Tiffany Roberts
Vice President, Regulatory Affairs

September 1, 2021

(Submitted via the Workshop Comment Submittal Form and by email to cleancars@arb.ca.gov)

Advanced Clean Cars
California Air Resources Board
1001 I Street,
Sacramento, CA 95814

Re: Comments on Advanced Clean Cars II Regulation August Workshop

The Western States Petroleum Association (WSPA) appreciates the opportunity to comment on the August 11, 2021 public workshop held by the California Air Resources Board (CARB) on the proposed Advanced Clean Cars II (ACC II) Regulation.[1] WSPA is a non-profit trade association that represents companies that export for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California and four other western states, and has been an active participant in air quality planning issues for over 30 years.

Transportation fundamentally is a vehicle/fuel system. CARB must incorporate this system view in the ACC II rulemaking. That means that CARB's ACC II rulemaking must evaluate the oxides of nitrogen (NO_X) and greenhouse gas (GHG) emission benefits of technology improvements in internal combustion engine (ICE) vehicles, such as the use of plug-in hybrid electric vehicles (PHEVs), improved fuel efficiency, and stricter low emission vehicle (LEV) standards, in conjunction with lower-carbon intensity (CI) fuels (including renewables). CARB must do these analyses that WSPA and other stakeholders have recommended (including those in our June 11th letter and the ones listed below) and revise the ACC II proposal. The current top-down zero-emission vehicle (ZEV)-centric approach would place California on a path that is inherently prone to implementation delays because of its singular over-reliance on unproven assumptions for battery electric vehicle (BEV) fleet penetration. In contrast, ACC II is strangely (and wrongfully) silent on promising lower-CI drop-in fuels that could be used in new or existing vehicles.

WSPA recommends the following CARB actions:

- CARB must evaluate lower-CI vehicle/fuel systems, similar to the evaluation for the BEV/electrical grid system. Such an evaluation would show that there are additional cost-effective options, which build on the Low Carbon Fuel Standard (LCFS) and other successful programs, for reducing GHG emissions.
- CARB must determine if additional ZEV requirements could increase consumer costs and potentially delay ZEV deployment, assess if new PHEV and LEV standards are

[1] CARB Notice of Public Workshop Meeting on August 11, 2021. Available at: https://ww2.arb.ca.gov/events/public-workshop-advanced-clean-cars-ii-0. Accessed June 2021.

appropriate, and evaluate how these factors may impact the emission benefits sought in ACC II.

- It is CARB's responsibility to provide analyses on alternatives to the draft regulatory proposal that include emissions and cost benefits analyses, whether or not stakeholders provide analyzed alternatives.
- CARB must clarify and expand the scope of the Environmental Analysis (EA) to ensure that all indirect and unintentional impacts from this rule are being considered, as required under CEQA.
- CARB's assumptions in the ZEV Cost Modeling workbook released prior to the May 6th ACC II workshop are optimistic and do not reflect the true cost increase that consumers would likely experience while purchasing a ZEV.
- We respectfully request that CARB respond to our prior June 11th comment letter (Attachment A) and this letter.

These issues are discussed in further detail in the following sections.

1. CARB must evaluate lower-CI vehicle/fuel systems, similar to the evaluation for the BEV/grid system. Such an evaluation would show that there are additional cost-effective options, which build on the Low Carbon Fuel Standard (LCFS) and other successful programs, for reducing GHG emissions.

The stated purpose of ACC II is to be a coordinated package of regulations for ZEVs and LEVs to achieve CAP and GHG emission reductions. However, throughout the drafting of this proposal, CARB has only evaluated pathways that center ZEVs as the means to achieve these reductions. But this ignores the CalEPA-sponsored study conducted by the University of California Institute of Transportation Studies that charted a pathway to achieving net-zero emissions in the transportation sector.2 This study was even presented at the June 8th Assembly Bill 32 (AB 32) Scoping Plan Kick-off. In their central low-carbon scenario, the study recognized that in 2045, nearly 40% of light duty vehicles (LDVs) and 50% of light duty trucks (LDT) would be ICEs or PHEVs. In order to achieve net-zero emissions, there will be significant demand for lower-CI drop-in fuels. A projected 3 billion gasoline gallon equivalents (GGE) of bio-based gasoline and bio-based diesel will be required in 2045 in this scenario.

The development of lower-CI drop-in fuels such as renewable gasoline, bioethanol, renewable diesel, biodiesel, and renewable natural gas (RNG) had been actively incentivized under the Low Carbon Fuel Standard (LCFS) up until this point and can be immediately deployed using existing fueling infrastructure. By neglecting to assess the potential for the use of lower-CI fuels or a mechanism to credit carbon neutral or carbon negative LEVs, CARB is discouraging further research in this technology and eliminating potential near-term GHG reductions and the possibility of achieving a carbon-neutral transportation sector.

[2] Driving California's Transportation Emissions to Zero. University of California Institute of Transportation Studies. Available at: https://www.ucits.org/research-project/2179/. Accessed: August 2021.

2. **CARB must determine if additional ZEV requirements could increase consumer costs and potentially delay ZEV deployment, assess if new PHEV and LEV standards are appropriate, and evaluate how these factors may impact the emission benefits sought in ACC II.**

In the August 11th ACC II workshop, CARB proposed incorporating mandatory minimum requirements that a vehicle must reach in order to receive ZEV credits (ACC II August 11th Workshop, Slide 40). CARB stated that they will consider how these changes will affect new and used ZEV pricing for low-income users but has not released information regarding the potential pricing changes for this addendum nor for the proposed Durability and Minimum Warranty Requirements discussed in the May 6th ACC II workshop. It is not clear that it has been demonstrated that these requirements will increase consumer acceptance if they simultaneously make BEVs more expensive. As it does not appear as if CARB is addressing other key implementation barriers such as increased electricity demand and charging infrastructure (particularly for rural areas and multi-family homes), this raises important questions as to what actual BEV demand will be. CARB's ACC II proposal must address actual user concerns in order to achieve widespread ZEV adoption.

For example, the BEV range requirements are not compatible with what consumers and businesses need. The minimum range requirements are increasing from 50 miles to 200 miles, as measured on regulatory tests. This is estimated to correspond to 150 miles of real world range. While it is good to see this increase in range requirements, it still allows OEMs to build "compliance vehicles" that are do not meet the end-use needs for all consumers. A 150-mile range vehicle would still require frequent charging for those who live in rural areas and travel large distances daily and would limit intra-state travel between Southern and Northern California, to our national parks, etc. CARB should evaluate multiple end uses to determine what is the appropriate range that would fulfil most consumer needs and present this data to stakeholders so they can provide appropriate feedback.

CARB should expand the use of PHEVs, which would provide cost-effective new car choices for consumers with range and charging infrastructure concerns that may take time to resolve. CARB must evaluate the PHEVs beyond the artificial (and not technically justified) 20% cap on ZEV sales targets, so that the actual incremental cost-effectiveness of BEVs is known and opportunities for earlier and most cost-effective GHG reductions evaluated. CARB must provide a sensitivity analysis on the impact PHEVs have on the fleet's emission inventory given the option of low CI vehicle/fuel systems.

Further, the proposed battery warranty requirements do not provide for a level playing field between BEVs and PHEVs. The proposed ACC II ruling maintains the minimum warranty for PHEV batteries at 15 years or 150,000 miles but sets the new BEV battery minimum warrant at 10 years or 150,000 miles. The discrepancy in these warranty requirements favors BEV technology over PHEV technology and should be rectified.

As discussed in the May 6th ACC II public workshop, CARB proposed removing ZEVs from the fleet average NMOG+NO_X emission standards. CARB's justification for this change was that the increased percentage of ZEVs in the fleet population "leaves room for non-ZEVs to become

dirtier" without providing any justification as to why this change is required (e.g., anticipated effect on projected criteria pollutant emissions in nonattainment areas). The removal of ZEV from this emission standard would skew the fleet-wide emissions and would punish non-ZEV vehicle owners and manufacturers. This action also removes a flexibility mechanism that allows for a more cost-effective pathway to meet emission targets. Under CARB's approach, original equipment manufacturers (OEMs) will not be able to take credit for their ZEV production when tabulating their fleet-wide emissions, which could be especially taxing for OEMs that produce for sectors that will more slowly transition to ZEV. CARB should consider removing this proposal unless it can provide evidence that this approach will result in a significant reduction in the statewide NMOG+NO_X inventory.

CARB's proposed reduction in cold-start idle time for emission certification testing could be technically infeasible. OEMs use the 20 second idle time after starting a vehicle to heat the three-way catalyst using hot engine exhaust. Most reductions in certified emissions over the past two decades have come from reducing "catalyst light-off time", which is the time between engine start and the catalyst being hot enough to reduce all three pollutants (CO, NO_X, and hydrocarbons). However, it is unclear whether OEMs will be able to meet proposed emission standard with a 5 second idle time. This requirement will require the addition of new engine technology but may still be difficult to meet without some degree of hybridization to support the use of electrically-heated catalysts. CARB should solicit opinions from OEMs to determine if this requirement is feasible.

CARB has also not provided evidence that the strengthening of PM emission standards for the US06 driving cycle will have a significant impact on the emissions inventory. It is unclear if this change is reasonably achievable by OEMs and if the rule will require significant modification to vehicles. WSPA is concerned that the emission benefits are insignificant and these proposed changes will disproportionately impact manufacturers of ICE, HEV, and PHEV. CARB must justify the addition of these emission standards with a cost-benefit analysis.

CARB must evaluate the anticipated emission reductions and costs associated with the stricter LEV standards, as it is not clear from the Workshop presentation that they would provide appreciable reductions and what impact they may have on reducing consumer options for new LEV standard vehicles (and encouraging them to hold onto older vehicles).

3. It is CARB's responsibility to provide analyses on alternatives to the draft regulatory proposal that include emissions and cost effectiveness analyses, whether or not stakeholders provide analyzed alternatives.

CARB is legislatively mandated under Senate Bill (SB) 617 to perform a Standardized Regulatory Impact Assessment (SRIA) prior to adopting a major regulation like the ACC II that could have an economic impact on California business enterprises and individuals in an amount exceeding fifty million dollars.[3] This will involve an evaluation and analyses of reasonable alternatives to the regulation that are less burdensome and could be equally effective in

[3] Senate Bill 617. Available at: http://leginfo.ca.gov/pub/11-12/bill/sen/sb_0601-0650/sb_617_bill_20111006_chaptered.pdf. Accessed: August 2021.

achieving the purposes of the regulation. WSPA and other stakeholders have requested CARB to perform emissions and cost effectiveness analyses for multiple fuel/vehicle technology pathways including LEV technologies with low CI renewable fuels. Instead of performing these analyses as mandated under State law, during the August 11th ACC II public workshop CARB requested stakeholders identify and propose fully scoped alternative proposals. CARB itself should propose and analyze multi-vehicle/fuel system alternative approaches to achieving the ACC II GHG targets.

4. **CARB must clarify and expand the scope of the Environmental Analysis (EA) to ensure that all indirect and unintentional impacts from this rule are being considered, as required under CEQA.**

The scope of the EA for the proposed ACC II regulation much at the minimum include the following:

- an evaluation of the environmental impacts of mass scale ZEV manufacturing
- a full life-cycle impact analyses of mass scale electric vehicle battery production including battery recycling and disposal
- an evaluation of the changes in non-exhaust particulate matter emissions from mass scale ZEV operation
- an assessment of the air quality and other environmental impacts resulting from updates and improvements to the existing electrical grid infrastructure upgrades (generation, transmission, storage, and distribution to support vehicle charging infrastructure while maintain reliability and resiliency
- an assessment of project alternatives that could include multi-technology fuel-neutral strategies such as LEV with lower-CI renewable fuels

5. **CARB's assumptions in the ZEV Cost Modeling workbook released prior to the May 6th ACC II workshop are optimistic and do not reflect the true cost increase that consumers will experience while purchasing a ZEV.**

CARB's cost calculations[4] do not take into account the effect of increases in BEV ranges that would occur over time, which would result in increased battery size and weight in future BEVs; instead CARB assumes that batteries will get smaller over time as BEVs become more efficient. With many new BEVs entering the market, range has become a marketing tool for manufacturers. We are already seeing BEVs with increasing ranges entering the market. For example, the range of the Nissan Leaf has increased from 84 miles in its model year (MY) 2015 vehicle to 226 miles in the MY 2020 vehicle, and the Kia Soul EV has also increased its range from 93 miles in MY 2015 vehicle to 243 miles in its MY 2020 vehicle.[5] CARB must review

[4] CARB ZEV Cost Modeling Workbook. Available at: https://ww2.arb.ca.gov/sites/default/files/2021-07/ZEV_Cost_Modeling_Workbook_MayWorkshop_Accessible_0.xlsx. Accessed: August 2021.

[5] Available at: https://www.fueleconomy.gov/feg/Find.do?action=sbs&id=34918&id=35601&id=43412&id=42562. Accessed: August 2021.

current market trends and update its estimates for battery size and weight thereby providing a more reasonable cost estimate for future BEVs in its cost calculations.

CARB's projections for the efficiency (in Wh/mi) of BE pickup trucks seem overly optimistic and potentially unrealistic compared to the current market trends. CARB assumes an energy efficiency of 356-374 Wh/mi in 2025 for BE pickup trucks. Whereas, current estimates of energy efficiency of these vehicles range from 450 Wh/mi to 570 Wh/mi.[6] Since 64% of new LDV registrations in 2020 in California were light duty trucks,[7] it is essential that CARB address this discrepancy between their estimates and the real world performance of these types of vehicles. Using an overly optimistic energy efficiency for these vehicles portrays BE pickup trucks as more cost effective than they actually are.

Finally, CARB assumes that 97% of the total battery energy will be usable across over the lifetime for a BEV, which is in direct conflict with currently available BEV performance data. A recent study[8] shows that actual usable energy for a "new" BEV is only 93% and this value drops to 80% over the 1000-3000 cycles of battery lifetime (~125,000 miles of BEV usage for 1,000 cycles). Since CARB's workbook uses the assumed usable battery energy to size the battery for a BEV and estimate the BEV cost, it is essential that they update this value to a more accurate number that reflects real world BEV performance.

6. CARB must respond to our previous comment letter dated June 11, 2021 following the May 6th ACC II workshop.

WSPA submitted the following comments as part of its June 11, 2021 in response to the ACC II public workshop held on May 6, 2021.[9] We request that CARB review and respond to these comments. These issues, summarized below, are presented in more detail in Attachment A.

- CARB must evaluate multiple vehicle/fuel technology scenarios instead of focusing on an electric vehicle (EV) centric approach to reducing NO_X and GHG emissions from light-duty and medium-duty vehicles (LD/MDVs)
- CARB should justify that a bifurcated criteria air pollutant emission standard for ZEVs and non-ZEVs will be a cost-effective pathway to achieve emission reductions
- CARB must evaluate the impact of the proposed ZEV penetration on the statewide particulate matter (PM) inventory (notably, due to heavier BEVs), especially in $PM_{2.5}$ nonattainment areas

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6 Every Electric Pickup Truck Currently on the Horizon. Car and Driver. Available at: www.caranddriver.com/news/a29890843/full-electric-pickup-trucks/. Accessed: August 2021.

7 California Auto Outlook Comprehensive information on the California vehicle market. Available at: https://www.cncda.org/wp-content/uploads/Cal-Covering-4Q-20.pdf. Accessed: August 2021.

8 König, A.; Nicoletti, L; Schröder, D.; Wolff, S.; Waclaw, A.; Lienkamp, M. An Overview of Parameter and Cost for Battery Electric Vehicles. World Electr. Veh. J. 2021, 12, 21. Available at: https://doi.org/10.3390/wevj12010021. Accessed: August 2021.

9 CARB Notice of Public Workshop Meeting on August 11, 2021. Available at: https://ww2.arb.ca.gov/events/public-workshop-advanced-clean-cars-ii. Accessed June 2021.

- CARB should consider the costs of additional road maintenance and loss of revenue from fuel sales into a techno-economic feasibility and cost-effectiveness assessment
- CARB must assess how future electric grid reliability and infrastructure needs will affect the feasibility of CARB's proposed ZEV purchase mandate
- CARB should evaluate potential electric vehicle battery supply chain requirements, especially demand for critical mineral resources which would be necessary to support the proposed ZEV sales mandate
- CARB must evaluate the feasibility of achieving CARB's anticipated near-term ZEV sales targets given current low adoption rates and consumer concerns
- CARB should address shortfalls in BEV performance that fail to satisfy end-uses currently met by ICEs
- CARB should incorporate the cost implications of the proposed Durability and Minimum Warranty Requirements on the future sales prices of ZEVs
- CARB must account for increased financial burden on non-dealer Independent Repair Shops resulting from ZEV transition
- CARB must provide data regarding the expected emission impacts of medium duty vehicle travel that is in towing mode

Sincerely,

Tiffany Roberts
Vice President, Regulatory Affairs

Attachment: "Comments on Advanced Clean Cars II Regulation May Workshop" by WSPA dated June 11, 2021

Tiffany Roberts
Vice President, Regulatory Affairs

June 11, 2021

(Submitted by email to cleancars@arb.ca.gov)

Advanced Clean Cars II
California Air Resources Board
1001 I Street,
Sacramento, CA 95814

Re: Comments on Advanced Clean Cars II Regulation May Workshop

The Western States Petroleum Association (WSPA) appreciates the opportunity to comment on the May 6th public workshop held by the California Air Resources Board (CARB) on the proposed Advanced Clean Cars II (ACC II) Regulation.[1] WSPA is a non-profit trade association that represents companies that export for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California and four other western states, and has been an active participant in air quality planning issues for over 30 years.

Executive Order (EO) N-79-20 states that CARB "**shall act consistently with technological feasibility and cost-effectiveness**". While the proposed zero emission vehicle (ZEV) requirements under ACC II may advance the goal for 100% of in-state sales of new passenger cars to be zero emissions (ZE) by 2035, CARB's analyses thus far fail to demonstrate that such a mandate is technically feasible or cost-effective. To demonstrate the feasibility of the proposal, CARB must do the following:

- Evaluate multiple vehicle/fuel technology scenarios instead of focusing on an electric vehicle (EV) centric approach to reducing NOx and Greenhouse Gas (GHG) emissions from light-duty and medium-duty vehicles (LD/MDVs)
- Justify that a bifurcated criteria air pollutant emission standard for ZEVs and non-ZEVs will be a cost-effective pathway to achieve emission reductions
- Evaluate the impact of the proposed ZEV penetration on the statewide particulate matter (PM) inventory (notably, due to heavier battery electric vehicles (BEVs)), especially in $PM_{2.5}$ nonattainment areas
- Consider the costs of additional road maintenance and loss of revenue from fuel sales into a techno-economic feasibility and cost-effectiveness assessment
- Assess how future electric grid reliability and infrastructure needs will affect the feasibility of CARB's proposed ZEV purchase mandate

[1] CARB Notice of Public Workshop Meeting on May 6, 2021. Available at: https://ww2.arb.ca.gov/events/public-workshop-advanced-clean-cars-ii. Accessed June 2021.

- Evaluate potential electric vehicle battery supply chain requirements, especially demand for critical mineral resources which would be necessary to support the proposed ZEV sales mandate
- Evaluate the feasibility of achieving CARB's anticipated near-term ZEV sales targets given current low adoption rates and consumer concerns
- Address shortfalls in BEV performance that fail to satisfy end-uses currently met by internal combustion engines (ICEs)
- Incorporate the cost implications of the proposed Durability and Minimum Warranty Requirements on the future sales prices of ZEVs
- Account for increased financial burden on non-dealer Independent Repair Shops resulting from ZEV transition
- Provide data regarding the expected emission impacts of medium duty vehicle travel that is in towing mode

These issues are discussed in further detail in the following sections.

1. CARB must evaluate multiple vehicle/fuel technology scenarios to reduce NOx and GHG emissions from light-duty and medium-duty vehicles under the proposed ACC II regulation. The proposed EV-centric approach fails to account for the emissions impacts of associated fueling and charging systems, and neglects the demonstrated Criteria Air Pollutant (CAP) and GHG emissions reduction potential of improved combustion engines and renewable fuel systems.

The goal of the proposed ACC II is to achieve CAP reductions mandated under the federal Clean Air Act (CAA) and GHG emission reductions to meet the statewide GHG targets, respectively. CARB's proposed ACC II regulation is a technology forcing standard that mandates large-scale LDV/MDV fleet turnover into EVs (BEV, fuel cell electric vehicles (FCEV), and plug-in hybrid vehicles (PHEV)), and fails to consider other fuel and engine technology scenarios that could result in more cost-effective GHG and CAP reductions. But CARB has provided no evidence that electrification of the light duty fleet will deliver significant CAP reductions. It is imperative that CARB assesses additional vehicle technology and fuel scenarios that could potentially achieve greater near-term CAP reductions while contributing towards state GHG goals in a cost-effective manner.

According to the ACC II workshop slides from May 6th, 2021, LDVs account for just 13% of statewide NOx emissions in 2017. In the South Coast, NOx emissions from LDVs are nearly negligible compared to other emission sources in the area, as seen on slide 8 of the 2022 Air Quality Management Plan (AQMP) working group presentation from December 16th, 2020.[2] We do note CARB's views on lifecycle emissions of different vehicle types in workshop Slide 5. However, CARB should present further detail regarding the assertion that vehicle electrification would yield NOx emission reductions across the lifecycle (well to wheel) as compared to liquid or gaseous fuels. CARB must prepare a comprehensive NOx emission inventory that captures upstream emissions from transportation energy production to quantify the NOx emissions impacts of the proposal.

[2] Available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/presentation-2022-aqmp-mobile-sources-wg-final.pdf?sfvrsn=12. Accessed: June 2021.

Additionally, it has not been demonstrated that an all-electric LDV/MDV fleet would produce GHG benefits significantly different than those which could be realized from improved internal combustion engines combined with alternative low-carbon fuels (e.g., bio-based gasoline, renewable diesel, renewable natural gas, etc.). According to a study conducted by UC Davis,[3] the near-term GHG reductions (in 2030) from pursuing a high-liquid fuels (HLF) pathway to carbon-neutrality were nearly equivalent to those under a high ZEV pathway similar to that proposed under ACC II. Further, these reductions under that study's HLF pathway were projected to cost approximately $2 billion less than an EV-centric pathway.

Further, CARB has not yet discussed or proposed minimum vehicle efficiency standards for BEVs, FCEVs and PHEVs. Different than a battery range standard, a vehicle efficiency standard would address the mileage efficiency per unit of energy consumed.

2. By mandating a bifurcated criteria air pollutant emission standard that creates a new separate standard for non-ZEV emissions, CARB would remove a flexibility mechanism that allows for a more cost-effective pathway to meet emission targets.

CARB has proposed bifurcating the non-methane organic gas (NMOG) plus NO_X fleet average standards to exclude ZEVs from the fleet averaged calculation and creating more emission bins for the non-ZEV emission standard. The proposed action appears to be based on a speculative assumption that the "non-ZEV fleet gets dirtier as ZEV sales increase". CARB has not provided any justification of why this change is required, the anticipated benefits from the proposed change (e.g., anticipated effect on projected criteria pollutant emissions in nonattainment areas) as well as the potential economic implications of such a mandate on non-ZEV manufacturers. The removal of ZEV from this emission standard would skew the fleet-wide emissions and would punish non-ZEV vehicle owners and manufacturers. This action also removes a flexibility mechanism that allows for a more cost-effective pathway to meet emission targets. Under CARB's approach, original equipment manufacturers (OEMs) will not be able to take credit for their ZEV production when tabulating their fleet-wide emissions, which could be especially taxing for OEMs that produce for sectors that will more slowly transition to ZEV. CARB must perform a cost-benefit analysis to determine if this mandate will have the desired impact on emissions given the expense that will be had on OEMs.

3. CARB must evaluate the impact of the proposed EV penetration on the statewide PM inventory (notably, due to heavier BEVs), especially in nonattainment areas.

CARB's proposed standards for BEV range and durability in the ACC II regulation[4] incentivize larger battery sizes and increasing vehicle weight. Per a study done by Timmers et al. (2016), BEVs were found to be 24% heavier on average than their internal combustion engine counterparts.[5] Due to this increased vehicle weight, entrained road dust emissions generated by LD BEVs would then be up to 24% higher[6] than diesel/gasoline alternatives. CARB needs to

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[3] Driving California's Transportation Emissions to Zero, UC Davis 2021. Available at: https://escholarship.org/uc/item/3np3p2t0. Accessed June 2021.

[4] CARB Advanced Clean Cars (ACC) II Workshop Slides from May 6th, 2021. Available at: https://ww2.arb.ca.gov/sites/default/files/2021-05/acc2_workshop_slides_may062021_ac.pdf. Accessed: June 2021

[5] Non-exhaust PM Emissions from Electric Vehicles, Timmers 2016. Available at: https://doi.org/10.1016/j.atmosenv.2016.03.017. Accessed: June 2021.

[6] CARB Methodology for Entrained Road Travel, March 2021. Available at: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/2021_paved_roads_7_9.pdf. Accessed June 2021

evaluate the impact of increased EV penetration on the State's PM inventory, and evaluate consistency with State Implementation Plan (SIP) actions that were crafted to reduce PM in nonattainment areas.

4. **CARB must incorporate the costs of additional road maintenance and loss of revenue from fuel sales into a feasibility assessment of ACC II.**

As noted in the previous comment, BEVs could be up to 24% heavier than their ICE counterparts, on average. The increased vehicle weight also correlates to increased wear on the State's roads. Historically, CARB has funded road repair through tax revenue from gasoline and diesel sales. As mentioned in WSPA's comment letter on CARB's April Draft Mobile Source Strategy (MSS), the state is projected to lose $5.6 billion in revenue from gasoline fuel taxes and $1.9 billion from diesel fuel taxes as the consumption of liquid fuels decrease[7]. A feasibility assessment must include how needed roadway maintenance and repair will be funded if ACC II is implemented.

5. **CARB must ensure that this transition is the cost-effective pathway to achieving California's criteria pollutant and greenhouse gas reductions. CARB's proposed ZEV purchase mandate and the necessary upgrades to the grid and associated infrastructure are projected to cost at least $2.1 to $3.3 trillion from 2020 to 2050.**

There exists significant stakeholder concern regarding the electric grid's reliability and readiness to support a full-scale transition to ZEVs. WSPA is concerned that the costs of grid and infrastructure upgrades will further stall a clean transition and prevent emission reductions from taking place on the timescale needed to meet federal emission standards.

A study commissioned by the California Energy Commission (CEC)[8,9] estimated that the total cumulative grid infrastructure costs (i.e., generation, transmission, distribution) required to meet the State's 2030 greenhouse gas target of 40% reduction from 1990 levels would be **$520 billion from 2020 to 2030** under the modeled high electrification scenario. It also projected a cumulative cost of **$1.82 trillion dollars from 2020 to 2050** to meet the State's 2050 GHG target of 80% reduction from 1990 levels (i.e., the high electrification scenario). But these costs are understated since they do not include vehicle charging infrastructure.

Per the CEC's AB2127 Report (performed in collaboration with the National Renewable Energy Lab (NREL)),[10] California is expected to fall short of its 2025 charging infrastructure targets, a shortfall which will increase significantly by 2030 where a total of 1,546,000 chargers will be required to support 8 million LD ZEVs in 2030 as forecast in CARB's Draft 2020 MSS. Further, CEC AB2127 Report projects that 157,000 DC fast chargers are needed to support the CARB

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[7] WSPA Comment Letter on CARB April MSS Draft. Available at: https://ww2.arb.ca.gov/sites/default/files/2021-05/9-WSPA_Comment_RevisedDraft2020MobileSourceStrategy.pdf. Accessed June 2021.

[8] E3 2018 Deep Decarbonization PATHWAYS Report. Available at: https://www.ethree.com/projects/deep-decarbonization-california-cec/. Accessed June 2021.

[9] E3 PATHWAYS Technical Appendix https://www.ethree.com/wp-content/uploads/2017/02/California_PATHWAYS_Technical_Appendix_20150720.pdf. Accessed June 2021.

[10] CEC AB 2127 EV Charging Assessment. Available at: https://efiling.energy.ca.gov/getdocument.aspx?tn=236237. Accessed June 2021.

2020 Draft MSS's population projection of 180,000 medium-duty/heavy-duty (MD/HD) ZEVs. Based on these vehicle-to-charger ratios, vehicle population projections from EMFAC2017,[11] fleet composition projections from CARB 2020 Draft MSS,[12] and vehicle charger cost data from the South Coast Air Quality Management District's (SCAQMD's) Warehouse Indirect Source Rule (ISR) Staff report,[13] **an investment in EV chargers between $0.3 and $1.5 trillion dollars** would be necessary to support the projected number of LD and MD/HD BEVs within the State in 2050.[14]

These potential costs would be significant to the California economy, both public and private. Since the success of ACC II would depend on the grid's capacity to support a ZEV fleet, CARB's rulemaking must fully account for the costs of required grid infrastructure upgrades.

6. CARB' strategy for critical mineral resource management relies on a recycling industry that does not yet exist and does not account for the projected global increase in demand for these resources, adding much uncertainty to the feasibility of a full ZEV transition.

WSPA is deeply concerned that CARB's proposed mandates for light duty vehicle electrification may not be achievable given the immutable constraints on global mineral resources critical to the technology mandate. Further, the significant increase in projected demand of these minerals coupled with uncertainty of mineral resources may result in greater price volatility of EV batteries. It is imperative that CARB conducts a detailed feasibility and environmental impact assessment of battery production to meet increased demand, as well as an evaluation of the cost implications of mineral scarcity on EV battery costs.

In the May 6th ACC II Public Workshop, CARB noted that the rate of depletion for several critical energy minerals required to produce EV batteries is increasing.[15] Notable among the listed minerals were lithium, cobalt, and nickel, for which the rate of depletion have more than doubled between 2010 and 2020 (e.g., the expected lifetime of existing reserves of lithium dropped from over 450 years to under 200 years between 2010 and 2020, and from nearly 100 years to 50 years for nickel and cobalt). Significant increases in the rate of battery production would be required in order to meet CARB's target of 26% LDV EVs sales by 2026, given that at present,

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[11] EMFAC2017 Web Database. Available at: https://arb.ca.gov/emfac/2017/. Accessed June 2021.

[12] CARB 2020 Draft MSS. Available at: https://ww2.arb.ca.gov/resources/documents/2020-mobile-source-strategy. Accessed June 2021.

[13] Low- and High- range charger purchase and installation costs from AQMD WAIRE, Table 18. Available at: http://www.aqmd.gov/docs/default-source/planning/fbmsm-docs/pr2305_draft-staff-report_03032021.pdf?sfvrsn=8. Accessed June 2021.

[14] According to CARB's 2020 MSS, 93% of the LDV fleet would be Zero-Emission Vehicles in 2050, with 18% comprising fuel cell vehicles and the remaining 75% battery electric. Based on the CARB MSS study, the same assumption of 18% of the MD/HD fleet in 2050 to be comprised of fuel cell vehicles was used, resulting in the remaining 82% comprised of BEVs. A vehicle replacement ratio of 1.2 was applied to convert this fraction (87%) of EMFAC2017 MD/HD vehicle population to a BEV population. These percentage projections were translated into the number of chargers based on based on vehicle population projections from EMFAC2017 and a scaling according to the vehicles-to-charger ratio from existing studies. Available at: https://arb.ca.gov/emfac/emissions-inventory. Accessed June 2021.

[15] CARB Advanced Clean Cars (ACC) II Workshop Slides from May 6th, 2021. Available at: https://ww2.arb.ca.gov/sites/default/files/2021-05/acc2_workshop_slides_may062021_ac.pdf. Accessed: June 2021

only 7.8% of California's LDV fleet sales were battery-electric, plug-in hybrid, or fuel cell in 2020.[16] For example, a study by the International Energy Association on the *Role of Critical Minerals in Clean Energy Transition*[17] ("IEA Study") projected that rapid and widespread vehicle electrification (including demand for batteries used to support a high renewables grid) would result in demand for lithium, cobalt and nickel growing by a factor of 19 - 42 times by 2040 relative to 2020 consumption levels globally. The study further states that the "expected supply from existing mines and projects under construction are estimated to only meet half of the projected lithium and cobalt requirements by 2030".

In the May 6th ACC II Public Workshop, CARB proposed battery recycling as a means to mitigate against global constraints on critical energy minerals and reduce dependency on battery manufacturing. CARB points to a 2021 study by Dunn et al.[18] to suggest that the US could meet more than half of the material demand for new batteries with recycled materials by 2040. However, CARB fails to acknowledge that the study arrives at this conclusion as an optimistic estimate "under idealized conditions", and most importantly, that "recycling and manufacturing infrastructure must be developed in each region" in order to achieve these high rates of material reuse and recycling.

The IEA Study states that the end-of-life recycling rate for lithium and rare earth minerals is less than 1% globally, indicating that recycling programs for these critical energy minerals have not been established. It also states that lack of infrastructure for material collection, lack of regulation for discharging, disassembling, and storing expended battery technology, and a lack of standardization of battery pack design pose significant challenges to the automating recycling processes.

CARB's long-term strategy for addressing ZEV battery requirements is dependent on recycling programs that do not yet exist. CARB claims that battery recycling and material recovery could meet more than half of the material demand in the US by 2040 (ACC II May Workshop Slide 90), but CARB must also anticipate scenarios where battery recycling does not meet these target goals. Given the environmental hazards presented by battery recycling, CARB's strategy must include a full risk assessment and cost benefit analysis to ensure that battery recycling will not burden communities with more environmental challenges.

CARB expects the first large scale retirement of EV batteries to begin within the next 5 to 10 years, and therefore it is critical that CARB addresses these challenges to battery recycling now.

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[16] California Energy Commission Zero Emission Vehicle and Infrastructure Statistics. Available at: https://www.energy.ca.gov/data-reports/energy-insights/zero-emission-vehicle-and-charger-statistics. Accessed: June 2021

[17] Available online: https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions. Accessed: June 2021

[18] Circularity of Lithium-Ion Battery Materials in Electric Vehicles. Available online: https://pubs.acs.org/doi/10.1021/acs.est.0c07030. Accessed June 2021.

7. The targets CARB has set for the proposed ZEV purchasing mandate are not consistent with the current market share for ZEV sales.

In the May 6th ACC II Public Workshop, CARB proposed setting a ZEV sales target starting at 26% in 2026, increasing up to 100% ZEV sales by 2035. According to the CEC, EV (BEV, PHEV, and FCEV) sales only made up 7.8% of the total new vehicle purchases in California in 2020.[19] CARB has not provided any measures or actions it will take to increase ZEV new vehicle sales from the current state to meet their proposed targets in 2026 and beyond, rendering it impossible to assess the feasibility and costs associated with such a transition.

8. CARB has not evaluated the feasibility and cost-effectiveness to replace existing ICE LDV and MDV in certain vehicle services uses with BEVs. CARB's PHEV cap is arbitrary.

CARB arbitrarily proposes a 20% cap every year on the number of PHEVs allowed to fulfill OEMs obligation (ACC II May Workshop Slide 49). CARB has not done a suitability analysis for LDV/MDV (as currently being done for heavy duty vehicles under the Advanced Clean Fleet [ACF] rulemaking[20]) to determine whether BEVs can serve as one-to-one replacements for every vehicle service. This is essential particularly for heavier vehicles such as pick up trucks and large sports utility vehicles (SUVs) and scenarios such as rural services, long- haul services, towing applications, and communities with urban, multi-family units with minimal or limited access to EV charging stations that cannot feasibly or economically transition to full BEV and may require PHEV or ICE for their daily needs. Emergency vehicles (e.g., police cruisers and other first responder vehicles) also fall under a class of vehicles that may need to rely on PHEVs to provide essential services when BEVs cannot. CARB must take a bottom-up approach when making projections of fleet makeup to ensure that the needs of the state's populace are being met in this transition.

9. CARB must incorporate the cost implications of the proposed Durability and Minimum Warranty Requirements on the future sales prices of ZEVs when evaluating the total economic impact of the proposed ACC II regulation.

In the May 6th ACC II Public Workshop, CARB presents a buildup of BEV, FCEV and PHEV costs based on a bottom-up estimate of component costs such as battery, non-battery component, and ZEV assembly costs. However, CARB has not accounted for potential additional costs that would be incurred by manufacturers to meet Durability and Minimum Warranty Requirements. CARB proposes a durability requirement for BEVs of 80% of certified Environmental Protection Agency (EPA) Urban Dynamometer Driving Schedule (UDDS) range for 15 years/150,000 miles, and a battery warranty term of 10 years/150,000 miles. These targets exceed current ZEV warranty offerings and currently achieved durability performance (ACC II May Workshop Slide 78), and therefore would very likely involve increased costs to the manufacturer which would be passed on to consumers.

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[19] California Energy Commission Zero Emission Vehicle and Infrastructure Statistics. Available at: https://www.energy.ca.gov/data-reports/energy-insights/zero-emission-vehicle-and-charger-statistics. Accessed: May June 2021.

[20] Advanced Clean Fleets – Meetings and Events. Available at: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets/advanced-clean-fleets-meetings-events. Accessed: June 2021.

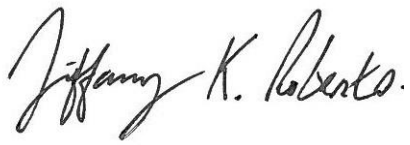
10. CARB must also consider the burden that a ZEV transition will have of non-dealership Independent Repair Shops when evaluating total economic.

CARB's proposed Service Information regulations requires emission-related repair information and additional tooling to access on-vehicle information to be made available for non-dealer technicians (i.e., independent repair shops). These mandates would place additional burden on independent repair shops to invest in new tooling to access and reprogram vehicle electronic control units (ECUs), retrain staff to interpret and diagnose an entirely new set of data protocols and fault codes associated with more complicated ZEVs, as well as other potential changes to business processes required to service ZEVs in a safe and efficient manner. CARB needs to perform an assessment of the costs incurred by these independent repair shops resulting from their proposed regulations as part of its overall cost-effectiveness demonstration.

11. CARB must provide data regarding the expected emission impacts of medium duty vehicle travel that is in towing mode as a part of its rationale for additional testing requirements.

CARB is imposing addition testing requirements on medium duty vehicle to match the testing procedures from the Heavy Duty Omnibus Rulemaking because certain MDV operating modes, such as towing, lead to increased on-road emissions. CARB should provide information about the fraction of MDV travel that is assumed to be in towing mode and the expected emission benefits of additional testing to reduce towing mode emissions. CARB must justify the additional testing requirements by showing that the emission reductions from this program rationalize the additional costs that it will incur.

Sincerely,



Tiffany K. Roberts
Vice President, Regulatory Affairs