California’s Pledge to Clean, Low-Carbon Transportation by Alberto Ayala

Federal rollback stunts, but does not derail, policy actions for cleaner cars, air quality, climate change, or renewable transportation energy.
Although the subject is evolving, at the time of this writing, 54.5 miles per gallon (mpg) is no longer the vehicle fleet average carbon efficiency target for model-year 2025 expected under the Obama-era clean car rules promulgated by the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) in 2012, and broadly supported by the auto industry at that time. Instead, the current federal administration intends to stall progress on efficiency improvements at the model-year 2020 level of about 37 mpg, according to the Safer, Affordable, Fuel-Efficient (SAFE) Vehicle Rule issued by the Trump EPA and the U.S. Department of Transportation (DOT) in September 2018.\(^1\) If the SAFE Rule survives mounting legal challenges or more automakers siding with California, and actually were to get implemented, then it would have, among other impacts, a direct and detrimental effect on air quality. These impacts would be felt across the United States, resulting in excess, unplanned vehicle emissions.

The transportation sector is the largest source of air and climate pollution in California and in many other states and light-duty vehicles (LDVs) are the most numerous vehicle category in the emissions inventory. Thus, any action that results in more emissions from future vehicles is also a direct contradiction to progress toward clean air and attainment of the U.S. National Ambient Air Quality Standards (NAAQS). Ironically, the SAFE Rule appears on the heels of the EPA Administrator stating in a letter to California regulators “foremost concern” for “ensuring clean air for all Americans.”\(^2\)

This federal action also comes at a time when California and many urban areas in other states in the United States are still suffering from too much ambient air pollution. According to the American Lung Association, in 2019, five California cities, including Sacramento, topped the list for the worst ground-level ozone pollution in the United States and three California cities are in the top five for the worst particle pollution.\(^3\)

The excess pollution the SAFE Rule represents will be significant because the recently released Part One Rule specifically revokes the ability for California to set its own greenhouse gas (GHG) standards, including the Zero Emission Vehicle (ZEV) Mandate. Arguably, the ZEV Mandate, dating back to 1990, is the most consequential regulatory requirement for car electrification ever adopted (California’s definition of a ZEV includes plug-in hybrid electric, battery electric, and fuel-cell electric vehicles). Single-handedly, it has led to today’s flourishing world electric vehicle (EV) market, introduced electricity and hydrogen as viable transportation fuels, and gave wings to disruptors like Tesla. The ZEV Mandate is in effect in California and a dozen other states that have adopted the California requirements.

In a recent analysis shown in Figure 1, CARB estimates that the SAFE Part One Rule alone can result in approximately a 12% cumulative increase in vehicle criteria pollution emissions in California by mid-century. The actual pollution effect is likely worse because this analysis does not include excess upstream emissions associated with more gasoline.

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combustion cars on the road. The decade between 2025 to 2035 is critical for many California regions to come into NAAQS attainment. Figure 1 also shows that even in those early years, the SAFE Rule will still result in a significant 2–6% cumulative increase in vehicle emissions on top of the more than 45% increase in carbon emissions right off the bat in 2025. If nothing else changes, affected businesses responsible for stationary and area-wide sources of emissions will need to be subject to additional regulatory requirements in order to offset the increase from mobile sources.

**One National Program**

The celebrated “one national program” of coordinated vehicle emission standards in the United States was the result of years of cooperation and extensive work by federal agencies, the states, industry, and non-government organizations (NGOs). These standards changed a historically bad trend of stagnant vehicle fuel economy and a lack of focus on mitigation of GHG emissions in the United States. The Obama-era standards were far reaching. They targeted vehicle performance improvements for model-years 2017–2025. A technical assessment conducted by agencies in 2016 in support of a midterm evaluation of the augural model-year 2022–2025 standards showed that car makers have ample opportunity to innovate on lower-emitting, higher-efficiency gasoline combustion engines to comply with the adopted emission limits. The assessment also suggested that automakers could meet the standards at similar or lower costs than what was originally anticipated.

The standards foresaw a massive shift toward smaller, highly boosted gasoline direct injection engines and a long list of other complimentary innovations for future vehicles to make them safer, cheaper to operate, and simply better in every respect. Upfront costs would go up, but the payback period was short and in the end the consumer would have a lower-polluting and much better car that was cheaper to operate. Thus, these standards were a win-win-win for the auto industry, the consumer, and the planet. Now the federal government is reversing all that technology innovation potential and freezing progress on vehicle criteria and GHG emissions performance, which will result in vehicle drivers paying more for fuel at the pump.

In the grand scheme of things for California, the Obama “one national program” of new GHG standards was a compromise and a modest attempt, at best, to reduce future vehicle pollution because it did not significantly push for significantly cleaner combustion engines or, most importantly, the lowest-carbon solutions such as hybridization or electrification. Instead, the auto industry could comply fully and simply with more efficient gasoline engines.

This is the reason I said in a statement for the press in 2016 that “it is up to the combined efforts of California, our ZEV-state partners, and other supporters to advance on ZEVs precisely because of the very low level of reliance on electrification needed to meet the national standards.” (As an aside, in retrospect and with these strong sentiments for vehicle electrification in mind, which also reflect broadly the state’s interests, it should be no wonder to the reader why the Volkswagen (VW) “dieselgate” settlement agreement that California forged to resolve the VW illegal actions is so heavily ZEV-centric and why so much of the settlement money is...
aimed at growing the ZEV market throughout the United States.)

Most importantly, California’s trailblazing spirit, economic prowess, and fervent desire to lead the world on climate action and in the electrification of transportation, starting with LDVs, are all still very much important forcing functions for state and local regulatory policies, investments, and broad bridge-building with other leading jurisdictions around the world such as China and Europe. California has invested hundreds of millions of dollars from its carbon cap-and-trade revenues to remove the barriers to electrification of transportation. Of the more than US$9 billion that the program has generated, nearly US$2 billion have gone for low carbon transportation, which includes more than 350,000 rebates for eligible ZEV buyers at a tune of more than US$820 million.\(^6\)

The sentiments for building bridges are captured well, for example, in two efforts started by California to accelerate the transition to a sustainable transportation energy sector. These are the International ZEV Alliance (http://www.zevalliance.org/) and the Under2Coalition (https://www.under2coalition.org/) of state and regions for climate action. Y. Wang\(^7\) argues very convincingly about a ZEV ecosystem created by California where cutting-edge vehicle innovation is flourishing. He also talks about how China is now running with the California ZEV Mandate idea and improving upon it to fast track China’s own global leadership on EVs.

However, it is clear the SAFE Rule and doing away with the long-standing California “waiver” authority to regulate vehicle emissions and other mobile sources, and if it stands, is an existential threat that would fundamentally re-shape transportation policymaking in the state that seven decades ago gave rise to the very concept of vehicle pollution control in the United States. As M. Kah\(^8\) recently reported, federal action is also having a chilling effect on EV progress in the United States. Kah’s work on forecast trends for the EV market suggests lower numbers of EVs than previously expected will be sold and greater divergence in the expected EV market share in the future. She cites the “U.S. federal government policy becoming more negative toward EVs and automotive fuel efficiency improvements” as one of two reasons for the slowing trends. The American consumer preference for larger, but less efficient vehicles, is also often cited as a reason for slower EV uptake. This factor is true and can affect the vehicle market as seen in the work of M. Sivak\(^9\) and colleagues who have been monitoring fuel economy trends of the U.S. fleet (see Figure 2). This work suggests that we may be back again in a period of stagnant fuel economy. At least until new EV pickups from Rivian, Bollinger Motors, Tesla, and other EV models entering the market now begin to generate consumer interest.

![Figure 2. The “window sticker” average fuel economy of the U.S. vehicle fleet.](source: Michael Sivak, Monthly monitoring of vehicle fuel economy and emissions (http://www.umich.edu/~umtrisw/ EDI_sales-weighted-mpg.html). Sustainable Worldwide Transportation; University of Michigan Transportation Research Institute.)
Figure 3. Timeline for CARB regulations focusing on the freight sector.

Moving Forward
California is already doubling down on its efforts. The state is driving for complete electrification of passenger cars, all shared mobility, and trucks. The state’s strategy for the LDV sector relies on a true and proven “carrots and sticks” approach. This starts with defending to the maximum extent possible the regulatory authority for the ZEV Mandate and other requirements, while also continuing to heavily invest...
cap-and-trade proceeds in EV buyer rebates, charging and hydrogen fueling infrastructure, and other EV market-building actions. And in a “no stone left unturned” approach, the state is also expanding efforts to electrify larger vehicle categories in the freight sector using incentives and regulatory instruments for heavy-duty and off-road EVs. This will be a huge lift—an expansive and expensive effort designed to tackle both conventional pollution and zero emission requirements for some of the most challenging vocations to electrify, as illustrated in Figure 3. The plan is far reaching, encompassing prominent heavy-duty applications like transit buses, freight trucks, and airport shuttles.

The state has already taken some important initial steps, having adopted regulatory requirements for 100% new zero-emission transit bus purchases by 2029, 100% zero-emission airport shuttles by 2035, and a ZEV Mandate for heavy-duty trucks from Class 2B vehicles all the way up to Class 8 tractors starting in 2024. Next, will be a more stringent nitrogen oxides emissions limit for new heavy-duty engines under the Heavy-Duty Omnibus Rule. All these policy developments clearly signal that while California may be stung by recent federal actions, it is not, by any means, knocked out of the fight. The commitment for getting to a sustainable transportation energy future is unwavering and the fight for clean air and the climate has not let up. The stage is set for this commitment to play out in the courts of public opinion and of the legal system as the “waiver” authority, the LDV GHG emission standards, the ZEV Mandate, and other state policies are challenged aggressively by the federal government and defended ardently by The Golden State and its supporters.

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**Disclaimer:** This article represents the author's analysis, perspective, and opinions related to the evolving policy landscape for vehicle emission standards, the market uptake of electronic vehicles, and the broader topic of sustainable transportation in the United States. These views are not official positions for any of the listed affiliations.

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