



California Air Resources Board
1001 I Street
Sacramento, CA 95814
June 9, 2022

ARB's Hearing on Proposed Advanced Clean Cars II Standards

Re: NRDC response to WSPA comments on Advanced Clean Cars II rulemaking

Dear Chairwoman Randolph and Members of the Board,

The Natural Resources Defense Council is a national environmental organization with over three million members and online activists, many of whom live in California. We are providing these comments on the Advanced Clean Cars II ("ACC II") proposal as a supplement to our testimony (June 9, 2022), as well as our earlier written comments submitted on May 31, 2022.¹ We have reviewed a number of the comments submitted by stakeholders in the process, and we write in response to new, particular claims raised by the Western States Petroleum Association ("WSPA") that were submitted on May 31, 2022 to the record.²

1. ARB has the authority and discretion to implement different forms of standards to reduce pollution and protect public health, and is not restricted from implementing just one type or design of a standard.

WSPA claims that ARB "must set a technology neutral performance-based standard rather than the Zero Emission Vehicle (ZEV) mandate." We strongly disagree. ARB has used its

¹ NRDC Comments on ACC II, May 31, 2022, https://www.arb.ca.gov/lispub/comm/iframe_bccomdisp.php?listname=accii2022&comment_num=403&virt_num=98

² WSPA Comments on ACC II, May 31, 2022, https://www.arb.ca.gov/lispub/comm/iframe_bccomdisp.php?listname=accii2022&comment_num=477&virt_num=162

authority and discretion over many decades to protect public health from air pollution, using a range of policy tools to fit the specific regulated party and industry. The promulgation and enforcement of protective standards have ranged from outright bans (e.g. removal of lead from gasoline via fuel standards), to vehicle standards (e.g. tailpipe greenhouse gas and criteria emissions standards), to technology-forcing requirements (e.g. zero-emission vehicle requirements), technology requirements or mandates (compliant aftermarket catalytic converters), to technology neutral performance-based standards (e.g. low carbon fuels standards). Just like building a house requires multiple tools, reducing air pollutants from various mobile sources and fuels requires multiple policy tools and complementary policies.

The Zero-Emission Vehicle (ZEV) program is a requirement that an increasing share of the new passenger vehicle fleet sold by automakers be zero-emissions from the tailpipe. The requirements are based on ZEV credits, and automakers have some flexibility to meet the ZEV credit requirements based on the mix of ZEV technologies and credits used.

WSPA gets into semantics somewhat in trying to bucket the ZEV program as a technology mandate. In fact, one could argue that the program has elements of “all of the above.” It could be considered a performance-based, technology-neutral emissions standard with the “performance level” set at zero and all technologies that achieve zero tailpipe emissions counted (which currently include hydrogen fuel cells, battery electric vehicles, and plug-in hybrid electric vehicles that achieve zero-tailpipe for a significant portion of driving). The ZEV program could be considered somewhat of a sales mandate, based on automakers needing to comply with a specific credit percentage. We note that there is significant flexibility in compliance such that a specific sales level for an automaker is not actually set, but rather the credit requirement. It has some elements of a technology mandate, although this is not entirely accurate because there is not just one technology mandated, but rather three very different technology categories which currently qualify for credits. We also note that if a new fuel technology in the future should appear - with zero-emission at the tailpipe - ARB could update the ZEV program to incorporate this technology.

2. The ZEV program is necessary to reduce both greenhouse (GHG) emissions and criteria emissions including oxides of nitrogen (NO_x) and fine particulate matter (PM), among other pollutants.

WSPA argues that there are other “fuels” beyond electricity and hydrogen that can reduce GHG emissions such as renewable fuels or low-carbon intensity gasoline depending on the feedstocks and processes used to produce the fuel. We agree.

But the ZEV program is not only about reducing GHG emissions, but also about eliminating criteria and toxic pollutants from the vehicle tailpipe. In fact, this was its purpose in the 1990s when the first iteration of the program was promulgated. Based on today’s technologies, combustion of renewable fuels or other low-carbon intensity liquid fuel reduces carbon emissions but still results in tailpipe criteria emissions such as NO_x and PM, unburned hydrocarbons (HCs), and other compounds. Allowance of these fuels still results in local air quality impacts and local damage to public health. In fact, that is why hydrogen - which can similarly be produced from renewable feedstocks or even renewable electricity - is not allowed in the ZEV program to be combusted in a hydrogen internal combustion engine. It is allowed as the fuel used in a fuel cell vehicle because when used in that fashion it produces zero tailpipe emissions.

The consultant analysis supporting WSPA’s comments does not quantify, or even mention, the increased criteria pollutant emissions that would result from its identified alternatives. The CARB staff report does not separate out the LEV and ZEV contributions to the total projected NO_x and PM reductions achieved by the ACC II proposal, so we are unable at this time to provide a precise estimate of the magnitude of the foregone reductions under the WSPA alternatives. A preliminary estimate can be provided, however, based on the incremental reductions that occur in model years 2036 and beyond. In those years all sales are ZEVs, so all additional reductions can be attributed to ZEVs (the LEV standards have no incremental impact). The incremental NO_x reductions in the staff report for each model year are about 2.6 tons per day, and the incremental PM reductions are about 0.2 tons per day.

ZEV technologies are widely accepted in the scientific and technical community as one of the primary strategies to significantly reduce pollution, improve efficiency, and reduce petroleum dependency. In fact, a recent congressional mandated report from the National Academies of Sciences, Engineering, and Medicine identifies the increased use of ZEVs as the greatest opportunity to do this over the 2025 to 2035 period.³

ARB's focus on ZEV technologies that deliver both criteria and GHG emission reductions from the tailpipe is supported based on the science and is reasonable. Fuels that are combusted do not meet the goals of the ZEV program for zero tailpipe emissions.

3. Programs like California's Low Carbon Fuel Standard and the tailpipe GHG emissions program already provide a mechanism to count and incentivize low carbon-intensity fuels and internal combustion engine technology improvements

WSPA identifies that ARB should adopt a GHG performance based emissions standard such as a Low Carbon Fuel Standard (LCFS) instead of a ZEV sales mandate. As we argued in points 1 and 2, ARB has the authority and discretion to determine the policy mechanism by which to achieve emission reductions from the vehicle-side, and has the mandate not only to reduce GHG emissions but to also address criteria emissions as well.

Fuel producers, like WSPA members, already have a LCFS program that is resulting in reductions in the GHG emissions from the fuel supply chain. That does not mean that there cannot be other programs, like the ZEV program, designed to address the vehicle side of the equation in tackling pollution, or that the agency must only consider GHG emissions.

WSPA also fails to acknowledge that in fact, there is already a separate, GHG emission reduction program on the vehicle tailpipe side, as part of the Advanced Clean Cars Program encompassing standards for criteria emissions, GHG emissions, and ZEV requirements. It is also unclear how WSPA's GHG performance standard proposal would not duplicate existing

³ NAS (2021), <https://www.nationalacademies.org/news/2021/03/zero-emission-vehicles-represent-the-future-of-energy-efficiency-petroleum-and-emissions-reductions-in-2025-2035-new-report-says>

LCFS programs that are already reducing emissions from the fuel-supply chain as well the existing GHG emissions standard on vehicle tailpipe emissions.

Finally, GHG emission reductions cited by WSPA could also be achieved by simply increasing the requirement under the LCFS going forward and a more likely pathway, to spur increased use of low carbon fuels.

4. A grid impacts analysis is not required by ARB in the ACC II program, and has anyhow already been completed by its sister agency, the California Energy Commission in partnership with ARB

WSPA claims that ARB must provide and consider “impacts of rolling blackouts, higher utility costs, destabilization of industrial operations, and other foreseeable consequences of shifting additional power demand onto the grid.” But the California Energy Commission (CEC) where these responsibilities fit, has already done so with ARB also participating as part of the state’s Zero-Emission Vehicle Infrastructure Plan development.

The CEC forecasts that EVs will account for approximately seven percent of annual electricity usage and one percent of the system peak demand in 2030.⁴ The CEC’s draft Zero Emission Vehicle Infrastructure Plan finds that “California’s electric grid can accommodate near-term infrastructure goals and longer-term goals can be achieved with planning, which is already underway.”⁵ State agencies and policymakers are implementing policies to encourage grid-friendly, beneficial load growth, such as time-of-use rates and programs to encourage charging during times when renewables are in excess.⁶ The CEC finds that costly grid upgrades and charging expenses can be mitigated through reducing operating costs such as demand charges through rate design, distributed energy resources, smart charging,

⁴ California Air Resources Board, “Governor Newsom’s Zero-Emission by 2035 Executive Order (N-79-20)” January 2021, <https://ww2.arb.ca.gov/resources/fact-sheets/governor-newsoms-zero-emission-2035-executive-order-n-79-20> [Accessed March 31, 2022.]

⁵ California Energy Commission, Draft Report 600-2022-054, page 1. <https://www.energy.ca.gov/sites/default/files/2022-04/CEC-600-2022-054.pdf>. [Accessed April 14, 2022.]

⁶ California Air Resources Board, “Governor Newsom’s Zero-Emission by 2035 Executive Order (N-79-20),” January 19, 2021, <https://ww2.arb.ca.gov/resources/fact-sheets/governor-newsoms-zero-emission-2035-executive-order-n-79-20>. [Accessed March 31, 2022.]

load management, and other managed charging strategies. All of Chapter 2 in the State's Zero-Emission Vehicle Infrastructure Plan examines the question of EV impact on the grid and finds "California's electric grid will adapt to ZEV load" and the plan overall finds that "California's electric grid can accommodate near-term infrastructure goals, and longer-term goals can be achieved with planning, which is already underway. California's existing grid and approved investments in it will allow the state to handle millions of electric vehicles in the next few years. Ongoing planning will help prepare the grid for reliance and reliability in the longer term."⁷ CEC also cites scores of studies that have already been conducted and we indirectly reference for the record via the CEC report citation. We point WSPA to this state agency report, as well as to several studies that have already affirmed that EVs won't crash the grid.

- A peer-reviewed study conducted by researchers in the U.S. Department of Energy's Lawrence Berkeley National Laboratory, utilized real-world data on the distribution grid and EVs to simulate what would happen if all households were driving an EV in a residential region of Northern California.⁸ The study found that high EV penetration can be achieved without straining the grid, simply by implementing smart grid integration strategies such as programs to charge vehicles during off-peak hours.⁹ Electric utilities currently have programs to do this and planning processes to accommodate this new load.
- A study by Synapse Economics, prepared on behalf of NRDC, found that EVs are not crashing the grid. In fact, based on data and reports from the three largest Investor Owned Utilities in California (PG&E, SDG&E, and SCE), the analysts found that very few EVs require distribution system or service line upgrades, that EV customers on time-of-use (TOU) rates use little energy during on-peak hours (i.e. the vast majority

⁷ California Energy Commission, *Draft Zero-Emission Vehicle Infrastructure Plan (ZIP)*, April 2022, CEC-600-2022-054, Thanh Lopez and Madison Jarvis, page 1 and Chapter 2.
<https://www.energy.ca.gov/sites/default/files/2022-04/CEC-600-2022-054.pdf>.

⁸ J. Coignard, P. MacDougall, F. Stadtmueller and E. Vrettos, "Will Electric Vehicles Drive Distribution Grid Upgrades?: The Case of California," in *IEEE Electrification Magazine*, vol. 7, no. 2, pp. 46-56, June 2019, doi: 10.1109/MELE.2019.2908794.

⁹ <https://www.nrdc.org/experts/pamela-macdougall/steering-ev-integration-forward>

of charging occurs at night or other off-peak periods), and TOU rates are effective for shifting EV charging loads to periods that are in fact beneficial for the grid.¹⁰

- A study by the US Department of Energy's (DOE's) Pacific Northwest National Laboratory, called the EV-at-scale Phase I analysis, "addressed the following two key questions of interest to DOE related to the impacts of EV at the bulk power level at the time when EVs are deployed at scale: 1. Are there sufficient resources in the U.S. bulk power grid to provide the electricity for charging a growing EV fleet? This question addresses the system adequacy. 2. What are the likely operational changes necessary to accommodate a growing EV fleet? This question addresses changes in generation mix, production cost [and] challenges and benefits of accommodating the new EV loads.... This study focused on the resource adequacy question of high EV adoption as the Western Electricity Coordinating Council (WECC) grid planners defined the evolution of the bulk power system to the year 2028."¹¹ The study found that 2028 resource adequacy is likely to be sufficient for high EV penetration assumption under normal operating conditions (normal system, weather, and water conditions). The corresponding electric fleet sizes for the WECC footprint are 9 million LDVs, 70,000 MDVs and 94 HDV charging stations. EV resource adequacy can be doubled with managed charging strategies.¹²
- A study by over 18 experts has found technical challenges [with EVs and the grid] can be overcome, and the grid can support increased transportation electrification, especially when considering historical growth rates in energy generation and generation capacity.¹³

¹⁰ A. Allison and M. Whited, *Electric vehicles are not crashing the grid: Lessons from California Synapse*, Nov. 2017, [online] Available:

http://www.synapse-energy.com/sites/default/files/EVs-Not-Crashing-Grid-17-025_0.pdf

¹¹ Kintner-Meyer, Michael, et al. July 2020. *Electric Vehicles at Scale – Phase I Analysis: High EV Adoption Impacts on the Western U.S. Power Grid*. Pacific Northwest National Laboratory. Page iii, . https://www.pnnl.gov/sites/default/files/media/file/EV-AT-SCALE_1_IMPACTS_final.pdf

¹² Ibid page v.

¹³ Grid Integration Tech Team and Integrated Systems ANALYSIS Tech Team. 2019. *Summary Report on EVs at Scale and the U.S. Electric Power System*.

<https://www.energy.gov/sites/prod/files/2019/12/f69/GITT%20ISATT%20EVs%20at%20Scale%20Grid%20Summary%20Report%20FINAL%20Nov2019.pdf>, Matteo Muratori et al. 2021. *Prog. Energy* 3 022002. Available at <https://iopscience.iop.org/article/10.1088/2516-1083/abe0ad>.

5. The types of renewable synthetic fuels cited by WSPA, such as power-to-fuels (i.e. “e-fuels”) are currently not commercialized, more costly, or limited in quantity.

We note that a number of studies have looked at the costs of zero-emission GHG fuels, also known as “e-fuels” or power to liquids, that in theory can be produced by using renewable electrolysis to electrolyze water to split water into hydrogen and oxygen, then combining this with carbon dioxide in a fuel reactor to make drop-in fuels such as gasoline. While we agree that technically, these can be made to be very low-carbon if produced using renewable electricity together with CO2 captured from the air or smokestacks, they are not currently commercially available and large questions remain about the high costs and the lower efficiency relative to simply using renewable electricity to directly power electric vehicles.¹⁴ While there are companies working to overcome these challenges, based on currently available data it does not appear reasonable or necessary for ARB to change regulatory systems to require or count these in 2026. ARB can always relook, as they have done historically, at the technology landscape over time and update standards. But as noted already, utilizing these fuels still result in other emissions from combustion, with public health impacts remaining. The use of these fuels may also ultimately be better directed to “harder to electrify” transportation or industrial categories where liquid fuels may be more necessary including shipping and aviation.

6. ARB has gone through a deliberate, thorough, reasonable, deliberate, and open public process in developing the Advanced Clean Cars II proposal. Their analysis and record appears to be thorough and reasonable.

We have looked into WSPA’s procedural complaints and they are meritless. CARB does not need to analyze every scheme that might be profitable for the oil companies. Nor do oil

¹⁴ <https://theicct.org/e-fuels-wont-save-the-internal-combustion-engine/>;
https://www.transportenvironment.org/wp-content/uploads/2021/11/2021_12_TE_e-fuels_cars_pollution.pdf

companies need to be static entities that do not invest in other fuels, including renewable electricity production, charging infrastructure, or batteries. In fact, some oil companies such as TotalEnergies (renamed from Total recently) are already investing in electric mobility.¹⁵ ARB staff has gone through a thorough process in developing the Initial Statement of Reasons, the policy proposal, as well as analysis of a reasonable set of alternatives including their environmental impacts.

We thank you for the opportunity to provide these comments for the record.

Sincerely,

Simon Mui, Ph.D.

Director, Clean Vehicles & Fuels Program

Natural Resources Defense Council

¹⁵ <https://www.barrons.com/articles/totalenergies-big-oil-company-ev-batteries-51632487450>