State of California
AIR RESOURCES BOARD

ADVANCED CLEAN CARS MIDTERM REVIEW

Resolution 17-3

March 24, 2017

Agenda Item No.: 17-3-8

WHEREAS, California's law and policy underlines the importance of protecting public health from motor vehicle air pollution;

WHEREAS, Health and Safety Code sections 39600 and 39601 authorize the Air Resources Board (ARB or Board) to adopt standards, rules, and regulations, and to do such acts as may be necessary for the proper execution of the powers and duties granted to and imposed upon the Board by law;

WHEREAS, in section 43000 of the Health and Safety Code, the Legislature has declared that the emission of air pollutants from motor vehicles is the primary cause of air pollution in many parts of the State, and sections 39002 and 39003 of the Health and Safety Code charge the Board with the responsibility of air pollution control from motor vehicles;

WHEREAS, California continues to suffer from some of the worst air pollution in the nation, with the only two areas designated as extreme nonattainment with the National Ambient Air Quality Standards for ground-level ozone;

WHEREAS, the fossil fuels that power cars, trucks, and other mobile sources are the largest contributors to the formation of ground-level ozone in California;

WHEREAS, sections 43013, 43101, and 43104 of the Health and Safety Code authorize the Board to adopt emission standards and test procedures to control air pollution caused by motor vehicles;

WHEREAS, section 43018(a) of the Health and Safety Code directs the Board to endeavor to achieve the maximum degree of emission reduction possible from vehicular and other mobile sources to attain the state ambient air quality standards at the earliest practicable date;

WHEREAS, section 43018(c) of the Health and Safety Code provides that in carrying out section 43018, the Board shall adopt standards and regulations that will result in the most cost-effective combination of control measures on all classes of motor vehicles

and motor vehicle fuel, including but not limited to reductions in motor vehicle exhaust and evaporative emissions, and reductions in in-use vehicular emissions through durability, performance improvements, and specification of vehicular fuel composition;

WHEREAS, section 39667 of the Health and Safety Code directs the Board to consider revisions to ARB's emissions standards for vehicular sources to achieve the maximum possible reduction in public exposure to substances that the Board has identified as toxic air contaminants under section 39662 of the Health and Safety Code; such regulations affecting new motor vehicles are to be based on the most advanced technology feasible for the model-year and may include, but are not limited to, the required installation of control measures on new motor vehicles;

WHEREAS, California enacted Assembly Bill (AB) 1493 (Pavley), statutes of 2002, chapter 200 (codified at Health and Safety Code section 43018.5), which directs the Board to develop and adopt regulations that achieve the maximum feasible and cost-effective reductions of greenhouse gas emissions from motor vehicles, beginning with the 2009 model year;

WHEREAS, in recognition of the devastating impacts of climate change emissions on California, Governor Arnold Schwarzenegger, in June 2005, signed Executive Order S-3-05 which established the following greenhouse gas emission targets:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020, reduce greenhouse gas emissions to 1990 levels; and
- By 2050, reduce greenhouse gas emission 80 percent below 1990 levels.

WHEREAS, the Legislature enacted the California Global Warming Solutions Act of 2006 (AB 32, statutes of 2006, chapter 488 (Nunez, Pavley); Health and Safety Code section 38500 et seq.), which declares that global warming poses a serious threat to the environment of California and creates a comprehensive multi-year program to reduce greenhouse gas emissions that cause global warming;

WHEREAS, in April 2015, Governor Edmund G. Brown, Jr. signed Executive Order B-30-15 that established a greenhouse gas emission reduction target of 40 percent below 1990 levels by 2030;

WHEREAS, California enacted Senate Bill (SB) 32, statutes of 2016, chapter 249 (Pavley), which directs the Board to develop and adopt regulations to ensure that statewide greenhouse gas emissions are reduced to 40 percent below the 1990 level by 2030;

WHEREAS, California enacted AB 197, statutes of 2016, chapter 250 (Garcia), which declares that continuing to reduce greenhouse gas emissions is critical for protecting all areas of the state, but especially for the state's most disadvantaged communities, as those communities are affected first, and most frequently, by adverse impacts of climate

change, including increased frequency of extreme weather events such as drought, heat, and flooding;

WHEREAS, the effects in California of climate change are expected to be severe, through record-setting fires, deadly heat waves, storm surges and rising sea levels, and drought;[1]

WHEREAS, climate change can also contribute to conditions that limit or prevent attainment with criteria pollutant standards and that worsen the effects of nonattainment by altering weather patterns, increasing air temperature, and creating other conditions that lead to criteria pollutant formation and retention, and by exacerbating health stresses on vulnerable populations, especially during periods when high air temperatures coincide with increased air pollution;

WHEREAS, combined programs to address all relevant pollutants from vehicles, including greenhouse gases, help support continued improvements in vehicle technology that limit criteria pollutant emissions and reduce greenhouse gases in an effective manner;

WHEREAS, statewide, about 12 million Californians live in communities that exceed the federal ozone and fine particulate matter (PM2.5)[2] standards;[3]

WHEREAS, the health and economic impacts of exposure to elevated levels of ozone and PM2.5 in California are considerable; meeting the standards will pay substantial dividends in terms of reducing costs associated with emergency room visits and hospitalization, lost work and school days, and most critically, premature mortality;[4]

WHEREAS, California's passenger cars and light-duty trucks emit approximately 25 percent of the total state-wide greenhouse gas emissions,[5] approximately 14 percent of total state-wide reactive organic gas (ROG) emissions, approximately 11 percent of total state-wide oxides of nitrogen (NOx) emissions, and approximately 4 percent of total state-wide PM2.5 emissions;[6]

WHEREAS, the *Revised Proposed 2016 State Strategy for the State Implementation Plan* (*2016 State SIP Strategy*) for ozone and PM2.5 establishes the State strategy for attaining the national ambient air quality standards for these pollutants in all areas of the State as required by federal law;

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[1] See, e.g., discussion of evidence in 78 Fed. Reg. 2112, 2129 (Jan. 9, 2013).
[2] Fine particulate has a diameter of 2.5 micrometers or less and is inhalable.
[3] See *Proposed 2016 State Strategy for the State Implementation Plan*, May 17, 2016, pp. 1, available at: https://www.arb.ca.gov/planning/sip/2016sip/rev2016statesip.pdf.
[4] See *2016 State SIP Strategy*, pp. 1
[5] California Air Resources Board (2016). Greenhouse Gas Emission Inventory (GHG EI) 2000-2014. Data and documentation is available at: www.arb.ca.gov/cc/inventory/data/data.htm
[6] California Air Resources Board. *Almanac Emission Projection Data (published in 2013) 2012 Estimated Annual Average Emissions STATEWIDE*, available at: https://www.arb.ca.gov/app/emsinv/2013/emssumcat_query.php?F_YR=2012&F_DIV=-4&F_SEASON=A&SP=2013&F_AREA=CA#7.

WHEREAS, the *2016 State SIP Strategy*, describes proposed measures to achieve the reductions necessary from the mobile sector and consumer products to meet federal ozone and PM2.5 standards over the next 15 years, and whereas the California vehicle programs are important to supporting the *Strategy*;

WHEREAS, on January 20, 2017, the Board released for public review and comment *The 2017 Climate Change Scoping Plan Update*,[7] describing proposed measures to reduce greenhouse gas emissions by 40 percent below 1990 levels by 2030;

THE ADVANCED CLEAN CARS PROGRAM

WHEREAS, in January 2012, the Board approved the Advanced Clean Cars program, which includes: the Low-Emission Vehicle III (LEV III) regulations that reduce criteria pollutants and greenhouse gas emissions from light- and medium-duty vehicles for model years 2015 through 2025, and the Zero-Emission Vehicle (ZEV) regulation, which acts as a focused technology-forcing piece of the Advanced Clean Cars program by requiring manufacturers to produce increasing numbers of pure ZEVs and plug-in hybrid electric vehicles in the 2018 through 2025 model years (Resolution No. 12-11);[8]

WHEREAS, in Resolution 12-11, the Board directed staff to examine a number of issues relating to the LEV III and ZEV regulations and report back on their findings, subsequently defined as California's Midterm Review;

LOW-EMISSION VEHICLE III REGULATIONS

WHEREAS, the LEV III regulations build upon the LEV I and LEV II regulations that reduced motor vehicle air pollution from passenger cars for the 1994 model year;

LEV III Greenhouse Gas Regulation

WHEREAS, the LEV III greenhouse gas regulation established increasingly stringent greenhouse gas standards for 2017 through 2025 model year light-duty vehicles which include passenger cars, sport utility vehicles, and pick-up trucks;

WHEREAS, the LEV III greenhouse gas regulation is contained primarily in title 13 of the California Code of Regulations, section 1961.3;

WHEREAS, on October 15, 2012, the United States Environmental Protection Agency (U.S. EPA) and the National Highway Traffic Safety Administration (NHTSA) jointly issued a Final Rule for 2017 through 2025[9] model year passenger vehicles titled "2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel

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[7] Available at: https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf.

[8] State of California, Air Resources Board, *Advanced Clean Cars Regulation Package*, Resolution 12-11 (January 26, 2012), Agenda Item No.: 12-1-2, available at: http://www.arb.ca.gov/regact/2012/cfo2012/res12-11.pdf.

[9] Note, U.S. EPA's emission standards, like the Board's, continue in effect for subsequent model years, unless amended.

Economy Standards," referred to as the "2017 through 2025 model year National Program," 77 Fed.Reg. 62623 (October 15, 2012));

WHEREAS, the federal passenger vehicle greenhouse gas regulations for the 2017 through 2025 model years closely mirror the California LEV III greenhouse gas regulation for these model years;[10]

WHEREAS, in November 2012, the Board approved amendments to the LEV III regulations to allow manufacturers to demonstrate compliance with California's greenhouse gas regulation for the 2017 through 2025 model years by demonstrating compliance with the 2017 through 2025 model year National Program because those federal standards would result in equivalent greenhouse gas emissions benefits,[11] except that California maintained its own reporting requirements;[12]
WHEREAS, as part of the 2017 through 2025 model year National Program, U.S. EPA committed to a midterm evaluation of its 2022 through 2025 model year passenger vehicle greenhouse gas standards;[13]

WHEREAS, ARB committed to participate in this midterm evaluation and conduct its own mid-term review to re-evaluate the state of vehicle technology to determine whether any adjustments to the stringency of the 2022 through 2025 model year standards are appropriate, and reserved all rights to contest final actions taken or not taken by U.S. EPA or NHTSA as part of or in response to the mid-term evaluation;[14]

WHEREAS, the Board directed the Executive Officer (in Resolution 12-11) to monitor consumer purchasing trends and California's fleet mix to evaluate any effect of a potential shift in vehicle footprint size to higher polluting vehicles and the reclassification of cars as trucks that deviates from the fleet size and category mix projected in the approved amendments, to make the information obtained publically available as it is acquired, and to report back to the Board by the end of 2016 regarding any such effects and to address any such effects in the midterm review;

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[10] See *Staff Report: Initial Statement of Reasons for Rulemaking; Proposed Amendments to New Passenger Motor Vehicle Greenhouse Gas Emission Standards for Model Years 2017-2025 to Permit Compliance Based on Federal Greenhouse Gas Emission Standards and Additional Minor Revisions to the LEV III and ZEV Regulations*, September 24, 2012, pp. 5-9, available at: https://www.arb.ca.gov/regact/2012/leviiidtc12/dtcisor.pdf.
[11] State of California, Air Resources Board, Resolution 12-35 (November 15, 2012), Agenda Item No.: 12-8-3, available at: https://www.arb.ca.gov/regact/2012/leviiidtc12/res12-35.pdf
[12] Cal. Code Regs., tit. 13, § 1961.3(c); State of California, Air Resources Board, *Advanced Clean Cars Program*, Resolution 12-21 (March 22, 2012), Agenda Item No.: 12-2-7, available at: https://www.arb.ca.gov/regact/2012/leviiighg2012/res12-21.pdf.
[13] 76 Fed.Reg. at 74779; 77 Fed.Reg. at 62628 [Mid-Term Evaluation], as corrected 77 Fed.Reg. 68070 (Nov. 15, 2012); 40 C.F.R. § 86.1818-12(h) [mid-term evaluation of greenhouse gas emission standards for light-duty vehicles, light-duty trucks, and medium-duty passenger vehicles].
[14] Reso. 12-11; State of California, Air Resources Board. *New Passenger Motor Vehicle Greenhouse Gas Emission Standards for Model Years 2017-2025 to Permit Compliance Based on Federal Greenhouse Gas Emission Standards and Additional Minor Revisions to the LEV III and ZEV Regulations*, Resolution 12-35. November 15, 2012. Agenda Item No.: 12-8-3, available at: http://www.arb.ca.gov/regact/2012/leviiidtc12/res12-35.pdf; Cal. Code Regs., tit. 13, § 1961.3(a)(11).

WHEREAS, a major milestone in the midterm evaluation is a 2016 *Draft Technical Assessment Report*[15] (2016 TAR), jointly developed and authored through a multi-year effort between U.S. EPA, NHTSA, and ARB, which is an update to the initial technical analysis of the feasibility, costs, and potential pathways to meeting the 2022 through 2025 model year National Program passenger vehicle greenhouse gas standards;

WHEREAS, at a July 2016 hearing, staff presented the major findings of the 2016 TAR to the Board:

> The 2025 model year National Program greenhouse gas standards can be met cost effectively predominantly with advanced gasoline engines and transmissions and a minimal reliance on ZEVs;
>
> The projected national fleet average greenhouse gas emissions for the 2025 model year will be higher than was originally projected (175 grams per mile versus the originally projected 163 grams per mile) because consumers are purchasing more trucks and fewer cars than was projected in the 2012 rulemaking, reflecting the flexibility designed into the regulation to allow vehicle manufacturers to adjust to consumer demand;
>
> The average incremental cost per vehicle to comply with the greenhouse gas standards in model year 2025 will be about the same or lower than the original projections used in the rulemaking (U.S. EPA 2016 TAR analysis: $894, NHTSA 2016 TAR analysis: $1,128; original 2012 analysis: $1,070);
>
> The payback period for recouping the cost of compliance is longer than originally estimated (5-6 years versus the originally projected 3.2 years), because current and future fuel prices, as forecast by the U.S. Energy Information Administration's 2015 Annual Energy Outlook, are lower now than what was projected back in 2012 during the original rulemaking;

WHEREAS, on November 30, 2016, U.S. EPA provided for public comment its "proposed adjudicatory determination (Proposed Determination) that the [National Program] greenhouse gas standards currently in place for model years 2022 through 2025 remain appropriate under the Clean Air Act and therefore should not be amended to be either more or less stringent;"[16]

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[15] U.S. EPA, NHTSA, ARB, *Draft Technical Assessment Report: Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards for Model Years 2022-2025* (July 2016), https://www3.epa.gov/otaq/climate/documents/mte/420d16900.pdf. Notably, this built upon the *Interim Joint Technical Assessment Report: Light Duty-Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards for Model Years 2017-2025* (September 2010), available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/interim-joint-technical-assessment-report-light-duty.

[16] The "proposed adjudicatory determination" was published in the *Federal Register* on December 6, 2016. 81 Fed. Reg. 87927 (December 6, 2016) [Notice of availability of a proposed order, Environmental Protection Agency, "Proposed Determination on the Appropriateness of the Model Year 2022–2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards Under the Midterm Evaluation"], available at: https://www.gpo.gov/fdsys/pkg/FR-2016-12-06/pdf/2016-29255.pdf

WHEREAS, U.S. EPA based the Proposed Determination on:

> Consideration of more than 200,000 public comments on the 2016 TAR, with comments from about 90 organizations and the rest from individuals; [17] and
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> Updates and improvements to the analyses in the 2016 TAR, using the most current information available, as informed by public comment, including updates to technology costs, technology effectiveness, modeling, consumer assessment, and other elements of the analysis;[18]

WHEREAS, the analyses conducted for the Proposed Determination corroborated the key conclusions[19] reached in the 2016 TAR:

> A wider range of technologies exist for manufacturers to use to meet the 2022 through 2025 National Program model year standards at costs that are similar to or lower than those projected in the 2012 Final Rule;
>
> The auto industry can meet the standards primarily with advanced gasoline vehicle technologies and a small amount of hybridization and electrification; and
>
> The updated 2025 projections of fuel prices, car/truck mix, and the fleet-target illustrate that the footprint-based standards will continue to accommodate consumer choice and achieve significant greenhouse gas reductions and fuel savings across all vehicle types;

WHEREAS, on January 13, 2017, U.S. EPA released its final determination (Final Determination) to maintain the current National Program greenhouse gas emissions standards for 2022 through 2025 model year vehicles, finding that automakers are well positioned to meet the standards at lower costs than previously estimated;[20]

WHEREAS, U.S. EPA concluded that "there has been no information presented in the public comments on the Proposed Determination that materially changes the Agency's analysis documented in the Proposed Determination;"[21]

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[17] *Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation* (November 2016, EPA-420-R-16-020), p. ES-1, available at: https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OAR-2015-0827-5942&attachmentNumber=1&contentType=pdf

[18] *Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation: Technical Support Document* (November 2016, EPA-420-R-16-021), available at: https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OAR-2015-0827-5941&contentType=pdf

[19] *Proposed Determination*. p. ES-2.

[20] *Final Determination on the Appropriateness of the Model Year 2022-2025 Light-duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation* (January 2017, EPA-420-R-17-001), available at: https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OAR-2015-0827-6270&attachmentNumber=1&contentType=pdf

[21] *Final Determination*. p. 3.

WHEREAS, the originally projected California greenhouse gas benefit in 2025 will still be achieved (at the same or lower cost to manufacturers), provided that the national program is maintained, despite increased truck sales, largely due to the actual share of passenger cars in the fleet mix being much higher than originally estimated for California (2012 projected benefit: 166 grams CO_2e per mile; current projected benefit: between 153 and 167 grams CO_2e per mile);[22]

LEV III Criteria Pollutant Regulations

WHEREAS, the LEV III criteria pollutant regulations include two primary elements: (1) tiers of exhaust emission standards for increasingly more stringent categories of low-emission light- and medium-duty vehicles; and (2) a mechanism requiring each manufacturer to phase-in a progressively cleaner mix of vehicles from year to year with the option of credit trading;

WHEREAS, the LEV III criteria pollutant regulations are contained primarily in four sections of title 13 of the California Code of Regulations:

- section 1961.2, which incorporates by reference
  - the "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles,"
  - the "California Non-Methane Organic Gas Test Procedures for 1993 through 2016 Model Year Vehicles," and
  - the "California Non-Methane Organic Gas Test Procedures for 2017 and Subsequent Model Year Vehicles;"

- section 1956.8, which incorporates by reference
  - the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Otto-Cycle Engines and Vehicles;" and
  - the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles;"

- section 1976, which incorporates by reference the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles;" and

- section 1978 which incorporates by reference the "California Refueling Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles;"

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[22] *California's Advanced Clean Cars Midterm Review*, Appendix M: *California GHG Technology Trends*, p. 13, available at: https://www.arb.ca.gov/msprog/acc/mtr/appendix_m.pdf

WHEREAS, under the LEV III criteria pollutant regulations there are seven low-emission vehicle categories to which a passenger car and light-duty truck may be certified: Low-Emission Vehicle 160 (LEV160), Ultra-Low-Emission Vehicle 125 (ULEV125), Ultra-Low-Emission Vehicle 70 (ULEV70), Ultra-Low-Emission Vehicle 50 (ULEV50), Super-Ultra-Low-Emission Vehicle 30 (SULEV30), Super-Ultra-Low-Emission Vehicle 20 (SULEV20), and ZEV;

WHEREAS, the LEV III criteria pollutant regulations include combined standards for non-methane organic gas (NMOG) emissions and oxides of nitrogen (NOx) emissions and establish fleet average NMOG+NOx requirements to reduce emissions from new passenger cars and light-duty trucks;

WHEREAS, the LEV III criteria pollutant regulations also establish a lower Federal Test Procedure (FTP) PM standard for passenger cars, light-duty trucks, and medium-duty passenger vehicles to 3 milligrams per mile (mg/mi) (phased-in between model years 2017 and 2021) and then to 1 mg/mi (phased-in between model years 2025 and 2028);

WHEREAS, the Board directed the Executive Officer (in Resolution 12-11) to re-evaluate the stringency and timing of the 1 mg/mi PM standard in the 2025 timeframe to determine the feasibility of implementing that standard earlier than 2025;

WHEREAS, at an October 2015 hearing, staff presented to the Board an assessment of the feasibility of measuring PM emissions at and below 1 mg/mi;

WHEREAS, that assessment confirmed the feasibility of PM emission measurement at and below 1 mg/mi and concluded that the existing gravimetric method is sufficient for measurement of low PM levels;

WHEREAS, staff has undertaken a test program to evaluate vehicles that emit low levels of PM and greenhouse gases;

WHEREAS, staff's updated analysis[23] described in the midterm review report has confirmed that compliance with the 1 mg/mi FTP PM standard by model year 2025 is feasible and manufacturers are on track to meet the standard;

WHEREAS, accelerating implementation of the 1 mg/mi FTP PM standard sooner than model year 2025 would likely entail increased costs to manufacturers and have limited additional emission benefits;

WHEREAS, research and testing to support this midterm review have revealed concerns regarding the robustness of PM control under broader in-use driving conditions than the FTP represents;

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[23] *California's Advanced Clean Cars Midterm Review*, Appendix J: *Vehicle PM Emission Control Technology Assessment*, available at: https://www.arb.ca.gov/msprog/acc/mtr/appendix_j.pdf

WHEREAS, the US06[24] test cycle is a high-speed, high-acceleration test procedure designed to measure off-cycle emissions (i.e., emissions from these driving conditions, which are not included in the FTP test cycle);

WHEREAS, in April 2014, the U.S. EPA adopted the federal Tier 3 criteria pollutant emission regulations titled "Control of Air Pollution from Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards,"[25] which closely mirror the LEV III criteria pollutant regulations, except that the federal Tier 3 regulations do not include the 1 mg/mi PM standard;

WHEREAS, in an October 2014 rulemaking, the Board approved amendments to the LEV III regulations to incorporate various federal Tier 3 provisions;[26]

ZERO-EMISSION VEHICLE REGULATIONS

WHEREAS, the California ZEV regulation was first adopted in 1990 as part of the original LEV regulations;

WHEREAS, the ZEV regulations are contained primarily in two sections of title 13 of the California Code of Regulations:

- section 1962.1, which incorporates by reference the "California Exhaust Emission Standards and Test Procedures for 2009 through 2017 Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes;" and
- section 1962.2, which incorporates by reference the "California Exhaust Emission Standards and Test Procedures for 2018 and Subsequent Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes;"

WHEREAS, at the January 2012 Board meeting, the Board approved amendments to the ZEV regulations as part of the Advanced Clean Cars program that require an increasing percentage of new passenger cars and light-duty trucks to be ZEVs and transitional ZEVs (plug-in hybrid electric vehicles) by model year 2025;

WHEREAS, the Board directed the Executive Officer (in Resolution 12-11) to amend the ZEV regulations to allow manufacturers who systematically over comply with the proposed LEV III greenhouse gas fleet average standards to offset a portion of their ZEV regulation requirements in only the 2018 through 2021 model years (ZEV over-compliance provision);[27]

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[24] Title 40 Code of Federal Regulations. Part 86. §86.1803-01 – Definitions, available at: http://www.ecfr.gov/cgi-bin/text-idx?SID=e903b781c860e91ad33808a2b27debc2&mc=true&node=se40.21.86_11803_601&rgn=div8.
[25] 79 Fed.Reg. 23414 (October 15, 2012).
[26] Reso. 14-34 (October 23, 2014).
[27] Cal. Code Regs., tit. 13, § 1962.2(g)(6)(C).

WHEREAS, the Board also directed the Executive Officer (in Resolution 12-11) to address the following as part of the midterm review:

> Monitor consumer acceptance of transitional ZEVs (TZEV, also known as plug-in hybrid electric vehicles or PHEVs) and report back by the end of 2016 on the TZEV volumes expected in the ZEV program in model years 2018 through 2021;
>
> Return with in-use data for range extended battery electric vehicles and plug-in hybrid electric vehicles, and, if warranted, propose modifications to treatment and credits for these vehicle types in 2016;
>
> Monitor the usage of the ZEV over-compliance provision during the 2014 to 2025 timeframe and during that timeframe report back to the Board every two years with: the number of automobile manufacturers intending to participate in the program, those manufacturers' respective market shares, and the number of ZEV and TZEV vehicles not delivered to California and "Section 177" states[28] due to the ZEV over-compliance program;
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> Conduct a study of the potential effects of adding an additional category of vehicles to the ZEV regulation for "BEV XX" vehicles allowed greater use of an internal combustion engine than allowed for vehicles approved as "BEV X" vehicles, where such BEX XX vehicles would only be applied to 25 percent of a manufacturer's pure ZEV requirement;

WHEREAS, nine states, Vermont, New York, Massachusetts, Rhode Island, Connecticut, Oregon, New Jersey, Maine, and Maryland, through Section 177 of the federal Clean Air Act, have adopted California's ZEV regulations (called the Section 177 ZEV states), and, when combined with California, account for nearly 30 percent of new light-duty vehicle sales in the United States;[29]

WHEREAS, since the January 2012 Board meeting, the ZEV regulations have been modified three times to better align the regulatory timeline and requirements with the status of ZEV technology and ZEV commercialization feasibility;

WHEREAS, in an October 2013 rulemaking, the Board approved changes to the ZEV regulations to amend an optional "Section 177" state compliance path, add a cap on specified ZEV credits, and amend the fast refueling definition for determining ZEV types;[30]

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[28] States that have exercised the authority under Section 177 of the Clean Air Act to adopt California's motor vehicle emission standards.

[29] *California's Advanced Clean Cars Midterm Review*, Appendix B: *Consumer Acceptance of Zero-Emission Vehicles and Plug-in Hybrid Electric Vehicles*, p. 13, available at: https://www.arb.ca.gov/msprog/acc/mtr/appendix_b.pdf

[30] State of California, Air Resources Board. *Minor Modifications to the Zero-Emission Vehicle Regulation*, Resolution 13-41. October 24, 2013. Agenda Item No.: 13-9-4, available at: https://www.arb.ca.gov/regact/2013/zev2013/res13-41.pdf

WHEREAS, in a May 2015 rulemaking, the Board adopted amendments to the ZEV regulations to provide greater flexibility to intermediate volume manufacturers, including a modified compliance definition, additional production lead time, the ability to pool compliance obligations in Section 177 ZEV states, and additional credit deficit recovery time;[31]

WHEREAS, besides following the direction from the Board in Resolution 12-11, staff monitored the emergence of the ZEV market and evaluated the effectiveness of the ZEV regulations as adopted in 2012, both in California and in the other states that have adopted California's ZEV regulations;

WHEREAS, at the July 2016 hearing, the Board directed the Executive Officer to look at historical credit banks (related to the ZEV regulations), crediting of ZEVs and PHEVs within the regulations, and how to ensure that the market is being developed in the appropriate timeframe to meet California's long term air quality and greenhouse gas emission reduction goals and to report back to them as part of the midterm review;

WHEREAS, manufacturers have been over-complying with the ZEV regulation requirements since the 2012 model year;[32]

WHEREAS, between 2011 and 2016, California accounted for approximately 48 percent of cumulative ZEV and PHEV sales in the U.S.,[33] and the Section 177 ZEV States have accounted for approximately 10 percent of cumulative ZEV and PHEV sales in the U.S.,[34] and California and the Section 177 ZEV states ranks as the third-largest PEV market globally;[35]

WHEREAS, ZEV infrastructure in California and the Section 177 ZEV states has grown since 2012, resulting in over 17,000 level 2 and 2,100 direct-current fast-charger connectors,[36] and 25 retail hydrogen stations operational in California;[37]

WHEREAS, California has further committed funding for 24 additional hydrogen stations and over 1,000 additional EV charging connectors, which are in varying stages of completion today;

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[31] State of California, Air Resources Board. *2014 Amendments to the Zero-Emission Vehicle Regulation*, Reso. 15-7. (May 21, 2015), Agenda Item No.: 15-4-2, available at: https://www.arb.ca.gov/regact/2014/zev2014/res15-7.pdf

[32] Attachment A: *California's Advanced Clean Cars Midterm Review*, January 18, 2017, p. 49.

[33] *California's Advanced Clean Cars Midterm Review*, Appendix B: *Consumer Acceptance of Zero-Emission Vehicles and Plug-in Hybrid Electric Vehicles*, pp. 13-15, available at: https://www.arb.ca.gov/msprog/acc/mtr/appendix_b.pdf.

[34] *California's Advanced Clean Cars Midterm Review*, Appendix B: *Consumer Acceptance of Zero-Emission Vehicles and Plug-in Hybrid Electric Vehicles*, pp. 13-15, available at: https://www.arb.ca.gov/msprog/acc/mtr/appendix_b.pdf.

[35] Attachment A: *California's Advanced Clean Cars Midterm Review*, January 18, 2017, p. 45.

[36] *California's Advanced Clean Cars Midterm Review*, Appendix D: *Zero-Emission Vehicle Infrastructure Status in California and Section 177 ZEV States*, p. 11, available at: https://www.arb.ca.gov/msprog/acc/mtr/appendix_d.pdf.

[37] *California's Advanced Clean Cars Midterm Review*, Appendix D: *Zero-Emission Vehicle Infrastructure Status in California and Section 177 ZEV States*, p. 30, available at: https://www.arb.ca.gov/msprog/acc/mtr/appendix_d.pdf.

WHEREAS, due to technology advancements and regulatory flexibility, new minimum compliance scenarios were developed that project approximately 1.2 million cumulative sales of ZEVs and PHEVs by 2025 in California;[38]

WHEREAS, electric drive technology has progressed faster than staff anticipated when developing the 2012 rulemaking, including a reduction of over 70% in battery system costs and nearly 60% in fuel cell system costs between 2006 and 2015,[39] leading to the announcement of over 70 ZEV and PHEV offerings for the next five model years;[40]

WHEREAS, PHEVs can generate significant benefits over conventional vehicles, but rarely result in greenhouse gas or criteria pollutant emission reductions equal to pure ZEVs, and therefore would not benefit from a change to the ZEV regulation credit structure, according to these findings:

> PHEV electric vehicle miles traveled (eVMT) and zero-emission vehicle miles traveled (zVMT) are highly driver dependent and based on daily trip distance, daily trip count, electric charging accessibility and region;[41]
>
> Testing confirms cold-start emissions can be higher under high-power demand conditions relative to more traditional engine start conditions for blended PHEVs;[42]
>
> New ARB VISION modeling reveals limitations are associated with future fleets with high PHEV penetration, due to PHEVs' flexible and user dependent nature;[43]

WHEREAS, all intermediate volume manufacturers[44] selling vehicles in California have announced plans to bring ZEVs to market over the next four model years, making additional flexibilities unnecessary;[45]

WHEREAS, consumer demand of ZEVs and PHEVs depends on consumer awareness, vehicle offerings, infrastructure availability and accessibility, incentives, and vehicle purchase and operation costs, which all need further support from a myriad of complementary policies to increase sales;

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[38] *California's Advanced Clean Cars Midterm Review*, Appendix A: *Analysis of Zero-Emission Vehicle Regulation Compliance Scenarios*, pp. 14-15, available at: https://www.arb.ca.gov/msprog/acc/mtr/appendix_a.pdf.
[39] *California's Advanced Clean Cars Midterm Review*, Appendix C: *Zero-Emission Vehicle and Plug-in Hybrid Electric Vehicle Technology Assessment*, pp. 7-9, available at: https://www.arb.ca.gov/msprog/acc/mtr/appendix_c.pdf.
[40] *California's Advanced Clean Cars Midterm Review*, Appendix C: *Zero-Emission Vehicle and Plug-in Hybrid Electric Vehicle Technology Assessment*, p. 3, available at: https://www.arb.ca.gov/msprog/acc/mtr/appendix_c.pdf.
[41] *California's Advanced Clean Cars Midterm Review*, Appendix G: *Plug-in Electric Vehicle In-Use and Charging Data Analysis*, pp. 25-28, available at: https://www.arb.ca.gov/msprog/acc/mtr/appendix_g.pdf.
[42] *California's Advanced Clean Cars Midterm Review*, Appendix H: *Plug-in Hybrid Electric Vehicle Emissions Testing*, p. 10, available at: https://www.arb.ca.gov/msprog/acc/mtr/appendix_h.pdf.
[43] *California's Advanced Clean Cars Midterm Review*, Appendix F: *Scenario Planning: Evaluating impact of varying plug-in hybrid electric vehicle (PHEV) assumptions on emissions*, p. 7, available at: https://www.arb.ca.gov/msprog/acc/mtr/appendix_f.pdf.
[44] Cal. Code Regs., tit. 13, § 1900(b)(9).
[45] Attachment A: *California's Advanced Clean Cars Midterm Review*, January 18, 2017, pp. 55-56.

WHEREAS, though ZEV and PHEV sales in the Section 177 ZEV states are smaller than in California, a market exists in those states, and is slowly increasing through government support, increased awareness, expanded product offerings, and regulatory flexibilities[46] specifically designed to ease manufacturers into full compliance in the Section 177 ZEV states;

RECENT ACTIONS OF THE FEDERAL GOVERNMENT AND MANUFACTURERS

WHEREAS, on March 13, 2017, the Administrator of the U.S. EPA and Secretary of the Department of Transportation signed a notice intending to reconsider the Final Determination, despite the robust record on which it is based;[47]

WHEREAS, on March 13, 2017, the Alliance of Automobile Manufacturers petitioned the U.S. Court of Appeals for the District of Columbia Circuit to review the action of the U.S. EPA in issuing the Final Determination, in which the State of California moved the next day to intervene to protect California's interests in the National Program that would result in equivalent or better greenhouse gas emissions benefits as California's standards, before the Alliance moved to dismiss its petition;[48]

WHEREAS, on March 15, 2017, the President announced he was "cancelling" the Final Determination and characterized the regulations as "job-killing",[49] despite 2016 as the "best year on record" for U.S. light-vehicle sales, following previous years of strong sales;[50]

WHEREAS, on March 15, 2017, the Governor and Attorney General of California, and the Senate President pro Tempore of the California Legislature announced their continued support for the current National Program and California's standards that protect the health of its people and the stability of the climate, provide consumers significant cost savings, and save significant natural resources;[51]

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[46] *California's Advanced Clean Cars Midterm Review*, Appendix B: *Consumer Acceptance of Zero-Emission Vehicles and Plug-in Hybrid Electric Vehicles*, pp. 13-14, available at: https://www.arb.ca.gov/msprog/acc/mtr/appendix_b.pdf.

[47] Available at: https://www.epa.gov/sites/production/files/2017-03/documents/cafe-joint-notice-dot-epa-2017-03-13.pdf.

[48] *Alliance of Automobile Manufacturers v. U.S. EPA*, (D.C.Cir.), case no. 17-1086, Pet. For Rev., filed March 13, 2017; Motion to Intervene of the State of California, ex rel. Gov. Brown, Jr., ARB, and Atty. Gen. Becerra, filed March 14, 2017; Motion of Petitioner to Dismiss its Petition for Review, filed March 20, 2017.

[49] Remarks by President Trump at American Center for Mibility, Detroit, Michigan, March 15, 2017, available at: https://www.whitehouse.gov/the-press-office/2017/03/15/remarks-president-trump-american-center-mobility-detroit-mi.

[50] Stoddard, Haig, Wards Auto, December Surge Lifts 2016 Sales to Record 17.5 Million Units, January 4, 2017.

[51] Governor's Press Office, California Leaders Blast Cynical Ploy by Trump Administration, Automobile Manufacturers to Roll Back America's Car Pollution Standards, March 15, 2017, available at: https://www.gov.ca.gov/news.php?id=19715; Gov. Brown to Administrator Pruitt, March 15, 2017, available at: https://www.gov.ca.gov/docs/3.15.17_Letter_to_EPA.pdf; Gov. Brown to Alliance of Automobile Manufacturers, Association of Global Automakers, March 15, 2017, available at: https://www.gov.ca.gov/docs/3.15.17_Letter_to_Auto_Manufacturers.pdf.

CONCLUSIONS OF CALIFORNIA'S MIDTERM REVIEW

WHEREAS, on January 18, 2017, staff released to the public its technical analysis for the midterm review of the adopted 2022 through 2025 model year LEV III greenhouse gas standards, the 1 mg/mi LEV III FTP PM emission standard, and the ZEV requirements, as set forth in the Attachment A to this resolution; and

WHEREAS, there are no environmental or economic impacts from this Board item, because the Board is not making any changes to current regulatory requirements;

NOW, THEREFORE, BE IT RESOLVED that the Board, having considered all information in the public hearing and administrative proceedings, finds that:

California has completed its mid-term review of the 2022 through 2025 model year LEV III greenhouse gas standards, and coordinated its review with its full participation in EPA's Midterm Evaluation;

The technical and economic evidence supporting the 2022 through 2025 model year LEV III greenhouse gas standards is definitive and conclusive, and no adjustments to the stringency of these standards are warranted;

Given that the greenhouse gas emission reduction benefits to California from accepting compliance with the 2022 through 2025 model year National Program are equal to or better than the benefits that would otherwise accrue from vehicles sold in California and those states that have adopted California's LEV III greenhouse gas standards as provided in Section 177 of the Clean Air Act;

Given U.S. EPA has issued a Final Determination affirming the 2022 through 2025 model year national greenhouse gas standards will remain as adopted, it is appropriate to continue California's participation in the 2017 through 2025 model year National Program by maintaining the "deemed to comply" provision allowing for compliance with the adopted U.S. EPA greenhouse gas standards for the 2022 through 2025 model years;

If the stringency of the 2022 through 2025 model year National Program greenhouse gas emission standards were substantially changed, despite the Final Determination by U.S. EPA based on a comprehensive record demonstrating that the existing standards should be maintained, these findings on the comparative benefits to California from accepting compliance with the National Program would likely be different;

The gravimetric method for determining PM emissions is appropriate for measuring low PM emission levels and that the method will remain the approved procedure for determination of compliance with ARB's LEV III PM emission standards;

The stringency and implementation schedule of the adopted 1 mg/mi FTP PM standard in the 2025 timeframe are appropriate;

Additional regulatory requirements are needed to better ensure that when the 1 mg/mi FTP PM standard is phased-in, it results in robust in-use PM control over a broader spectrum of driving conditions than encountered in the FTP;

No adjustments to the stringency of the 2018 through 2025 model year ZEV requirements are needed; regulatory stability, for both California and the Section 177 ZEV states, can help ensure a continued path of increasing, but achievable, ZEV vehicle volumes;

It is appropriate to maintain the existing ZEV regulation flexibilities for intermediate volume manufacturers;

It is appropriate to maintain the existing credit structure and caps for PHEVs through the 2025 model year.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to:

(1) Develop proposals for future consideration by the Board to strengthen the 1 mg/mi particulate matter requirements, to be phased-in with the 2025 model year, which may include:

a. development of a more stringent US06 cycle PM emission standard, which would verify PM is well-controlled over more-aggressive driving conditions; and
b. consideration of PM emission standards for other test cycles and ambient conditions, as necessary, to ensure in-use PM emissions are minimized.

(2) Develop proposals for future consideration by the Board to strengthen the Advanced Clean Cars program for the 2026 and subsequent model years, including potential changes to:

a. the greenhouse gas and the criteria pollutant regulations to meet California's 2030 and later climate change and air quality requirements;
b. the ZEV regulation, including new ZEV requirements and regulatory structure adjustments to increase certainty of future vehicle volumes, account for technology improvements, revise PHEV minimum qualifications, and consider any other relevant factors to maximize long-term greenhouse gas and criteria pollutant reductions; and

(3) Continue to closely monitor vehicle manufacturers' progress in complying with the requirements of the Advanced Clean Cars program and to report to the Board if amendments to the regulations are necessary.

(4) Continue to closely study the ZEV market and vehicle ownership needs and implement additional complementary policies as necessary, including:

a. Evaluating the electric charging network requirements as electric vehicle range and product diversity increases; ensure this informs public network planning and investments; and
b. Expanding current ZEV outreach programs including the creation of a new, broad, consumer awareness campaign.

(5) Continue to monitor and participate in federal proceedings related to the federal midterm evaluation, the 2022-2025 model year National Program emission standards, and the 2022-2025 model year corporate average fuel economy standards, to evaluate whether to revisit the findings here and whether any changes to California's LEV III program and its acceptance of compliance with the National Program are appropriate to address California's unique air quality challenges and its mandates to achieve aggressive greenhouse gas reductions to protect public health and the environment.

I hereby certify that the above is a true and correct copy of Resolution 17-3 as adopted by the Air Resources Board.

Rana McReynolds, Clerk of the Board

Resolution 17-3

March 24, 2017

Identification of Attachments to the Board Resolution

Attachment A: "California's Advanced Clean Cars Midterm Review," released January 18, 2017, available at: https://www.arb.ca.gov/msprog/acc/acc-mtr.htm .