New Heavy Truck and Train Rules in California

By John Benson

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1. Introduction

The California Air Resources Board (CARB) is almost always the first-mover when it comes to regulations that reduce greenhouse gases and other sources of pollution. I've written about this organization before in the following posts:

The Air We Breathe: *This post is about an important resource for energy, as well as every living thing on our planet. The title of this post might help you guess what this resource is. The governmental body that defines the rules to remedy our air quality issues is the California Air Resources Control Board (CARB). This post is about current and future CARB rules, especially as they impact various energy users.*

https://energycentral.com/c/cp/air-we-breathe

The Air We Breathe, Parts 2 & 3: *In mid-November I came across a just-released scoping plan by the California Air Resources Control Board (CARB) which was very good and thorough. It also clearly defined how CARB will lead us (California) to Carbon Neutrality by 2045. I summarize this plan in the two posts linked below.*

https://energycentral.com/c/ec/air-we-breathe-part-2

https://energycentral.com/c/ec/air-we-breathe-part-3

Today (April 28, 2023), the California Air Resources Board (CARB) approved world-leading regulation to phase out the sales of medium and heavy-duty greenhouse gas (GHG) emitting trucks in California by 2036 – moving the state forward on Governor Gavin Newsom's ambitious plan to dramatically cut pollution, protect public health and accelerate the transition to clean vehicles. CARB also approved first-in-the-nation regulation to limit train pollution.[1]

2. Medium and Heavy Trucks

Known as Advanced Clean Fleets, the new rule puts the state on a path toward accomplishing Governor Newsom's goal of fully transitioning the medium and heavy-duty trucks that travel California roads to zero-emissions technology by 2045, providing major fleet operators – including state, local and federal government fleets – with different options to begin transitioning next year. For example:

- *Drayage trucks (i.e. big rigs), local delivery and government fleets must transition by 2035;*
- *Garbage trucks must be zero-emission by 2039;*
- *And all other vehicles covered by the regulation must be zero-emission by 2042.*

[1] Office of Governor Gavin Newsom, "California Approves World's First Regulation to Phase Out Dirty Combustion Trucks and Protect Public Health," April 28, 2023, https://www.gov.ca.gov/2023/04/28/california-approves-worlds-first-regulation-to-phase-out-dirty-combustion-trucks-and-protect-public-health/

3. Locomotives

For 50 years, California has ratcheted up rules to curb tailpipe pollution from cars and trucks to reduce lung and heart disease and smog that once frequently fouled Los Angeles' air. Now the state is targeting dirty exhaust from diesel-powered trains that it says has become a top source of harmful emissions.[2]

The California Air Resources Board, or CARB, approved the new "In-Use Locomotive" regulation requiring both passenger and freight railways operating in the state to set aside funds to be used for future purchases of cleaner locomotives starting in 2024. The amounts each operator must set aside will vary based on how much nitrogen oxide and diesel particulate pollution they generate in the state.

Ultimately, the goal is to push railroads to shift to zero-emission trains by the 2030s, potentially powered by batteries, hydrogen or other non-polluting technologies.

Diesel trains will also only be allowed to idle in place for a maximum of 30 minutes starting next year to help cut down on emissions (with some exemptions). Rail operators must register every locomotive they use in California with CARB beginning in 2024 and report their fleets' annual emissions and idling data.

"Locomotives are a key part of California's transportation network, and it's time that they are part of the solution to tackle pollution and clean our air," CARB Chair Liane Randolph said in an emailed statement. "We are moving toward a future where all transportation operations in the state will be zero emissions."

Diesel exhaust from trains is an obvious target as it's become a severe problem for the state, which struggles with severe air pollution problems arising from its dry climate, wildfires and large population.

While freight trains are remarkably fuel efficient, capable of hauling a ton of cargo 500 miles per gallon of fuel, CARB estimates that emissions from a single train are worse than 400 heavy-duty trucks as they don't use the same types of exhaust treatment devices. The agency believes that its new rules could reduce overall exhaust emissions by nearly double what's emitted by all passenger vehicles in the state between now and 2050.

Work on the new rules started in 2018, said Cari Anderson, chief of CARB's freight transport branch. "It's been a long time coming and it was a very proud moment today when the board voted yes," Anderson told Forbes. She said the state has been discussing its plans for locomotive pollution with the U.S. Environmental Protection Agency for some time.

Federal emissions rules for locomotives haven't been updated since 2008. In a letter to California regulators late last year, the EPA said it created a team to investigate the matter as it also considers new regulations to address train exhaust.

[2] Alan Ohnsman, Forbes, "California Expands Its Air Pollution Fight With New Rules For Dirty Train Exhaust," April 27, 2023, https://www.forbes.com/sites/alanohnsman/2023/04/27/california-expands-its-air-pollution-fight-with-new-rules-for-dirty-train-exhaust/?sh=7e9ce95741e4

4. The Proposed In-Use Locomotive Regulation

The following are from the CARB Site linked below.

https://ww2.arb.ca.gov/our-work/programs/reducing-rail-emissions-california/locomotive-fact-sheets?utm_medium=email&utm_source=govdelivery

4.1. Starting in 2024: Spending Account

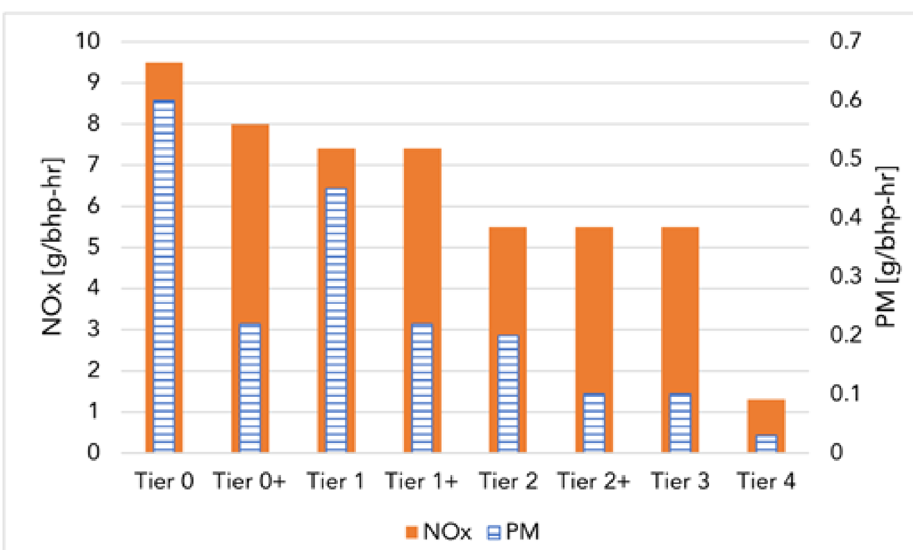
Locomotive operators would be required to fund their own trust account based on the emissions created by their locomotive operations in California. The dirtier the locomotive, the more funds must be set aside.

Spending Account funds would be used in the following manner:

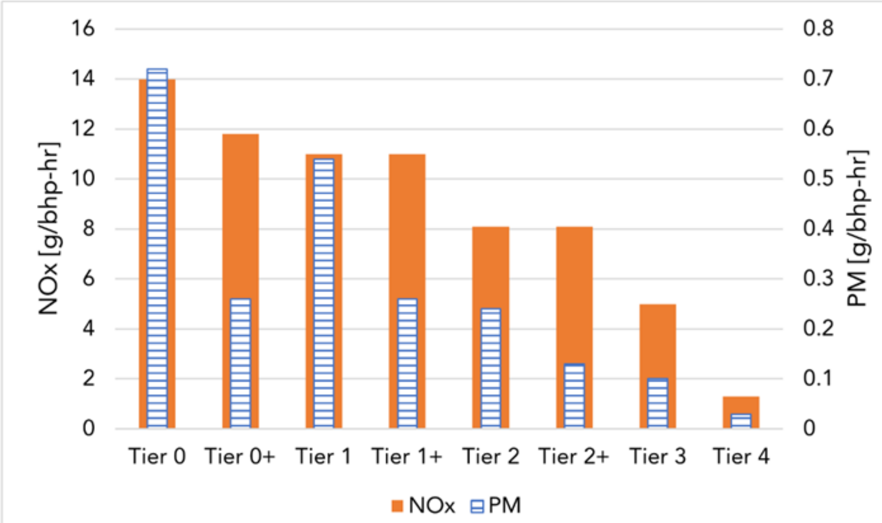
- Until 2030, to purchase, lease, or rent Tier 4 or cleaner locomotives, or for the remanufacture or repower to Tier 4 or cleaner locomotive(s).
- At any time, to purchase, lease, or rent zero emissions (ZE) locomotive(s), ZE capable locomotive(s), ZE rail equipment, or to repower to ZE locomotive(s) or ZE capable locomotive(s).
- At any time, for ZE infrastructure associated with ZE locomotive(s), ZE capable locomotive(s), ZE rail equipment.
- At any time, to pilot or demonstrate ZE locomotives or ZE rail equipment technologies.

As far as Locomotive Pollution Standards, there are two sets of standards one for Line Haul Locomotives, and one for Switch Locomotives. These can be seen below.

Line Haul Locomotive Emission Standards



Switch Locomotive Emission Standards



4.2. Starting in 2030: In-Use Operational Requirements

Only locomotives less than 23 years old would be able to be used in California.

Switchers operated by Class I, Class III, industrial and passenger locomotive operators with an original engine build date of 2030 and beyond would be required to operate in a ZE configuration to operate in California.

Passenger locomotives with an original engine build date of 2030 and beyond would be required to operate in a ZE configuration to operate in California.

Class I line haul locomotives with an original engine build date of 2035 and beyond would be required to operate in a ZE configuration to operate in California.

4.3. Starting in 2024: Idling Limit

All locomotives with automatic shutoff devices would not be permitted to idle longer than 30 minutes, unless for an exempt reason. Exemptions align with those described by U.S. EPA., and would be granted for reasons like maintaining air brake pressure or keeping the driver cabin heated or air conditioned.

4.4. Starting in 2024: Registration and Reporting

Locomotives operating in the state would be required to register with CARB.

Reporting includes and annual administrative payment.

Locomotive activity, emission levels and idling data would be required to be reported annually.

4.5. Additional Options under the Proposed Regulation

Alternative Compliance Plan: *As an alternative to the Spending Account, the In-Use Operational Requirements, or both, the Proposed Regulation offers an Alternative Compliance Plan, which would allow locomotive operators to reduce emissions through other strategies, provided those strategies are not already required. Alternative Compliance Plans must achieve emission reductions equivalent to or greater than those under the Proposed Regulation.*

Alternative Fleet Milestone Option: *As an alternative to the Spending Account and the In-Use Operational Requirements, the Proposed Regulation would allow locomotive operators to reduce emissions by committing to four operational milestones, and to offset the use of older locomotives that would have been banned under the main regulatory pathway:*

- *Beginning January 1, 2030, 50 percent of annual fleet usage in California must be from Tier 4 or cleaner locomotives.*
- *Beginning January 1, 2035, 100 percent of annual fleet usage in California must be from Tier 4 or cleaner locomotives.*
- *Beginning January 1, 2042, 50 percent of annual fleet usage in California must be from ZE locomotives, ZE capable locomotives, or ZE rail equipment.*
- *Beginning January 1, 2047, 100 percent of annual fleet usage in California must be from ZE locomotives, ZE capable locomotives, or ZE rail equipment.*

Compliance Extensions: *Temporary Operating Extension: The Proposed Regulation allows operation of locomotives prohibited from operation in California under the In-Use Operational Requirements under specific circumstances, such as for removal or for maintenance.*

Compliance Extension for delays due to compliant equipment (including infrastructure) manufacture or installation delays, or unavailability.

Small Business Hardship Extension: The Proposed regulation offers a process for small businesses to apply for a temporary extension of their obligations under the Spending Account and/or the In-Use Operational Requirements.

Historic Railroad Low-Use Exemption: Historic locomotive operators that meet specific requirements may receive permission to be exempt from obligations under the Spending Account and/or the In-Use Operational Requirements.

4.6. Zero Emissions?

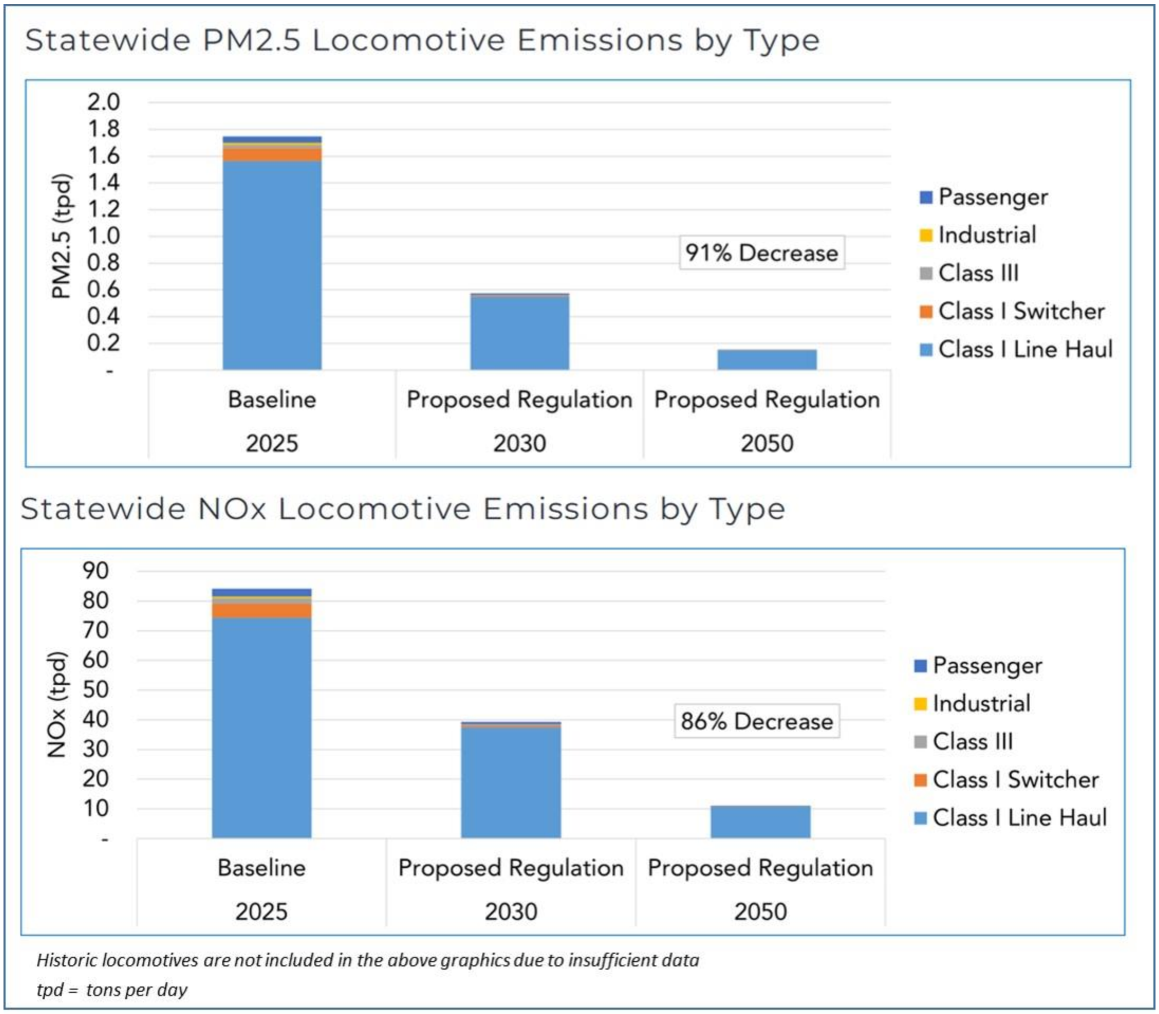
According to the California Air Resources Board (CARB), “zero emissions” means that a vehicle or equipment has no tailpipe emissions and no emissions from fueling or charging. CARB’s definition of zero-emission vehicles includes battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and hydrogen fuel cell electric vehicles (FCEVs).[3]

The above definition of ZE would seem to eliminate any “clean fuel” options (other than hydrogen) for meeting this standard, Also, forget plug-in hybrids, unless they are always operated in the EV Mode and never fire-up or refuel their IC engine. It will also probably eliminate hydrogen ICE which have some “tailpipe emissions,” although these are minimal with after-treatment to eliminate NOx emissions.

[3] This paragraph was created by Microsoft Bing Generative AI, and it referenced: https://ww2.arb.ca.gov/our-work/programs/zero-emission-vehicle-program

5. Standards' Evolution

The following graphic shows the evolution of the air quality standards for locomotives.



6. Likely Challenges

Author's comment: First movers that implement new regulations can almost always expect a legal fight. CARB knows this, has many lawyers that have much experience in defending their air quality standards, and will not shy away from a fight.

Though California has the authority to regulate automotive emissions in the state, granted to it by Congress decades ago, it's never attempted to do that with exhaust generated by freight railroads that haul cargo across the country. The Association of American Railroads, representing the freight rail industry, questions whether California's authority extends to them.[2]

"CARB's decision is entirely untenable and will not result in emissions reductions," the trade group said in an emailed statement, noting that the group believes the state agency doesn't have the legal authority to regulate in this way.

The Association said its members have worked with California to reduce emissions and that "railroads' commitment to helping the state reduce emissions and making operations more sustainable nationwide has not wavered."

"What has changed is CARB, which has turned its back on that proven partnership with the industry, appreciation of the state of technology and commitment to real progress over politics," the group said.

A spokesperson didn't immediately respond to questions about whether the group planned to take legal action.

CARB thinks freight railroads may sue the state over the rules but believes they are legal.

"Everything we're proposing, we think we have legal authority to, Ellen Peter, CARB's chief counsel, said in a November 2022 hearing. "We have obviously a disagreement with the railroads on how we're approaching it, but we think that everything we have is totally appropriate."

Final author's comment: I expect a reasonable translation of the above text is that the California Locomotive Pollution Standards were developed with consultation between CARB and the rail industry, but the latter didn't get everything they wanted, so now they are whining about it and probably will challenge it in court. I expect this is mainly a delaying tactic.