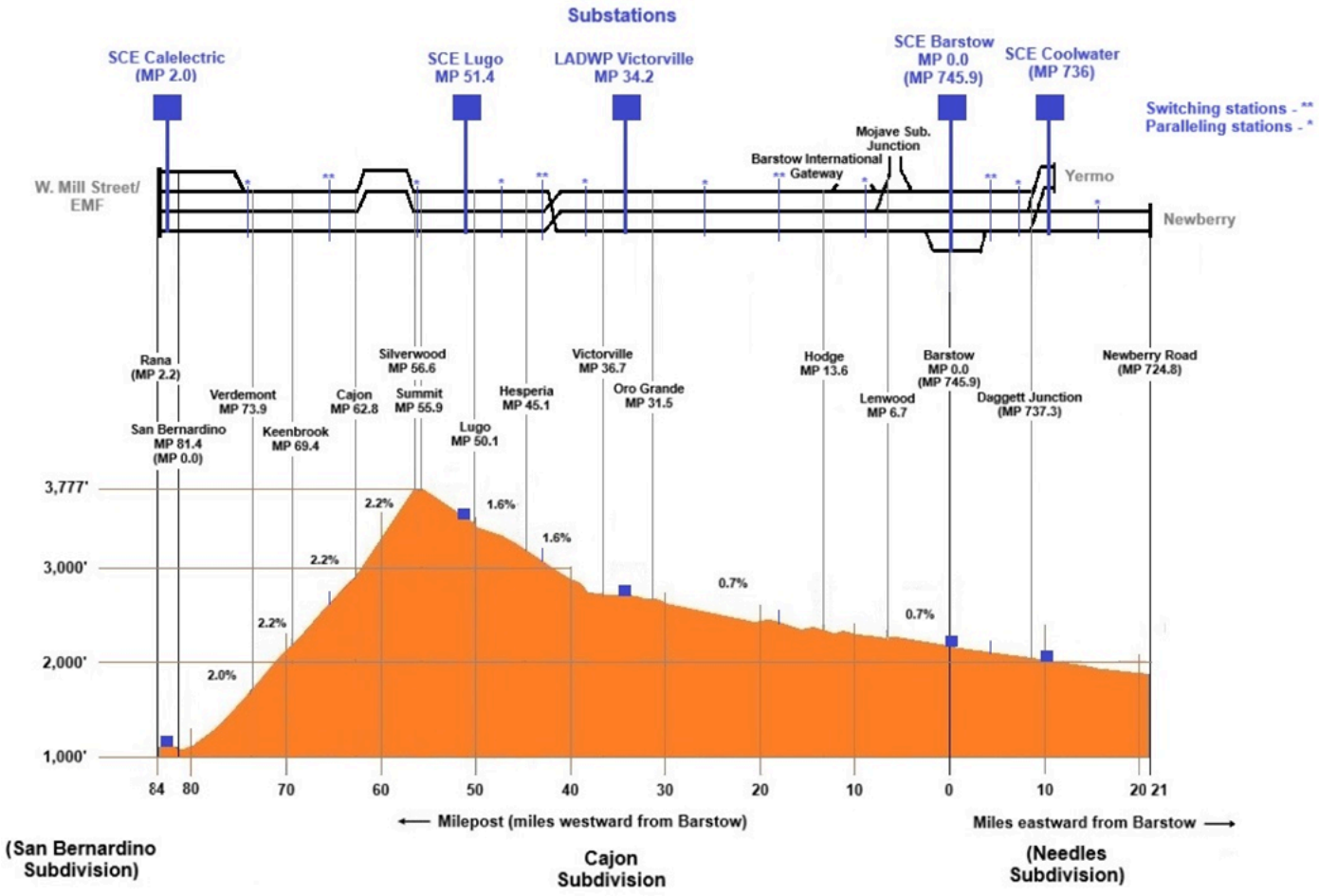


Map showing proximity of existing major substations and related power grid infrastructure to the BNSF Cajon Subdivision (background power grid map from California Energy Commission)

The steep grade of the Cajon Subdivision between San Bernardino (1,053') to Cajon Pass (3,777') climbs over 2,700' in net elevation over a route length of less than 26 miles, as shown on the elevation diagram below. The ruling grade is 2.2%. Such a grade is well-suited to an electric locomotive's many advantages in mountainous terrain, including better adhesion,

[15] https://www.energyre.com/project/illinois/transmission/soo-green
[16] https://chpexpress.com/
[17] https://calelectricrail.org/wp-content/uploads/2026/01/FurrerFrey-66-kV-OCS-combined-mast-Switzerland.jpg

greater power at low speeds, and regenerative braking downhill– as proven by electric freight and passenger rail operations around the world.



The Cajon Subdivision's steep grade, combined with the high number of trains (over 60 per day) even before the BIG is operational, makes it an ideal candidate for electrification, as these factors make it one of the highest fuel usage rail segments in the country. The better uphill acceleration and tractive power of electric locomotives can increase the overall speed of freight trains moving uphill on Cajon Pass, which would increase overall freight volume throughput capacity and enhanced asset productivity. For example, speeding up freight trains going up Cajon Pass (even from average of ~10 mph in the slowest spots to a modest ~15 mph) could significantly increase the capacity of the BNSF Southern Transcon between LA and Chicago, including between the Ports of LA/LB and the BIG.

A 1978 Federal Railroad Administration study on freight rail electrification used a metric for route evaluation not based simply on trains per day, but gross tons of freight per year. The positive rate of return scenarios (18- 21%) modelled were on routes with 70 million and 97 million gross tons per year, which work out to an average of about 19 and 27 freight trains per day (10,000 short tons each), respectively. A 1983 study, "Cost/Benefit Evaluation of Electrification of a U.S. Rail Network", concluded the best single 'surrogate' for main economic

factors of rail electrification was annual fuel consumption per route-mile, although variables uncorrelated with fuel consumption (e.g. bridge clearance and signal and communication compatibility) were still significant cost factors[18]. It should be remembered that the 1970s-80s era North American coal railroads justified electrification on at most three heavy trains per day.

A 2024 study[19] of the economics of electrifying a longer segment with similar trains per day to the proposed ports to Barstow corridor found positive cost-benefit ratios (1.3-3.7) and a high rate of return (22.9%) for conventional electrification with public support, as is likely here. Cost sharing with utilities could further increase the financial benefit of electrification.

The 1992 regional rail electrification study by the Southern California Regional Rail Authority proposed the Ports of LA/Long Beach freight corridor as one of the highest-priority "candidate routes" for electrification[20]. A 2024 study by the Department of Energy on rail decarbonization also identified the ports to Barstow as part of a key corridor[21]. In summary, electrification of the ports to Barstow is far from infeasible and would be a net benefit for BNSF in addition to air quality.

In addition to engineering design and cost estimates, a technical study is needed on performance and economics of electric locomotive operations between Barstow and San Bernardino, and beyond to both Yermo/Newberry Springs and the Ports of LA and Long Beach. Such a study needs to evaluate how electrification could increase throughput (trains per day) on the Cajon Subdivision while reducing operating and maintenance costs for the BNSF Railway as well as emissions on the corridor.

It is imperative that electric truck charging infrastructure, electric switchers, and line-haul electrification of the Southern Transcon from the ports to Barstow be included as mitigations for the BIG. These investments will substantially improve air quality in the MDAB as well as the SCAB, with the potential for net financial and operational benefit to BNSF as well.

Sincerely,
Adriana Rizzo
Founding Member
Californians for Electric Rail

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[18] C.H. Spenny and G.B. Mott, "Cost/Benefit Evaluation of Electrification of a U.S. Rail Network", Transportation Research Record 939, 1983.
[19] "Modeling the Economics of Modern Options for Mainline Freight Railway Electrification" C. Tyler Dick, Rydell Walthall, Michael Iden, Jim Blaze, 2024
https://railtec.illinois.edu/wp/wp-content/uploads/2024_11_08-Hay-Seminar_Tyler-Dick_compressed.pdf
[20] "Southern California Accelerated Electrification Program", Southern California Regional Rail Authority, 1992
https://libraryarchives.metro.net/dpgtl/Metrolink/1992-ExecSummary-SoCal-Accelerated-Rail-Electrification.pdf
[21] "An Action Plan for Rail Energy and Emissions Innovation", US Department of Energy, 2024
https://www.epa.gov/system/files/documents/2024-12/rail-action-plan-report.pdf