

September 3, 2021

Ms. Rajinder Sahota
California Air Resources Board
Industrial Strategies Division
1001 I St.
Sacramento, CA 95814

RE: Scoping Plan Scenario Concepts Technical Workshop

Dear Ms. Sahota:

Thank you for the opportunity to submit comments regarding the August 17, 2021, Public Workshop to discuss Modeling Scenarios for the upcoming 2022 Scoping Plan update. I am submitting these comments as Founder and CEO of ClearFlame Engine Technologies, which is developing an innovative technology that will dramatically reduce the carbon and health-related emissions from diesel engines used in long-haul trucking, agricultural and other off-road engines, backup power generation, and other applications.

Introduction:

The recent Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)¹ underscored the need for California to take bold steps to decarbonize the entire transportation sector. In particular, the report noted that we will exceed the Paris Accord's goal of limiting global warming to no more than the 1.5°C - 2°C range unless deep reductions in carbon dioxide (CO₂) and other greenhouse gas emissions occur in the coming decades.² The silver lining in the report's dire projections: if we can reach carbon neutrality by mid-century, we could stabilize the world's climate at the levels of climate change that are already embedded in our climate system in as soon as two decades—and early reductions this decade will play an especially critical role in accelerating progress towards that goal.

As California moves to define its Modeling Scenarios to meet the goals of AB32—as well as to meet the broader objectives of the Paris Climate Accord and the needs identified in the recent IPCC report—we strongly encourage you to consider additional, ambitious, fuel-neutral, technology-agnostic, performance-based approaches to decarbonizing the medium-duty, heavy-duty, and off-road diesel sectors that will be hardest to electrify. We believe that doing so will complement the ongoing imperative to electrify the passenger cars, buses, drayage trucks, and other vehicles that will be feasible for electrification in the near- and mid-term. This comprehensive approach will

¹ Working Group I, Climate Change 2021: The Physical Science Basis, accessed at <https://www.ipcc.ch/assessment-report/ar6/> on September 2, 2021.

² Summary for Policymakers, Point B1, accessed at https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Headline_Statements.pdf on September 2, 2021.

encourage the market to innovate and respond more quickly and successfully than a strategy that pre-selects a few winning technologies. Most important, we believe that this approach will yield faster emissions reductions this decade, at scale, and more cost-effectively than the “electrify only” approach currently envisioned.³

Specific recommendations:

We recommend five specific steps to accomplish this goal:

- First, like so many others, we are alarmed by the latest IPCC findings, as well as the constant drumbeat of increased severe storms, wildfires, and other daily reminders of climate change’s impact. Thus, we welcome the staff’s proposal to accelerate the state’s climate targets and encourage CARB to adopt the most ambitious Carbon Neutrality timetable that is feasible.⁴ Further, we believe that each of our recommendations below will help identify additional emissions reduction scenarios that will help ensure that the most ambitious Carbon Neutrality targets are, in fact, feasible.
- Second, to match the urgent need to move forward as expeditiously as practicable, we encourage CARB to continue with its original timeline for completing and adopting the 2022 Scoping Plan Update. California’s comprehensive approach to achieving its climate and air quality goals depends on the regulatory certainty provided by the schedules set forth in AB 32, including requiring the State’s Scoping Plan to be updated at least once every five years. Given that the last plan was finalized in 2017, finalizing the next Scoping Plan by the end of next year is not only statutorily required but is critically important if the state is to implement the many measures necessary to reach carbon neutrality as expeditiously as possible.-
- Third, we recommend that CARB redefine its scenarios for the transportation sector⁵ as “Decarbonization,” rather than “Electrification,” to underscore the need to decarbonize even the hard-to-electrify segments of the transportation sector. We strongly support electrification in the passenger car and other segments where it will be feasible between now and midcentury. However, we believe that labels matter and that redefining the objective as decarbonization will lead to emissions reductions that may not be considered using a framework that considered only electrification strategies.
- Fourth, we recommend that CARB include scenarios that model the decarbonization potential of introducing advanced internal combustion engine technologies that will operate on low-carbon, zero-carbon, and even carbon-negative non-petroleum fuels in the hard-to-electrify segments of the medium-duty, heavy-duty, and off-road diesel market. Given that the CARB Advanced Clean Truck Rule acknowledges that many diesel trucks will continue to be sold deep into midcentury, we want to ensure that CARB is modeling the future

³ See CARB, 2022 Scoping Plan Update – Scenario Concepts Technical Workshop, August 17, 2021 (hereafter “CARB Presentation”), slides 19-20.

⁴ CARB Presentation, slides 11-12.

⁵ CARB Presentation, slides 19-20.

transportation market in a way that identifies as many decarbonization options wherever they exist, including fuel/technology scenarios that could yield significant benefits from both a climate and health perspective.

- Fifth, we recommend that CARB include scenarios that model the decarbonization potential of using low-carbon liquid fuels to decarbonize existing diesel vehicles, equipment, and engines. While a zero-carbon fuel strategy is mentioned as an option for several of the scenarios for industrial engines,⁶ we believe that expanding this scenario option for the entire diesel sector can provide additional decarbonization and health benefits quickly and before mid-century.

In sum, as the state considers a more aggressive timetable for reaching Carbon Neutrality, we strongly encourage CARB to take advantage of all emission reduction solutions available. Recent reports⁷ have shown that a diverse portfolio of solutions will be needed to meet California's carbon neutrality goals, especially in the transportation sector.

More about ClearFlame:

ClearFlame was founded in 2016 by two Stanford Ph.D. students committed to accelerating the transition to near-zero and zero-carbon solutions to help meet California's climate goals.

ClearFlame patented engine technology complements California's existing electrification goals by providing near-zero criteria pollution and carbon neutrality carbon solutions for heavy-duty trucks, agricultural and construction equipment, and other off-road engines that will be most difficult to electrify by mid-century. More specifically, we are working with leading industry OEMs to modify standard diesel engines to operate at much higher temperatures, thereby opening the door to using low carbon, non-petroleum fuel like ethanol. This combination enables us to deliver a product that offers the same power, torque, reliability, and durability that diesel fleet owners, farmers, and other end users expect, with near-zero soot and nitrogen oxide emissions—all while replacing 100% of the petroleum with clean-burning, domestically produced, net-zero-carbon ethanol. In short, ClearFlame is taking the diesel fuel out of the diesel engine.

As a Black- and Woman-founded and led business, we are developing a solution that addresses the climate crisis and deals with the energy equity and environmental justice issues that disproportionately impact underrepresented populations globally. Our

⁶ CARB Presentation, slide 30.

⁷ See, e.g., Brown, A. L., Sperling, D., Austin, B., DeShazo, JR, Fulton, L., Lipman, T., et al. (2021). Driving California's Transportation Emissions to Zero. *UC Office of the President: University of California Institute of Transportation Studies*. <http://dx.doi.org/10.7922/G2MC8X9X> Retrieved from <https://escholarship.org/uc/item/3np3p2t0>



technology solution aims to combine these goals and improve human health, our environment, and the cost competitiveness of cleaner fuels.

Thank you for your consideration of our comments. We look forward to working with CARB staff to finalize the Scoping Plan in the year ahead and towards the full and timely implementation of AB 32 and California's broader climate, clean air, and public health goals in the future.

Sincerely,

A handwritten signature in black ink, appearing to read "BJ Johnson". The signature is fluid and cursive, with a long horizontal stroke at the end.

BJ Johnson, Ph.D.
Founder and CEO