May 31, 2022

Clerk of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

SUBMITTED ELECTRONICALLY AT: www.arb.ca.gov/applications/public-comments

Re: Notice of Public Hearing to Consider Proposed Advanced Clean Cars II Regulations

To Members of the California Air Resources Board ("CARB" or "the Board"),

Rivian Automotive, LLC, ("Rivian") appreciates this opportunity to comment on the proposed Advanced Clean Cars II ("ACCII") regulations. The development of the ACCII proposal is just the latest example of California's continued leadership in transportation electrification and climate action that is recognized across the country and around the world. Rivian strongly supports the proposed regulation's direction and California's efforts to accelerate transportation emissions reductions and zero-emission vehicle ("ZEV") uptake. However, Rivian has identified gaps in the proposed regulation which we believe may needlessly impede or otherwise delay the transition to a 100 percent ZEV fleet. These gaps largely stem from a proposed stringency level that appears inconsistent with the state's mobile source strategy and pre-existing industry trends, ZEV-crediting rules, and certain technical definitions. Rivian respectfully requests that CARB amend the proposed regulation to ensure the incentives created by ACCII support the most robust, equitable, and transparent shift toward all-electric transportation.

Keeping the World Adventurous Forever

Founded in 2009, Rivian is an independent company headquartered in California where we maintain office locations in Irvine and Palo Alto, as well as customer-facing service centers in several cities. With approximately 5,000 employees across the state and more than 12,000 around the world, it's Rivian's mission to Keep the World Adventurous Forever. Rivian's focus is the design, development, manufacture, and distribution of all-electric adventure vehicles, specifically pickups, sport utility vehicles, and commercial vans. Key to the success of our mission, these vehicles will displace some of the most polluting passenger vehicles and trucks on the road today.

Rivian brought the first electric truck to market last year when we launched the R1T pickup from our manufacturing facility in Normal, Illinois, followed shortly thereafter by the R1S SUV and a commercial fleet electric delivery van for Amazon. All our vehicles are considered medium-duty for regulatory purposes and satisfy ZEV requirements under both ACCI and the Advanced Clean Trucks rule ("ACT"). The R1T and R1S provide all-electric options in segments where added utility is a necessity. The R1T has an EPA-labeled 314-mile range and 11,000lbs of towing capacity, while the R1S is a seven-passenger full-sized SUV; both are well-equipped to displace

the less-capable, yet similar, conventionally powered vehicles. Rivian is also building a network of DC fast and Level 2 chargers across the country, including sites on public lands such as the Golden Gate National Recreation Area and Yosemite National Park.

Rivian Supports Ambitious Policies and Regulation to Accelerate ZEV Market Growth Consistent with California's Climate Goals

Rivian strongly supports California's efforts to accelerate transportation emissions reductions and zero-emission vehicle uptake. The proposed ACCII regulation is an important part of those efforts. We are supportive of the draft regulation's direction and goals but have specific comments and concerns regarding various aspects of the proposal. These are addressed in turn below.

Stringency

- **Consider Greater Stringency.** With the ACCII program, CARB proposes to transition California's passenger vehicle market to 100 percent ZEV sales. Rivian strongly supports the goal but believes the ambition of both the ramp rate and the 100 percent sales target could be revised, commensurate with the urgency of the climate crisis and the state's air quality challenges. Rivian is a member of the Zero Emission Transportation Association (ZETA), the first industry-backed coalition advocating for 100 percent of new vehicles sold by 2030 to be electric. What seemed aspirational at ZETA's founding is quickly becoming both more plausible and more necessary. Rivian has consistently supported the most ambitious possible regulatory standards and policies to decarbonize transportation. We believe a 100 percent ZEV sales requirement earlier than 2035 is achievable and more likely to be a forcing function for manufacturers than the existing requirement.

  We are also concerned that the program's intermediary requirements are insufficiently stringent. As proposed, ACCII's percentage requirement in Model Year 2026 is 26 percent. However, this falls short of the roughly 46 percent ZEV sales share that CARB's 2020 Mobile Source Strategy calls for in that year.[1] CARB has also previously reported that they expect total ZEV sales to reach almost 25 percent in MY2025 under business as usual.[2] Once environmental justice and pooling credits are accounted for, which would inflate the compliance value of the ZEVs sold, it seems that CARB risks launching the ACCII program at a stringency level that requires no additional action from industry. We encourage CARB to reconsider its annual ZEV requirements to implement an even more ambitious rule.

- **Rethink the Role of PHEVs.** In the interest of maximum feasible stringency, emissions reductions, and environmental integrity, Rivian opposes the inclusion of PHEVs in the program. Given the numerous manufacturer commitments to introduce all-electric vehicles in the coming years, we believe that incentives to sell vehicles producing any tailpipe

[1] LDV Vision Model spreadsheet at https://ww2.arb.ca.gov/resources/documents/2020-mobile-source-strategy.
[2] https://ww2.arb.ca.gov/sites/default/files/2021-05/acc2_workshop_slides_may062021_ac.pdf

emissions unnecessarily weaken the mandate and slow the state's progress toward carbon neutrality. PHEV inclusion in the ACC program made sense in the past to transition OEMs and consumers away from internal combustion engine technology, but Rivian believes there is no longer a need for such a "bridge." Moreover, PHEVs exhibit significant variability in their environmental performance. Research from Europe suggests that PHEVs deliver poorer environmental benefits in real-world usage than certified under test procedures, with troubling implications for the projected benefits of regulatory programs that encourage the development and sale of these vehicles.[3]Rivian requests that CARB reconsider PHEV crediting in this next phase of the ACC program.

ZEV Crediting

- **One ZEV, One Credit.** Rivian agrees with program design changes which more directly tie ZEV credits to ZEVs on the road. We support the proposal to allocate 1 excess vehicle value per ZEV delivered, and accordingly support the conversion of historical ZEV credits to this system with a discount factor of ¼, representing a ZEV meeting the minimum range requirements under ACCII.

- **Expiring Historical and Newly Generated Credits is Appropriate.** Rivian also supports the introduction of expiration dates for both historical and newly generated credits, limiting the life of an excess vehicle value to up to five years in the future or three years in the past. We agree that expiry dates help ensure that averaging, banking, and trading provisions only enable a smoothing of year-to-year ZEV fluctuations, rather than permitting OEMs to stockpile credits several years ahead of their obligation. Rivian suggests CARB extend this reasoning into the later years of the program and set all credits to expire by the 100% ZEV date, preventing an OEM from carrying deficits after 2035 MY or from using banked credits to sell ICEs post-2035 MY. By capping the use of credits after the 100% ZEV date, CARB can protect the spirit of the regulation and help achieve the governor's climate targets.
- **Maintain Credit-Earning Optionality for MD ZEVs.** The existing ACC regulation certifies as ZEVs "passenger cars, light-duty trucks, **and medium-duty vehicles**" (emphasis added) that meet the requirements of the ZEV emission standard.[4] In combination with the ACT regulation, manufacturers of MD ZEVs have the option to earn credits under either ACCI or ACT, but not both.[5] ACCII should preserve this option to earn credits for MD ZEVs. To maximize the incentive for manufacturers, MD ZEV credits should be fully transferable at 100 percent of their value after the ACT obligation is fulfilled. Maintaining MDV eligibility is important for two key reasons.

[3] Patrick Plotz et al., The International Council on Clean Transportation, *Real-World Usage of Plug-In Hybrid Electric Vehicles: Fuel Consumption, Electric Driving, and CO_2 Emissions* (2020), available at https://theicct.org/sites/default/files/publications/PHEV-white%20paper-sept2020-0.pdf.
[4] 13 CCR §1962.2.
[5] 13 CCR §1963.2(i).

- **Not all Section 177 states will adopt the ACT regulation in a timely manner**. **The ability to earn ZEV credits under ACCII with MD ZEVs will be critical in these states** for incentivizing the rapid electrification of MDVs. Conventional MD vehicles, including more capable pickups and vans used in both personal and commercial applications, generally pollute more than their light-duty counterparts. Electrification of the medium-duty segment promises particularly pronounced emissions benefits that are worthy of regulatory recognition.[6] From Rivian's perspective, the option to earn credits under either the ACC and ACT programs is important for our business as we work to achieve greater scale and impact.
- **ZEV credit options under ACCII would incentivize the migration of the light-duty ZEV assurance measures proposed under the regulation to the MDV classes.** As written, ZEV assurance measures crafted by staff under ACCII apply only to the passenger cars and light-duty trucks currently proposed as eligible to earn LD ZEV credits under the program. These measures come at a cost to manufacturers. It is conceivable that, absent the prospect of earning LD ZEV credits, some automakers might forgo meeting these assurance measures on MD ZEV products to the detriment of broader ZEV consumer acceptance. Many MDVs look like LD vehicles and play a similar role in the lives of their owners and drivers. MD passenger vehicles even have U.S. EPA fuel economy labels and are federally regulated as LD products for greenhouse gas emissions. Retaining MD ZEVs in the ACC program will incentivize compliance with the ZEV assurance measures in the MD classes and should help meet consumer expectations across both the LD and MD segments.

Retaining LD ZEV credit eligibility for MD ZEVs under the ACC program is important and consistent with the existing approach under ACCI. We recognize the potential concern that allowing MD ZEVs the option to earn ZEV credits under ACCII could detract from efforts to electrify the LDV fleet. However, **MD ZEVs are not a low-cost pathway for earning ZEV credits.** It is unlikely that manufacturers would supplant or delay less costly LD ZEV product plans in favor of MD ZEV development. Rather, retaining the existing credit optionality for MD ZEVs would ensure that a powerful incentive remains in place for the development and sale of MD ZEVs—compliant with ZEV assurance measures and capable of replacing some of the most highly polluting conventional vehicles on the road today—across the entire footprint of the Section 177 states.

Equity Provisions

- **Environmental Justice Incentives are Valuable.** Rivian applauds staff's efforts to ensure equitable proliferation of EVs and their associated benefits. We support the use of

[6] Maxwell Woody et al., "The Role of Pickup Truck Electrification in the Decarbonization of Light-Duty Vehicles," *Environmental Research Letters* 17, no. 3 (January 2022): 034031, www.doi.org/10.1088/1748-9326/ac5142.

environmental justice credits to incentivize more accessible ZEV offerings. Rivian commends CARB's efforts to embed equity and inclusion into this next phase of the Advanced Clean Cars program and encourages staff to continue innovating policy mechanisms for greater accessibility to the electrification revolution.

- **Pooling Allowance May Concentrate Emissions and Restrict EV Access.** Rivian is concerned that the limited pooling provisions will enable manufacturers to prioritize certain regions for EV deployment, potentially leading to more concentrated tailpipe emissions in other regions relative to a non-pooling case. Rivian questions if the limited pooling allowance may cause unintended environmental justice consequences and wonders if more stringent caps or an altogether elimination of the annual pooling allotment may be warranted to minimize regional inequities in both EV access and air pollution.

Assurance Measures

- **Battery Warranty.** Rivian supports the proposed battery warranty for 70% state-of-health (SOH) through 2030 MY and 75% in 2031 and subsequent model years. Transparency about battery capability is vital to both EV penetration and a robust used-ZEV market. We agree with staff that tying the warranty to a meaningful metric best enables consumers to make the switch to electric vehicles with confidence that the technology will meet their needs. Rivian's new vehicle warranty coverage currently includes all components inside the high-voltage battery and 70% or more of the battery capacity for 8 years or 175,000 miles, whichever comes first, which meets the requirement as proposed. We appreciate CARB's consultation with industry in setting the SOH levels, and the appropriate lead time given to meet the increased SOH warranty requirements in 2031 and subsequent model years.

- **Convenience Cord.** Rivian supports efforts to increase at-home charging access. We already provide a user-selectable cord capable of both L1 and L2 charging with each vehicle and believe the convenience cord requirement is both achievable and valuable for increasing EV adoption. Nonetheless, Rivian notes that the current proposal only considers half of the equation and does not remove the need for an electrician to confirm the electric capability of an outlet and corresponding electrical infrastructure to safely charge an EV. Though we welcome the convenience cord requirement as one piece of the larger charging-ready strategy, we encourage further consideration into the technical requirements needed to prepare homes for EV charging.

- **Battery Durability.** Rivian agrees with the in-use durability standards and transparent battery health in principle, but caution that the proposed language will likely force reserve capacity and thereby increase vehicle cost (both new and used), obscure true battery capability, decrease vehicle performance with added weight, and expose manufacturers to cost-prohibitive corrective actions. According to the ISOR, the 80% SOH target reflects CARB's consideration of future innovations to increase durability. In weighing battery product development timelines with the lead time for this durability requirement, Rivian believes an 80% target will force manufacturers to build in reserve capacity in the early years, especially for heavier, more capable, vehicles. To enable battery innovations to reach

market readiness without forcing reserve capacity in the short term, Rivian suggests decreasing the SOH requirement to more closely align with either the proposed ZEV warranty standards or the United Nations Global Technical Regulation (UN-GTR), or initiating the requirement in 'data gathering' mode.

Rivian suggests implementing reduced durability requirements similar to the warranty standard changes now under consideration. Beyond concerns with interpretability of SOH for batteries with reserve capacity, Rivian also worries about deploying critical, low-supply materials to build larger batteries increasingly likely to outlast the vehicle. The reserve capacity required to meet an 80% SOH requirement will increase the battery materials required for each EV, further straining material supplies, increasing environmental footprint, and increasing costs for all EVs. Recognizing that CARB also proposed incentives for low priced ZEVs and proposed stepping up the warranty requirement after 2030 model year, Rivian believes an initial standard of 70%, at a reduced mileage, with a planned increase in 2031 model year may be a better approach to support the full suite of policy objectives.

The UNECE EVE technical regulation contains similar durability requirements, and an initial threshold of 70% SOH would better align the Advance Clean Cars program with other global standards. CARB could align ACCII battery durability requirements with the United Nations Global Technical Regulation (UN-GTR) of 70% useable battery energy at 8 years / 100,000 miles.

With rapid and recent battery technology development and implementation advancements, CARB could initiate the durability requirement in ‘data gathering’ mode. This would allow CARB to update ACCII in a few years with more representative data. The “data gathering” mode could also be paired with less stringent initial durability requirements to provide CARB with higher mileage data while still allowing for an assurance measure as initially intended by staff.

Technical Considerations

- **Defining ZEV Test Groups.** Rivian agrees that ZEV test groups should be defined as broadly as possible. A broad test group definition will increase the speed of new EVs to market and reduce EV compliance costs. Staff should work with the EPA on limiting test groups to only those vehicle features necessary to meet some other regulatory requirement. Test group should not be a reason in and of itself to drive more testing. Number of electric motors, vehicle class, and even battery configuration might not impact durability. Furthermore, EV range calculations, for the purposes of the EPA Fuel Economy Label, should be updated to allow greater EV range specificity without requiring strict test group limitations that will only increase unnecessary delay to market and costs. CARB should keep the test group definition as broad as possible for EVs, allowing CARB staff to approve multiple motors, vehicle classes, battery configurations, and other vehicle attributes in the same test group.

- **Propulsion System Active Definition.** Rivian seeks clarification on certain elements of the propulsion system active definition. The examples, "remote activation to precondition the cabin" and "(HVAC) turned on to condition cabin prior to driving," lead to some ambiguity in the case of vehicles with "non-traditional" vehicle power moding and propulsion system moding with multiple options available to the consumer regarding "cabin conditioning", and without inclusion of a start-stop button. Cabin conditioning may not always align with an intent to drive the vehicle, and ambiguity caused by these aspects of the definition in conjunction with complex state machines surrounding true entry to propulsion system active may lead to non-uniform implementation of propulsion system active across manufacturers or potentially across products in a single manufacturer. Additionally, referencing "is enabled by the driver" may not sufficiently account for driver-less vehicles in the future.

  Rivian notes that the definition as proposed does not precisely capture the activities that we understand CARB to be targeting, and that this may skew the enforcement of provisions proposed under §1962.7. This ambiguity will result in varied implementation across those vehicles taking a "non-traditional" approach to power modes and propulsion system modifications, which, in turn, will result in inaccurate or un-comparable data for all standardized data requiring incorporation of propulsion system active. Such inaccuracies will have specifically severe effects in relation to vehicle selection for enforcement testing as proposed per §1962.7. We believe this definition of propulsion system active creates sufficient ambiguity to materially influence metrics used to determine eligibility for inclusion in durability testing. Rivian asks that CARB staff clarify the elements of the propulsion system active definition leading to ambiguity and consider clarifying the definition of "driver" in the case of future driver-less vehicles.

- **High Voltage Battery Pack State of Health.** Rivian supports the proposed requirement to ensure that drivers have access to standardized battery state-of-health metrics. Transparency is vitally important to assuage consumer concerns which might otherwise pose barriers to EV adoption. As proposed, the definition of high voltage battery pack SOH in consideration of energy reserve, as specified under (c)(4)(A)4.d., is ambiguous and open to interpretation based on use of the wording "normalized such that 100 percent reflects the usable battery energy as if the user was allowed to initially access the maximum the system is designed to ever allow". Since SOH is an important value to the customer and to the proposed body of regulations and it has enforcement and warranty implications, Rivian asks that CARB directly define the calculation in cases of reserve capacity. In Rivian's view, this definition should consider reserve capacity in both the numerator and denominator and bound the SOH at 100% such that it will always result in a beginning life value of 100%. We propose the following definition:

$$SOH_{yrX} = \frac{Capacity\ Measured + (Reserve_{\ total} - Reserve_{\ unreleased})}{Certified\ Capacity + (Reserve_{total} - Reserve_{unreleased})}$$

- **OTA Reprogramming Data Report Frequency.** To reduce administrative burden, Rivian would appreciate clarification on whether OTA related data reporting is required in cases where the relevant cumulative values are saved prior to the reprogramming and written back into the onboard data system upon update completion. This "inhale, exhale" approach

to ensuring that key indicators do not reset at every OTA update may provide a desirable compliance pathway if it would suffice for CARB's purposes. Rivian seeks clarification on whether saving and reassigning the cumulative metric values sufficiently honors the spirit of this regulation or if the full reports would be required upon each system update regardless.

- **Reference Documents.** In the interest of clarity, Rivian believes that there should be explicit references to the most relevant standards whenever possible. To that end, we ask CARB to directly incorporate by reference the following:
    - SAE J2534-2, for incorporation of Diagnostics over Internet Protocol ("DoIP")
    - The balloted version of SAE J1979-3, which went out for ballot on 28 April 2022
    - SAE J1979-DA. Rivian seeks verification that CARB will allow use of the latest revision of the J1979-DA that includes all applicable data.

- **Cumulative Battery System Current.** Rivian questions the use case behind generating cumulative battery system current at 1 second intervals, as requested/required by proposed language in 1962.5(c)(4)(A). While we recognize that this requirement was tied to PEMS data collection, the use case does not exist for EVs. In the case of range testing, there is no real need to poll this data throughout the test at one second intervals, as it suffices to take a read at the beginning and end of the cycle. For these reasons, Rivian asks that CARB reconsider the need for continuous current reporting additional to the cumulative report.

Conclusion

Rivian's mission to Keep the World Adventurous Forever is made manifest in our commitment to the environment and addressing climate change. We strongly support the most ambitious regulatory programs to reduce emissions and achieve 100 percent ZEV sales as soon as possible, of which ACCII is a leading example. We applaud the continued leadership of California and CARB in pushing the ZEV industry forward. Rivian largely supports the direction of this next phase of the Advanced Clean Cars program and urges CARB staff to strengthen the proposal before the Board by aligning durability thresholds to global programs, reconsidering the necessary stringency and ZEV-crediting rules, and clarifying the rationale of and ambiguity in technical definitions such as SOH. In particular, we believe that retaining the option for MD ZEVs to earn credits under ACCII will materially strengthen the policy as well as the efforts of California and all Section 177 states to achieve their goals.

We welcome the opportunity to discuss these comments further with you at your convenience in the coming weeks. Thank you in advance for your consideration and we look forward to the upcoming Board hearing.

Sincerely,

Chris Nevers
Senior Director of Public Policy
Rivian Automotive, LLC