

2026 Inventory Updates: Class I Line Haul & Class I Switchers



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1 Background

This report details California Air Resources Board's (CARB) 2026 emission inventory updates (known as the 2026 update) for Class I line haul locomotives and Class I switchers operating in California. Class I railroads are the largest freight railway companies in the United States, defined by the Surface Transportation Board as carriers earning annual operating revenues exceeding \$1.09 billion¹. BNSF Railway (BNSF) and Union Pacific (UP) Railroads are the two Class I rail companies operating in California, responsible for line haul and switcher railyard activities within the state.

BNSF and UP provided statewide line haul and switcher railyard data for calendar year 2024. The data include gross ton-miles (GTM) for line haul activity and full-time equivalent (FTE) switcher activity at railyards. The railroads also provided line haul average fuel use per GTM. Previous statewide submittals included calendar year 2018 Class I line haul data and calendar year 2019 Class I Switcher railyard data.

This 2026 update uses CARB's 2021 Class I Line Haul Inventory² and 2022 Class I Switcher Rail Yard Inventory³ growth and turnover forecasts, and adjusts the forecast based on activity reported in the new 2024 rail company data submittals. This update does not include changes to growth factors or tier distribution.

Both BNSF and UP acknowledge that the calendar year 2024 data submittals reflect both methodology and operational improvements. Historically, switcher activity may have been overestimated as railroads assumed all locomotives at a yard were operating as switchers and included them in the activity estimates. Current estimates no longer assume all locomotives at a yard operate as switchers since they now use an improved tracking system. The railroads stated that operational changes such as longer trains, using line haul locomotives in place of switchers, and other routing efficiencies have reduced activity and increased efficiency.

1.1 Class I Locomotives Combined Impact

To address operational changes from the rail roads and to get a clearer understanding of Class I locomotive impacts, this section provides graphs that combine the data on both line haul and switcher locomotives. Figure 1 presents changes in the combined statewide fuel use for Class I line haul and switcher locomotives in California. The left bar represents the calendar year 2024 projections from the 2021 line haul and 2022 switcher inventories while

¹ <https://www.stb.gov/reports-data/economic-data/>

² CARB's 2021 Linehaul Inventory Documentation, <https://ww2.arb.ca.gov/sites/default/files/2022-07/2021%20Line-Haul%20Locomotive%20Emission%20Inventory%20%28Final%29%202022%20July%20Update.pdf>

³ CARB's 2022 Switcher Railyard, <https://ww2.arb.ca.gov/sites/default/files/2022-07/2022%20Class%20I%20Switcher%20Emission%20Inventory%20technical%20document%2007112022.pdf>

the right bar is the new rail submittal for calendar year 2024. The calendar year 2024 data submittal shows a 33% reduction in total locomotive fuel use for both line haul and switcher locomotives as compared to 2024 projections from the prior inventories. Line haul makes up a significant portion of fuel use, and therefore emissions, in the state.

Figure 1 Combined Statewide Linehaul and Switcher Fuel Use Comparison

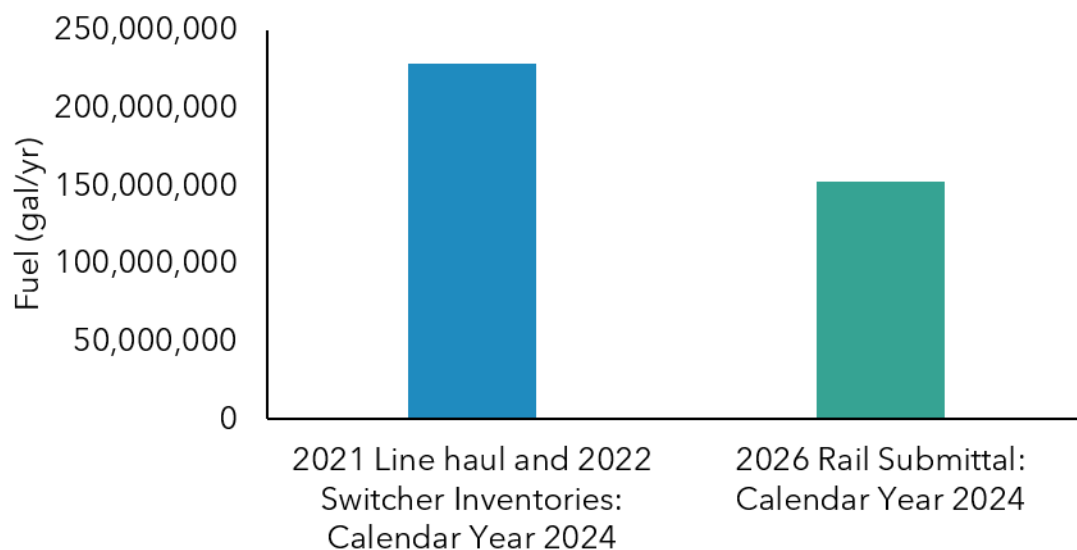


Figure 2 compares the NO_x projections, measured in tons per day (tpd) for the 2021 Line haul and 2022 Switcher inventories, shown in blue, with the 2026 line haul and switcher NO_x projections (known as the 2026 combined update), shown in green, reflecting the applied 33% reduction.

Figure 2 Combined Statewide NO_x Emissions Projections

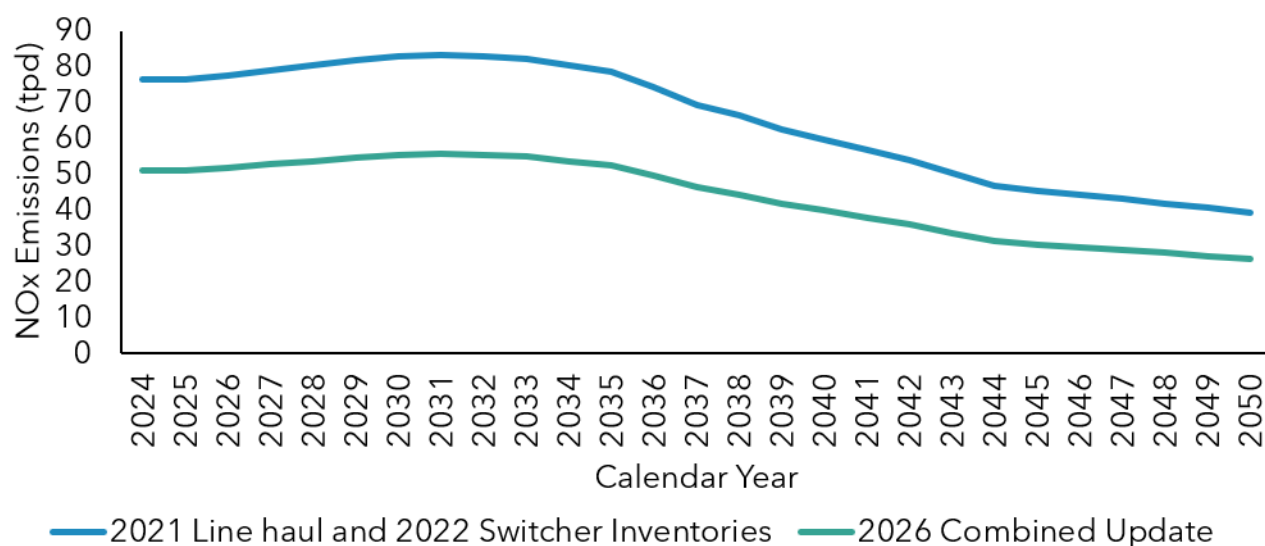
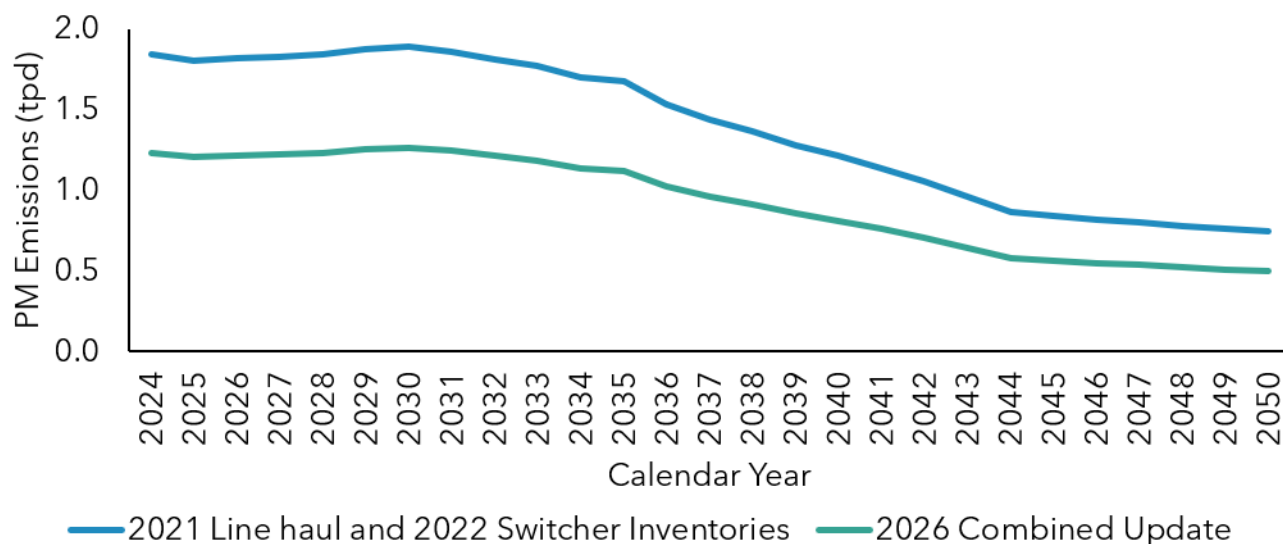


Figure 3 compares the PM projections for the 2021 Line haul and 2022 Switcher inventories, shown in blue, with the updated 2026 PM projection, shown in green, reflecting the applied 33% reduction.

Figure 3 Combined Statewide PM Emissions Projections



Staff calculated the percent reduction in fuel use for both line haul and switcher locomotives for each air district. Figure 4 and Figure 5 show how the 31% reduction in activity and fuel use in South Coast AQMD affects emissions for calendar years 2026, 2031, and 2037. The blue bars represent the emissions projected in the 2021 Line haul and 2022 Switcher Inventories, and the green bars represent the emissions after applying the 31% reduction in fuel use.

Figure 4 Combined South Coast AQMD NOx Emissions Projections Comparison

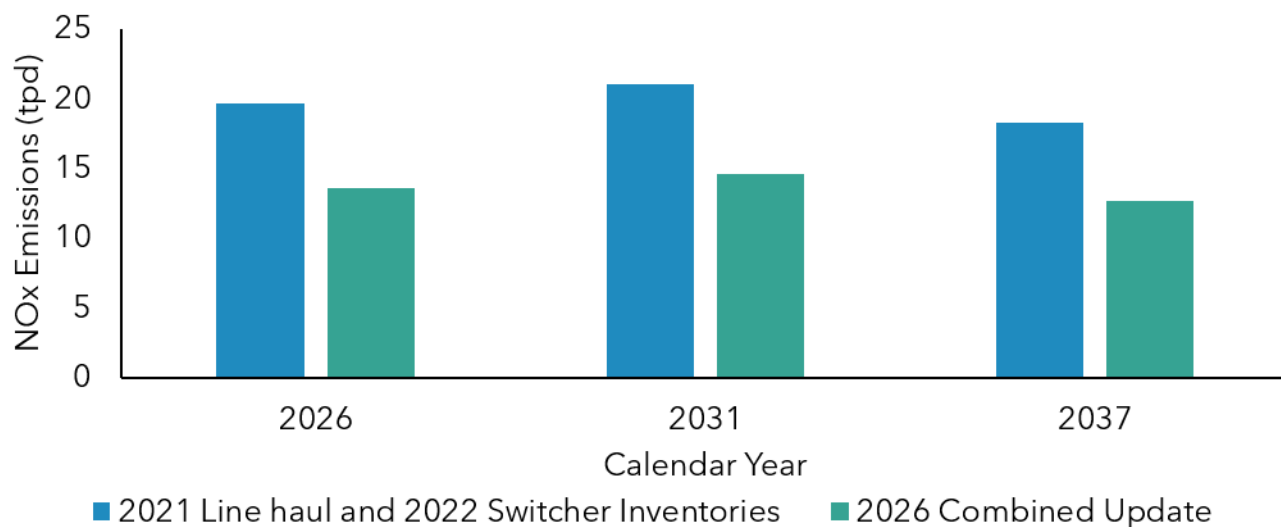
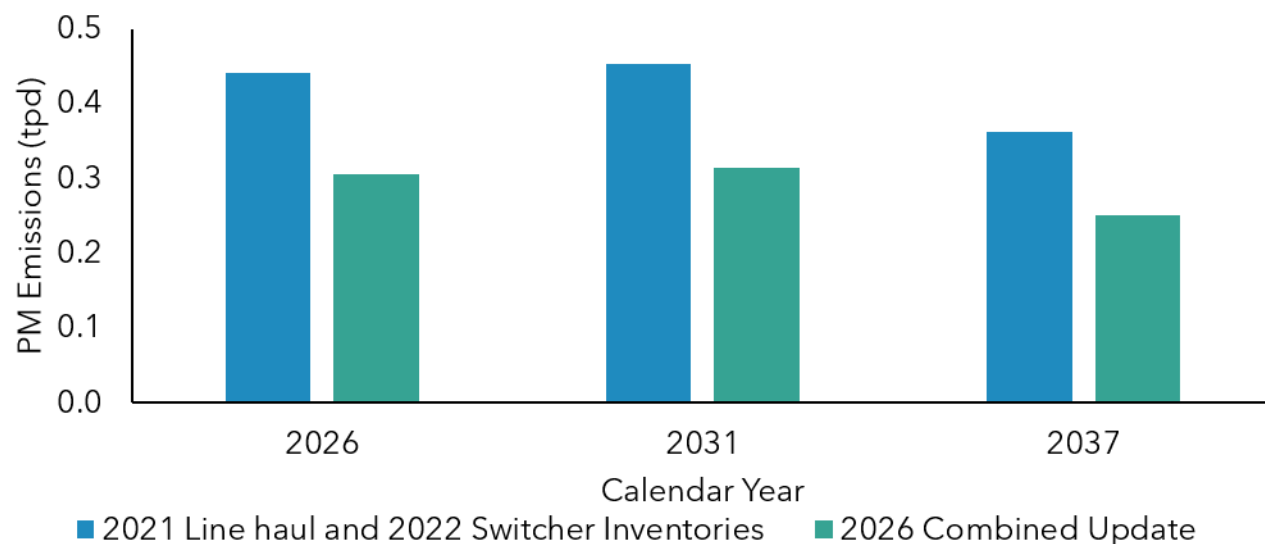


Figure 5 Combined South Coast AQMD PM Emissions Projections Comparison

Staff calculated the percent reduction in fuel use for both line haul and switcher locomotives for each air district. Figure 6 and Figure 7 show how the 46% reduction in activity and fuel use in San Joaquin Valley APCD affects emissions, measured in tons per day, for calendar years 2026, 2031, and 2037. The blue bars represent the emissions projected in the 2021 Line haul and 2022 Switcher Inventories, and the green bars represent the emissions after applying the 46% reduction in fuel use.

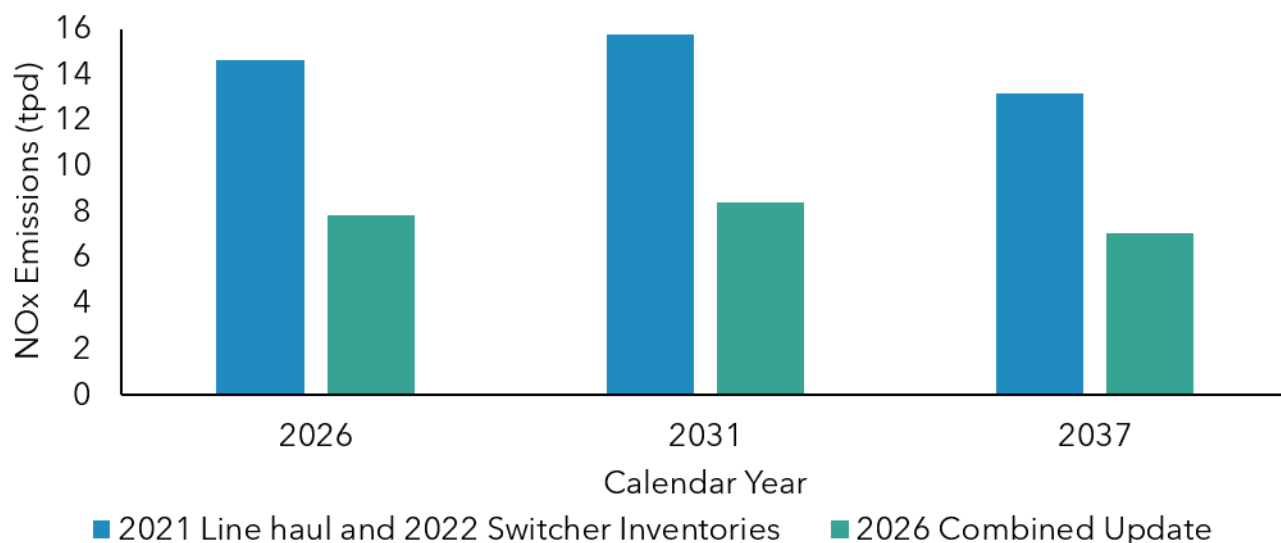
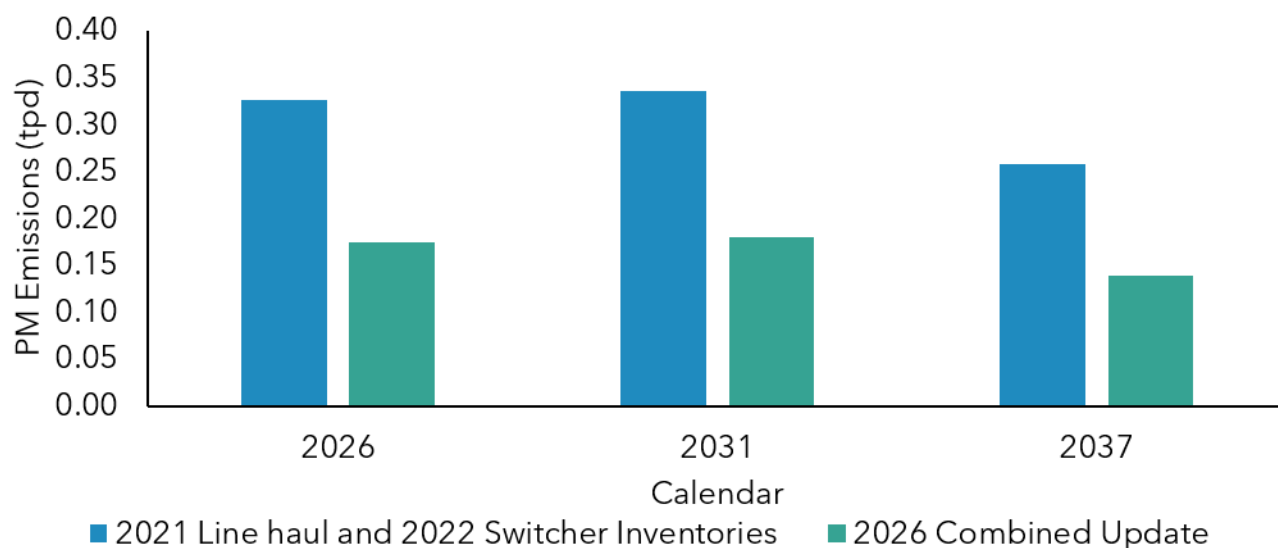
Figure 6 Combined San Joaquin Valley APCD NOx Emissions Comparison

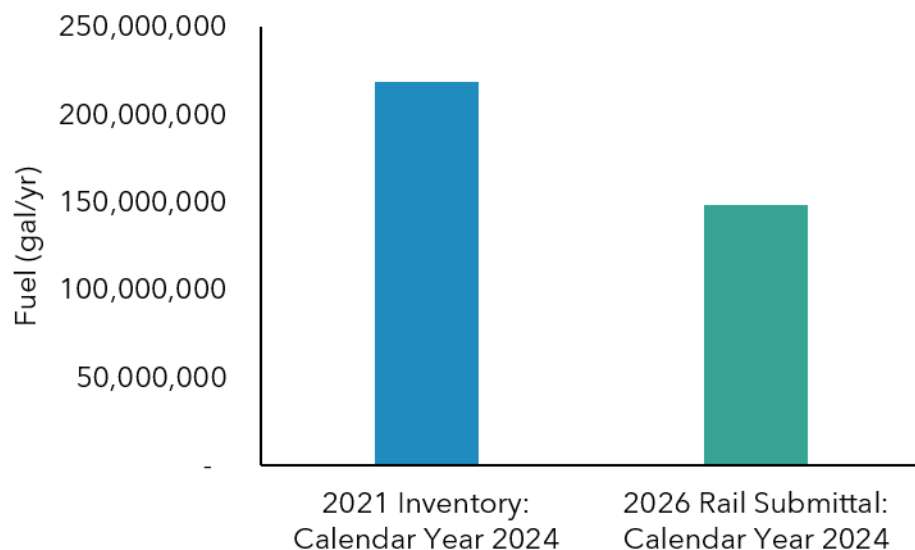
Figure 7 Combined San Joaquin Valley APCD PM Emissions Comparison

2 Class I Line Haul

BNSF and UP, the two Class I operators in California, provided 2024 freight activity measured in gross ton-miles (GTM), which combine freight tonnage and track miles. They also provided average fuel use per GTM. UP averaged 1.082 gallons per 1,000 GTM⁴ and BNSF used 1.15 gallons per 1,000 GTM⁵. CARB staff combined each company's reported GTM with its company-specific conversion rate to estimate the fuel consumed by line haul locomotives in California in 2024. Staff then compared the newly reported data with the 2021 inventory projection for the same calendar year. Thus, in 2024, statewide fuel use in the updated data is 32% lower than CARB staff's 2021 inventory projection. This is due to a combination of lower activity than the previous data, as well as the previously projected growth in activity not occurring. Figure 8 compares the 2021 inventory projection for 2024 (219 million gallons) with the rail companies' 2024 data submittal (150 million gallons).

⁴ <https://www.up.com/press-releases/financial/4q24-earnings-announcement-nr-250123>

⁵ <https://www.bnsf.com/news-media/railtalk/community/fuel-efficiency-and-emissions-reduction.html>

Figure 8 Line Haul Fuel Comparison

CARB used the calendar year 2024 data submittal, allocated at the county level, to adjust the 2021 inventory's 2024 projection. As mentioned above, the 2026 update does not include changes to growth factors or tier distribution.

2.1 Line Haul Statewide Projections

Figure 9 compares the 2026 update (blue line) to the 2021 inventory projections (orange line). The 2026 update is 32% less than the 2021 inventory, in every year.

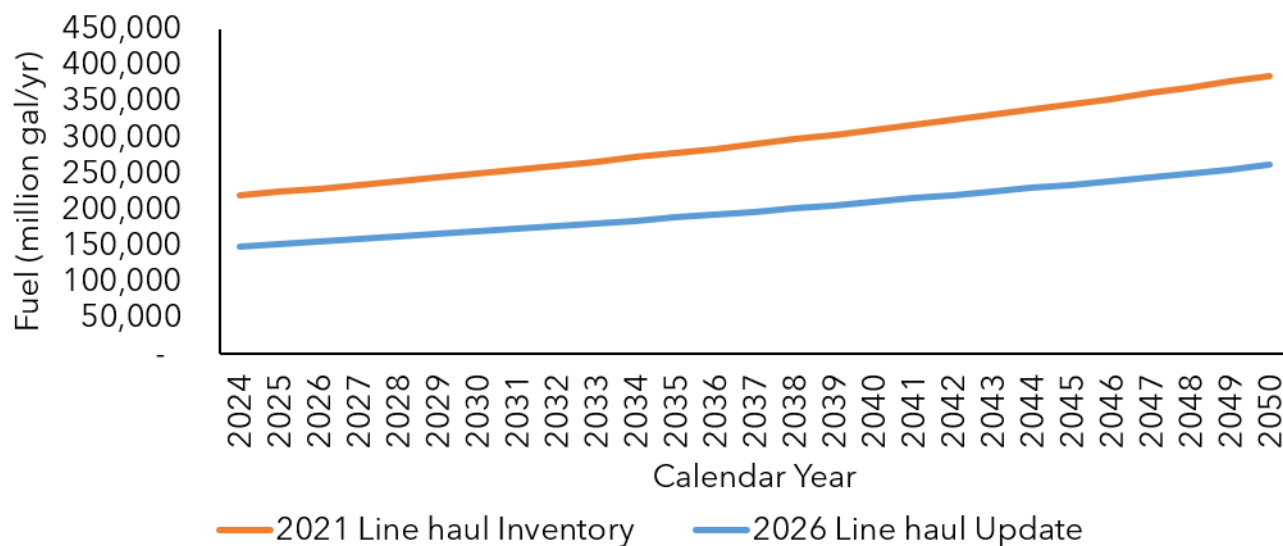
Figure 9 Line Haul Statewide Fuel Projections Comparison

Figure 10 shows the same 32% statewide reduction in NO_x emissions, and Figure 11 shows the corresponding reduction in PM emissions.

Figure 10 Line Haul Statewide NO_x Emissions Projections Comparison

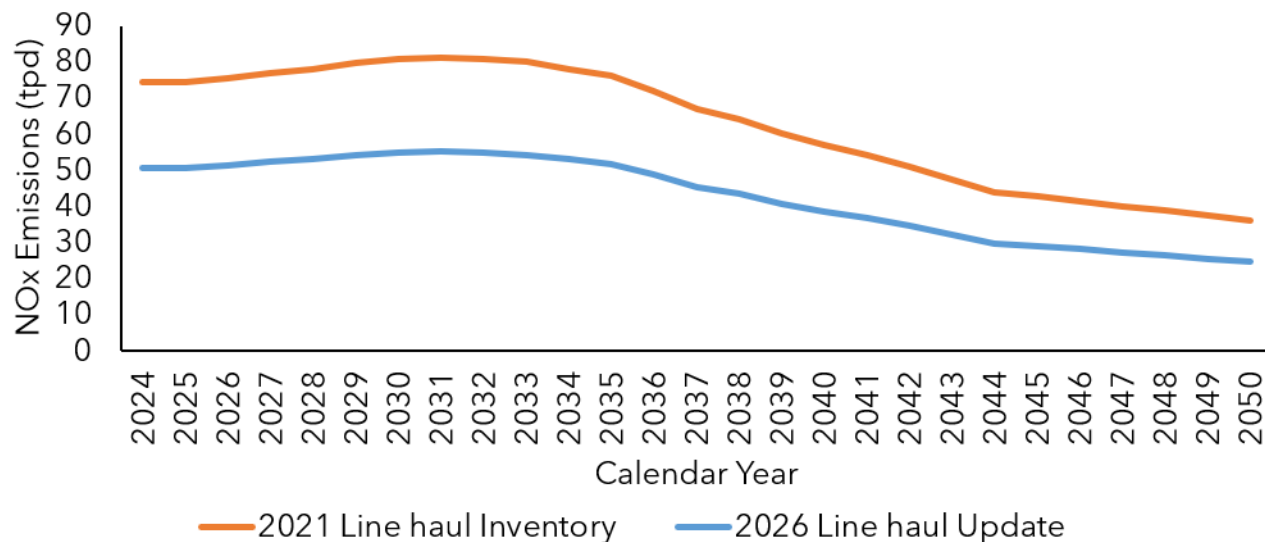
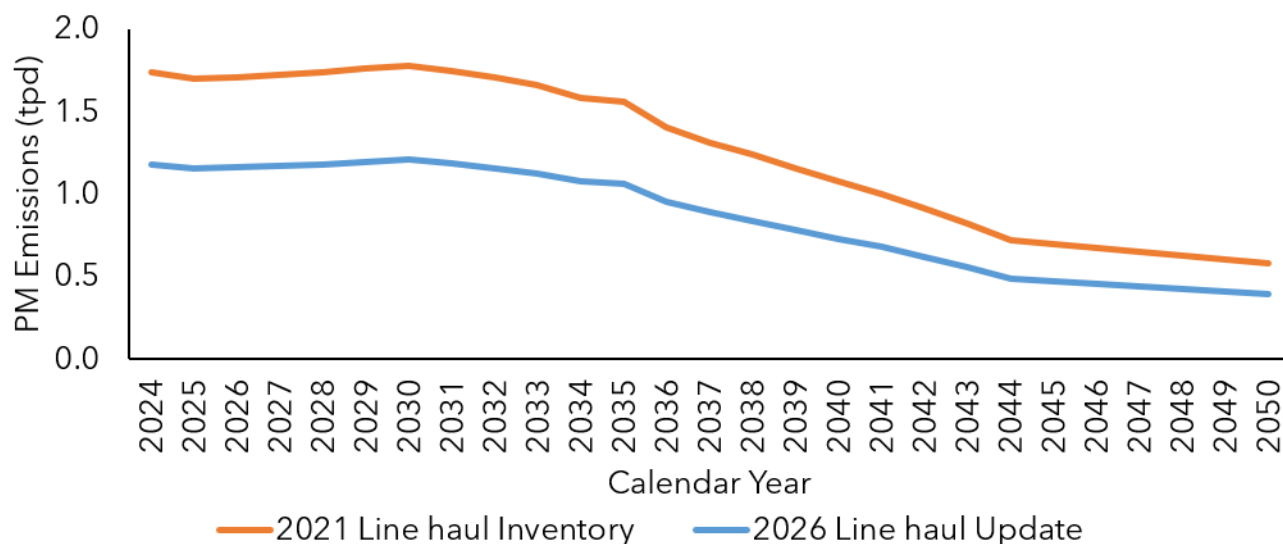


Figure 11 Statewide PM Emissions Projections Comparison



2.2 Line Haul Comparison by Air District

Figure 12 and Figure 13 show the NO_x and PM reductions for South Coast Air Quality Management District (SCAQMD) in key years, reflecting a reduction of 28% in each year. The previous 2021 linehaul inventory document highlighted the South Coast Air Basin as opposed to the air district.

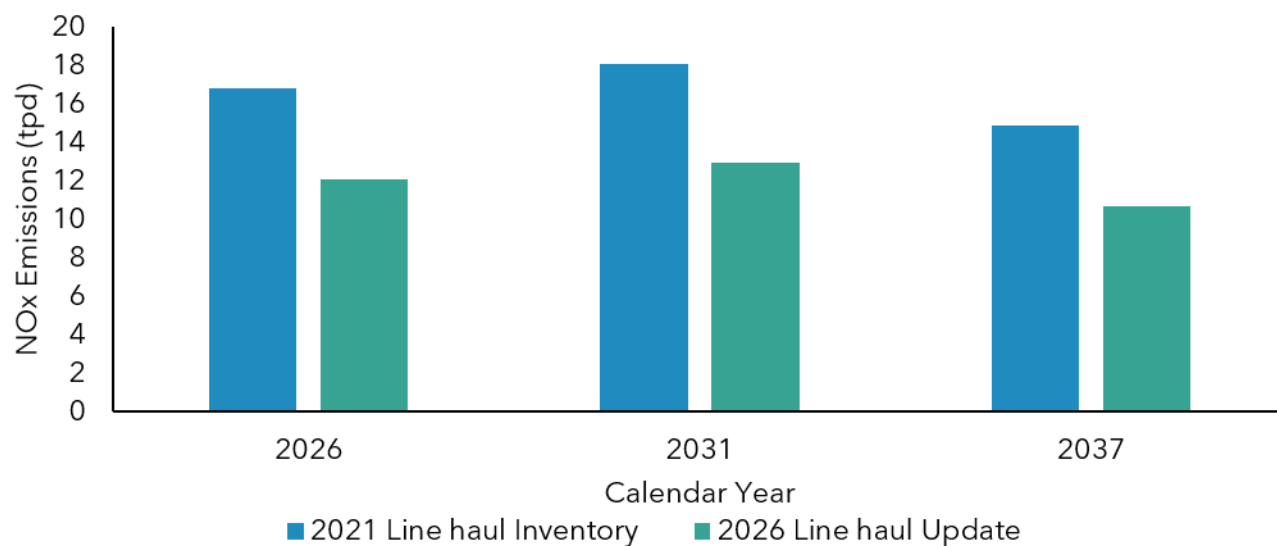
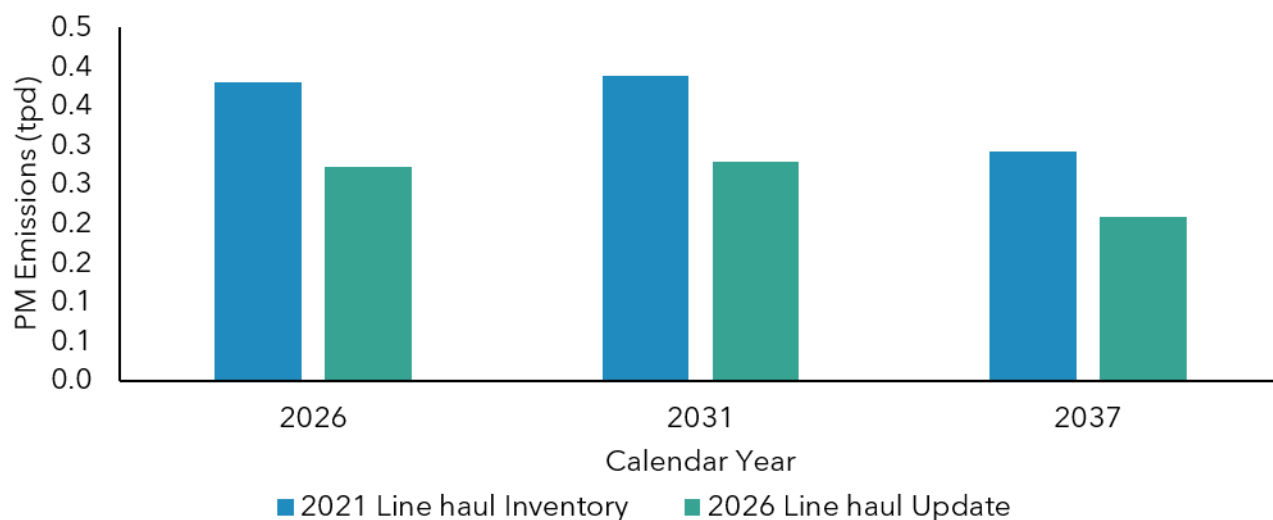
Figure 12 Line Haul South Coast AQMD NOx Emissions Comparison**Figure 13 Line Haul South Coast AQMD PM Emissions Comparison**

Figure 14 and Figure 15 show the NOx and PM reductions for San Joaquin Valley Air Pollution Control District (SVJ APCD) in key years, reflecting a reduction of 46% in each year.

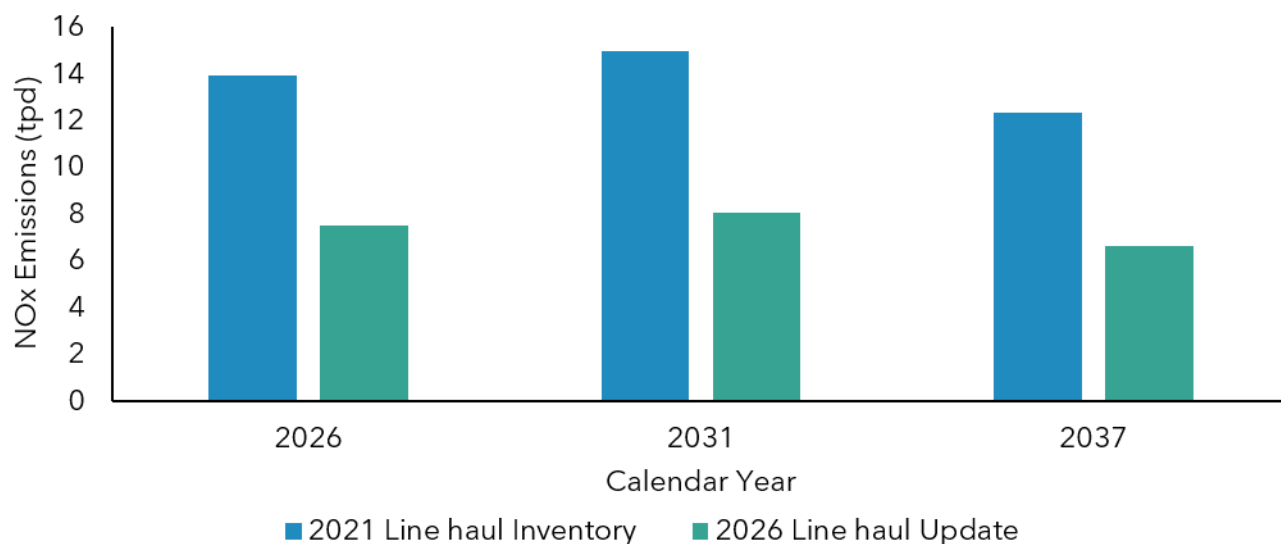
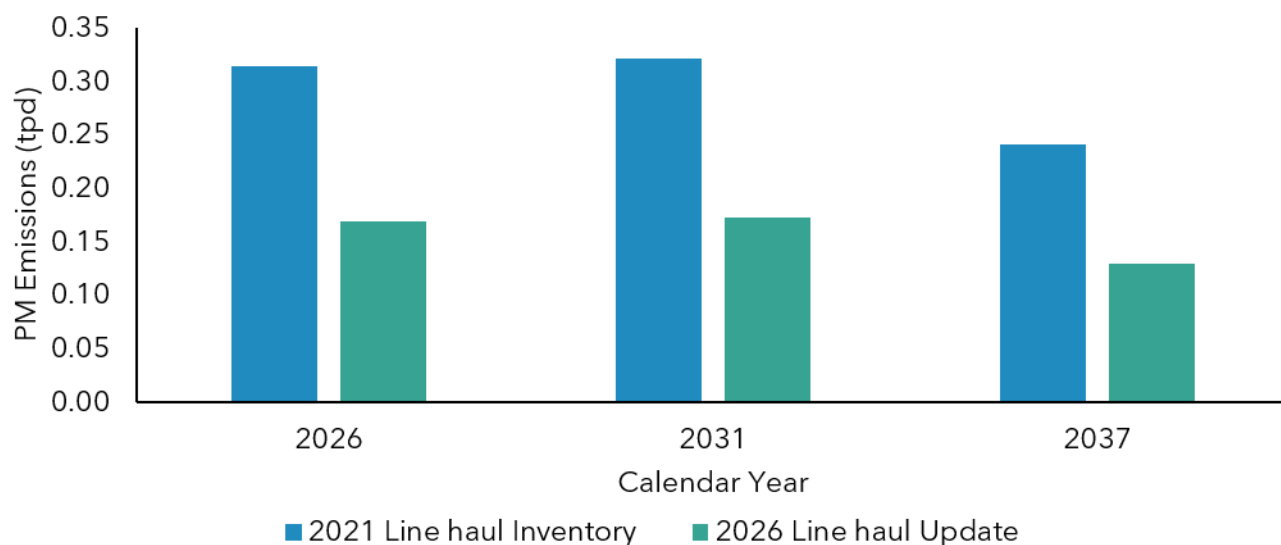
Figure 14 Line Haul San Joaquin Valley APCD NOx Emissions Comparison**Figure 15 Line Haul San Joaquin Valley APCD PM Emissions Comparison**

Table 1 and Table 2 list line haul NOx and PM emissions by air district in alphabetical order. The first column identifies the air district, followed by emissions from the 2026 update, emissions from the 2021 inventory, and the percent increase or reduction. As mentioned above, changes may be due to a combination of lower activity and projected activity growth not occurring, in addition to any improvements in railroad efficiencies. CARB does not have specific information on why different areas are growing or shrinking specifically, rather the shifts are directly the result of reports from UP and BNSF.

Table 1 Line Haul Base Year 2024 NOx Emissions by Air District

Air District	2021 Line Haul Inventory (tpd)	2026 Line Haul Update (tpd)	Percent Change
Antelope Valley AQMD	0.64	0.45	-29%
Bay Area AQMD	1.49	1.08	-27%
Butte County AQMD	1.15	0.85	-26%
Feather River AQMD	0.59	0.50	-16%
Imperial County APCD	4.74	3.38	-29%
Kern County APCD	2.19	1.03	-53%
Lassen County APCD	1.25	0.62	-50%
Modoc County APCD	0.43	0.19	-56%
Mojave Desert AQMD	23.76	17.59	-26%
Monterey Bay Unified APCD	0	0	N/A
Northern Sierra AQMD	1.52	1.18	-22%
Placer County APCD	2.76	1.24	-55%
Sacramento Metropolitan AQMD	0.88	1.37	55%
San Diego County APCD	0	0	N/A
San Joaquin Valley Unified APCD	13.70	7.51	-45%
San Luis Obispo County APCD	0.05	0.00	-95%
Santa Barbara County APCD	0.09	0.02	-79%

Shasta County AQMD	0.62	0.84	35%
Siskiyou County APCD	1.26	0.77	-39%
South Coast AQMD	16.56	11.28	-32%
Tehama County APCD	0.35	0.35	2%
Ventura County APCD	0.05	0.02	-53%
Yolo/Solano AQMD	0.31	0.24	-21%

Table 2 Line Haul Base Year 2024 PM Emissions by Air District

Air District	2021 Line Haul Inventory (tpd)	2026 Line Haul Update (tpd)	Percent Change
Antelope Valley AQMD	0.015	0.011	-29%
Bay Area AQMD	0.035	0.025	-27%
Butte County AQMD	0.027	0.020	-26%
Feather River AQMD	0.014	0.012	-16%
Imperial County APCD	0.111	0.079	-29%
Kern County APCD	0.051	0.024	-53%
Lassen County APCD	0.029	0.015	-50%
Modoc County APCD	0.010	0.004	-56%
Mojave Desert AQMD	0.555	0.411	-26%
Monterey Bay Unified APCD	0	0	N/A

Northern Sierra AQMD	0.036	0.028	-22%
Placer County APCD	0.064	0.029	-55%
Sacramento Metropolitan AQMD	0.021	0.032	55%
San Diego County APCD	0.000	0.000	-100%
San Joaquin Valley Unified APCD	0.320	0.175	-45%
San Luis Obispo County APCD	0.001	0.000	-95%
Santa Barbara County APCD	0.002	0.000	-79%
Shasta County AQMD	0.015	0.020	35%
Siskiyou County APCD	0.029	0.018	-39%
South Coast AQMD	0.387	0.263	-32%
Tehama County APCD	0.008	0.008	2%
Ventura County APCD	0.001	0.001	-53%
Yolo/Solano AQMD	0.007	0.006	-21%

3 Class I Switchers

Switchers are locomotives operated by BNSF and UP at Class I railyards in California. BNSF and UP provided 2024 activity data by railyard. Switchers operate in and around California's Class I railyards, moving individual railcars or segments of trains. They assemble railcars for line haul service and disassemble arriving trains so the cars can be stored and sorted. These activities are known as switching, and the locomotives that perform them are called switchers. A switcher may be a lower-horsepower locomotive designed for switching or a former line haul locomotive that has been removed from long haul service and reassigned to railyard operations.

Railyards are strategically located near areas such as California's ports and industrial centers, and their operations can and can pose significant health risks to nearby communities. The switcher locomotive fleet is not captive, meaning they move all over California as needed,

and do not permanently reside at a particular railyard. For additional information, please refer to CARB’s 2022 Switcher Inventory⁶.

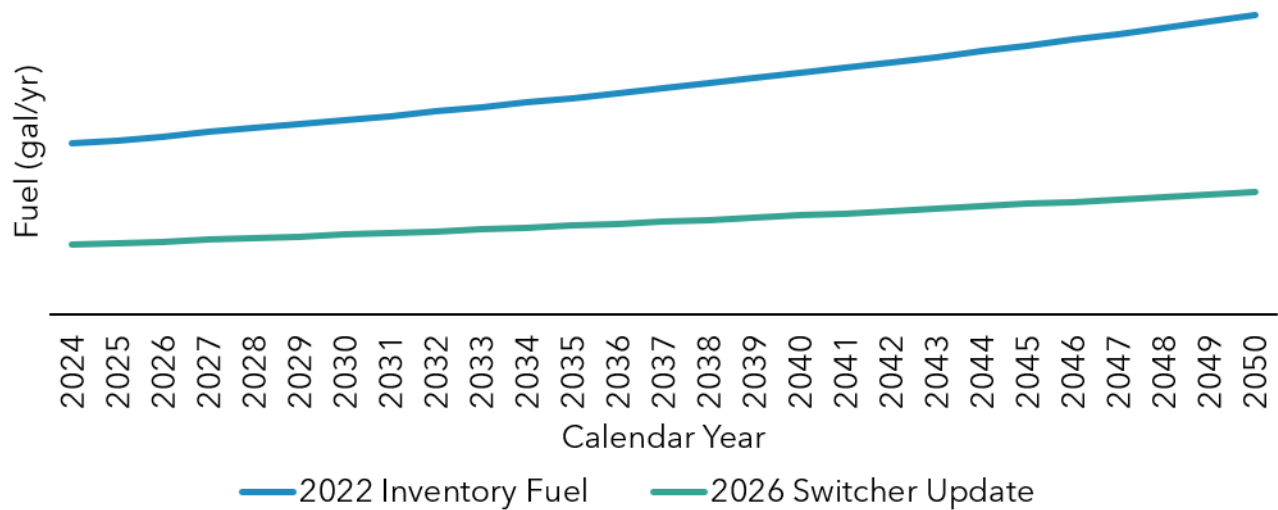
The following figures and tables compare the 2022 switcher inventory projections with the updated 2026 switcher projections for calendar year 2024. The updated data show significant decreases in switcher fuel use and FTE activity compared with previous years.

Figure 19 compares the 2022 Switcher Inventory projection for calendar year 2024 with the combined 2024 railyard submittal from UP and BNSF. The y-axis values, which represent exact annual fuel use in gallons, have been removed to maintain confidentiality. Railroad reported switcher fuel usage decreased by 59% in 2024. The rail companies claim this decrease is due to increased operational efficiencies and methodology updates which include using line haul locomotives for switching activity. This means that in some cases, railyards might see similar total emissions, even as switcher fuel use and emissions decrease. This activity is accounted for in the line haul emission inventory.

3.1 Switcher Statewide Projections

Figure 16 compares the 2022 switcher inventory fuel projection, shown in blue, with the updated 2026 fuel projection, shown in green, reflecting the applied 59% reduction. The y-axis values, which represent exact annual fuel use in gallons, have been removed to maintain confidentiality.

Figure 16 Switcher Statewide Fuel Projections Comparison



⁶ CARB’s 2022 Switcher Railyard, <https://ww2.arb.ca.gov/sites/default/files/2022-07/2022%20Class%20%20Switcher%20Emission%20Inventory%20technical%20document%2007112022.pdf>

Figure 17 compares the 2022 switcher inventory NO_x projection, shown in blue, with the updated 2026 NO_x projection, shown in green, reflecting the applied 59% reduction.

Figure 17 Switcher Statewide NO_x Emissions Projections Comparison

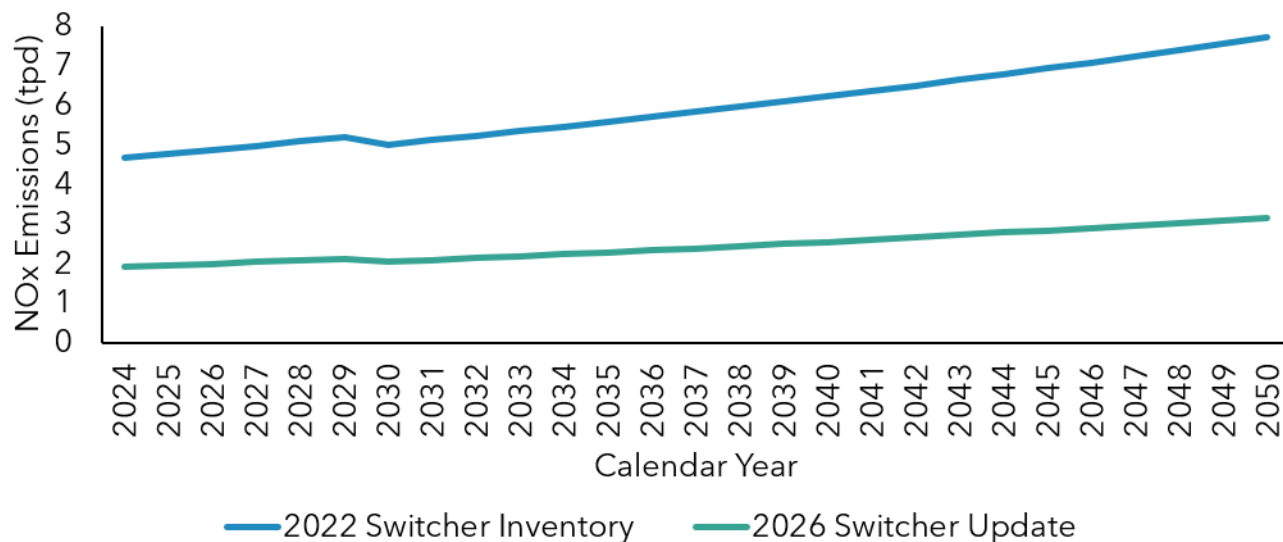
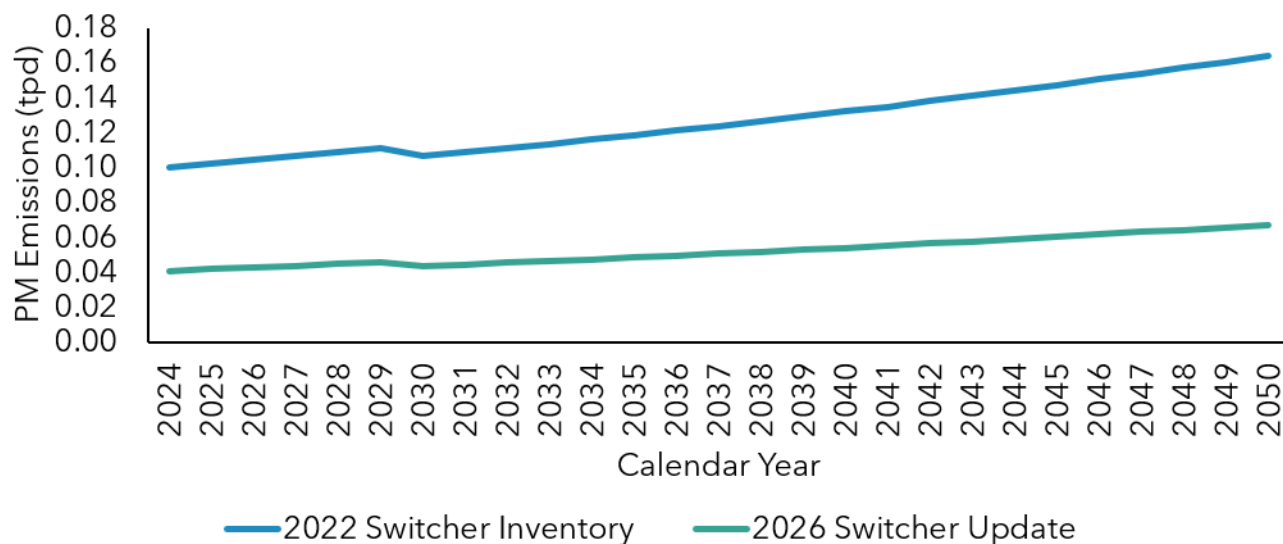


Figure 18 compares the 2022 switcher inventory PM projection, shown in blue, with the updated 2026 PM projection, shown in green, reflecting the applied 59% reduction.

Figure 18 Switcher Statewide PM Emissions Projections Comparison



3.2 Switcher Comparison by Air District

Staff calculated the percent reduction in fuel use for each air district. Figure 19 and Figure 20 show how the 77% reduction in activity and fuel use affects South Coast AQMD

emissions, measured in tons per day, for calendar years 2026, 2031, and 2037. The blue bars represent the emissions projected in the 2022 switcher inventory, and the green bars represent those emissions after applying the 77% reduction in fuel use.

Figure 19 Switcher South Coast AQMD NOx Emissions Projections Comparison

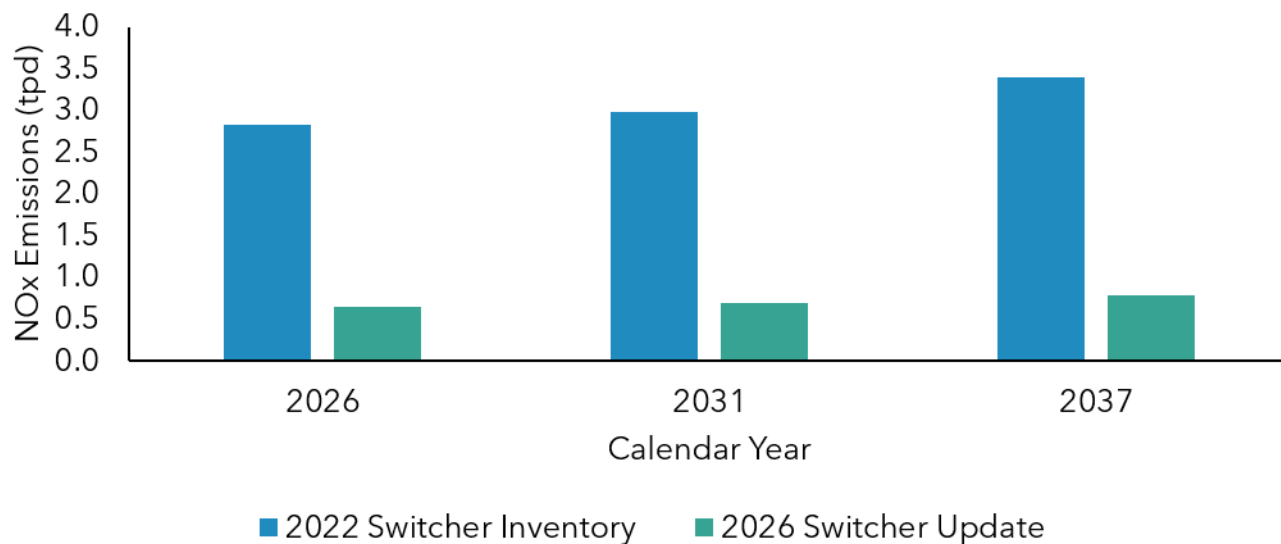


Figure 20 Switcher South Coast AQMD PM Emissions Projections Comparison

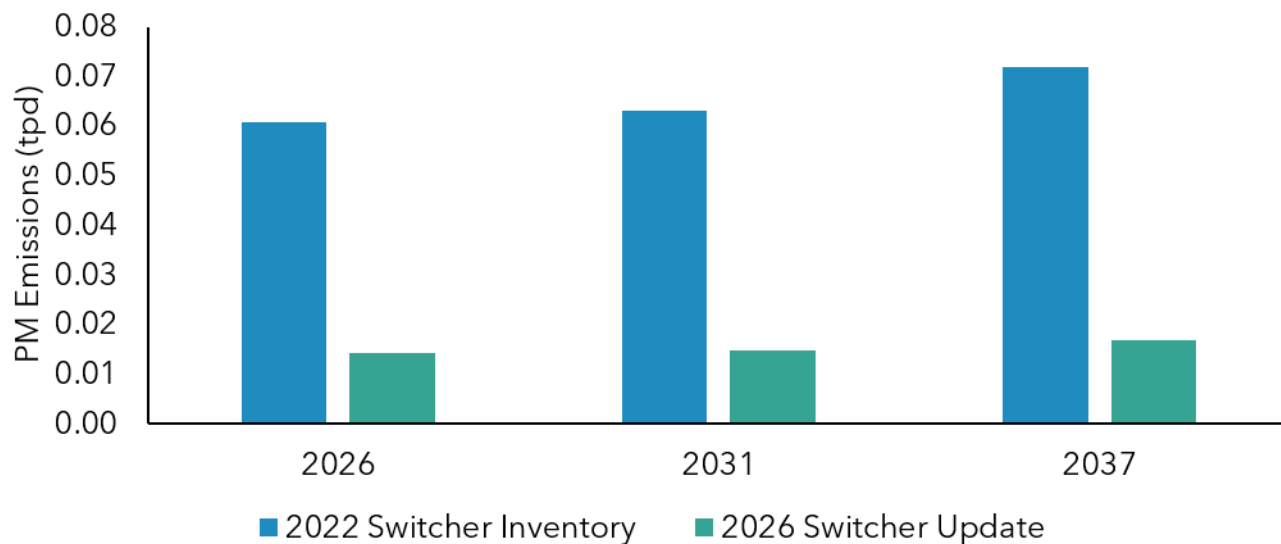


Figure 21 and Figure 22 show how the 49% reduction in activity and fuel use affects San Joaquin Valley Unified APCD emissions, measured in tons per day, for calendar years 2026, 2031, and 2037. The blue bars represent the emissions projected in the 2022 switcher inventory, and the green bars represent those emissions after applying the 49% reduction in fuel use.

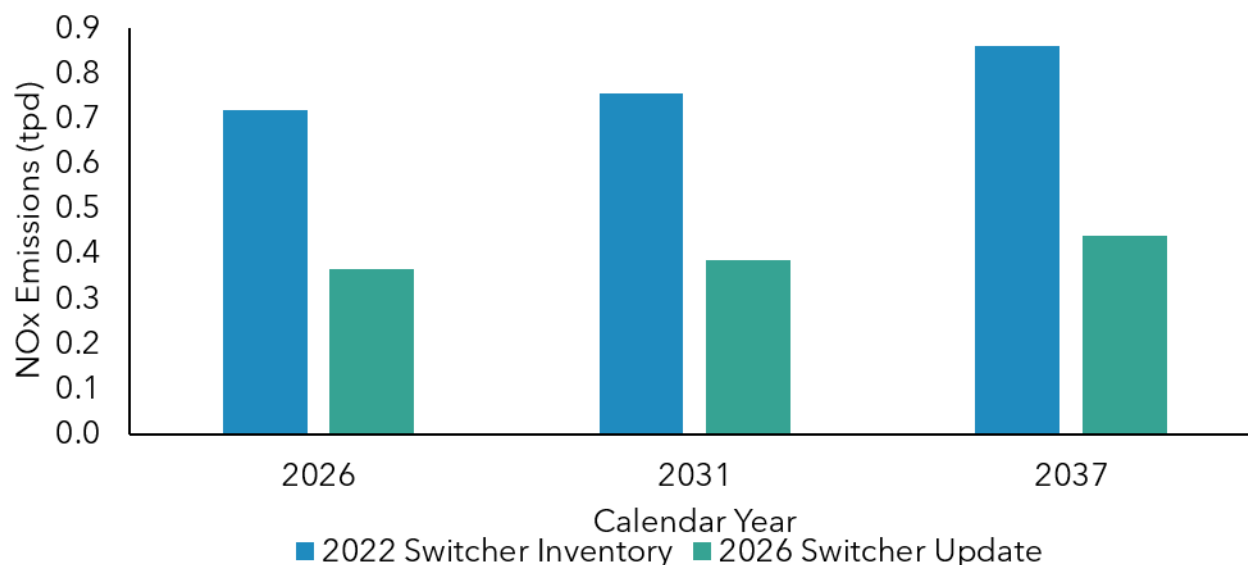
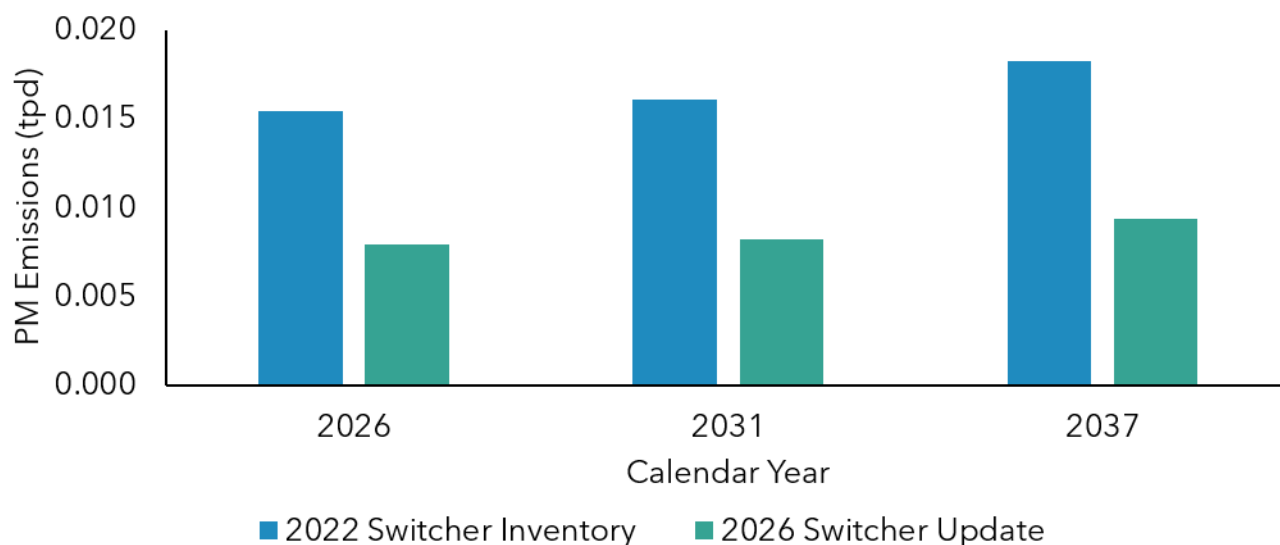
Figure 21 Switcher San Joaquin Valley APCD NOx Emissions Projections Comparison**Figure 22 Switcher San Joaquin Valley APCD PM Emissions Projections Comparison**

Table 3 and Table 4 below show the percent change in fuel use applied to the 2022 switcher inventory along with the updated 2026 NOx and PM emissions by air district, for calendar year 2024. There is less fuel use in most air districts, and therefore a reduction in emissions, except for Mojave Desert AQMD. Mojave Desert AQMD has a 33% increase due to increased activity in the Barstow railyard within the district. Sacramento Metropolitan AQMD and Yolo/Solano AQMD both had a 100% decrease due to no fuel use or FTE activity reported for the railyards that are located within those districts. The rail companies have said these decreases are due to operational changes.

Table 3 Switcher Base Year 2024 NO_x Emissions by Air District

Air District	2022 Switcher Inventory (tpd)	2026 Switcher Update (tpd)	Percent Change
Bay Area AQMD	0.433	0.221	-49%
San Joaquin Valley Unified APCD	0.688	0.353	-49%
South Coast AQMD	2.709	0.632	-77%
Placer County APCD	0.326	0.147	-55%
Sacramento Metropolitan AQMD	0.025	0	-100%
Mojave Desert AQMD	0.385	0.513	33%
San Diego County APCD	0.065	0.053	-19%
Yolo/Solano AQMD	0.027	0	-100%

Table 4 Switcher Base Year 2024 PM Emissions by Air District

Air District	2022 Switcher Inventory (tpd)	2026 Switcher Update (tpd)	Percent Change
Bay Area AQMD	0.009	0.005	-49%
San Joaquin Valley Unified APCD	0.015	0.008	-49%
South Coast AQMD	0.058	0.014	-77%
Placer County APCD	0.007	0.003	-55%
Sacramento Metropolitan AQMD	0.001	0.000	-100%

Mojave Desert AQMD	0.008	0.011	33%
San Diego County APCD	0.001	0.001	-19%
Yolo/Solano AQMD	0.001	0	-100%

4 Appendix: Line Haul - by County

Table 5 Line Haul Base Year 2024 Activity by County

County	2026 Line Haul Update (MWHrs)	2021 Line Haul Inventory (MWHrs)	Percent Change
Alameda	7,734	11,574	-33%
Butte	38,747	52,629	-26%
Contra Costa	32,922	47,268	-30%
Fresno	41,851	67,544	-38%
Imperial	154,638	216,527	-29%
Kern	124,392	264,865	-53%
Kings	17,741	35,592	-50%
Lassen	28,371	57,215	-50%
Los Angeles	155,260	219,928	-29%
Madera	32,445	60,158	-46%
Merced	43,620	86,420	-50%
Modoc	8,507	19,493	-56%
Monterey	0	0	N/A
Nevada	11,415	28,815	-60%
Orange	31,881	55,130	-42%
Placer	56,762	126,082	-55%

Plumas	42,676	40,561	5%
Riverside	213,506	328,135	-35%
Sacramento	62,480	40,245	55%
San Benito	0	0	N/A
San Bernardino	938,867	1,268,053	-26%
San Diego	0	26	-100%
San Francisco	97	151	-36%
San Joaquin	57,271	103,256	-45%
San Luis Obispo	109	2,144	-95%
San Mateo	537	672	-20%
Santa Barbara	824	3,905	-79%
Santa Clara	3,048	1,803	69%
Santa Cruz	0	0	N/A
Shasta	38,321	28,420	35%
Sierra	0	75	-100%
Siskiyou	35,041	57,652	-39%
Solano	11,752	15,442	-24%
Stanislaus	27,509	46,123	-40%
Sutter	6,738	11,788	-43%
Tehama	16,068	15,793	2%

Tulare	45,195	61,850	-27%
Ventura	1,085	2,332	-53%
Yolo	4,355	5,145	-15%
Yuba	15,938	15,303	4%