

2020 Mobile Source Strategy

Webinar – March 25, 2020

Questions/Comments and Staff Responses

| | Question/ Comment | Commenter |
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| 1 | <p>CARB’s data show that we won’t meet Clean Air Act standards without aggressive actions to clean up engines and fuels and reduce vehicle miles travelled. Failure to attain the standards would result in thousands of premature deaths and preventable illnesses, as well as the threat of federal sanctions.</p> <p>We look forward to working with CARB on the measures you have outlined. For the sake of the health of all Californians – especially those with respiratory ailments and those living in disadvantaged communities – we cannot afford to delay or weaken air quality standards.</p> <p>RESPONSE: CARB appreciate your support and engagement during Mobile Source Strategy development. We agree with you that meeting California’s air quality and climate goals require ambitious technology transformations (e.g. penetration of zero emission vehicles combined with clean combustion technologies). We are definitely looking forward to working with you and your team as we refine these scenarios.</p> | Bill Magavern, Coalition for Clean Air |
| 2 | <p>I also have questions about biofuels as part of the 2020 mobile source strategy. Could you please provide the contact info for relevant LCFS team members?</p> <p>RESPONSE: This web link (https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/lcfs-contacts) provides contact information for different LCFS programs.</p> | Brent Newell, Public Justice Food Project |
| 3 | <p>So for clarity, "Electric Vehicle" are BEV's and FCEV's? Clearly, FCEV's are electric.</p> <p>RESPONSE: Correct. Both battery electric and fuel cell electric vehicles are here referred to as electric vehicles.</p> | Bud Beebe |
| 4 | <p>Is there any research being conducted to better understand the connection between transit ridership and land use planning? E.g. are we actually seeing communities being built where housing, jobs, and schools are located closer to transit and safe walking / bicycling infrastructure? Or is that research that CARB can do?</p> <p>RESPONSE: MPOs, who are tasked with developing regional plans that coordinate transportation and land use try to do this. MPOs work with locals so that more housing is planned and built near existing transit. These are referred to as transit priority areas or priority development areas. Then incentives (at the local and state level) are used to bolster implementation of these efforts. However more research needs to be done to evaluate accessibility to transit, and how easy it is for someone to reach that transit station. CARB is conducting research on this and staff can follow up and provide you with more information if necessary.</p> | Chanell Fletcher |

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| 5 | <p>1 - What type of new zero-emission equipment will replace generators that are part of the off-road sector as shown on slide 32? Isn't this equipment that generates electricity and if not what does it generate?</p> <p>RESPONSE: Portable battery-powered sources (also called "battery generators") are available for some applications and can take the place of an internal combustion engine-powered generator for a period of time for some users. As battery packs continue to improve, CARB is seeing progression of home battery packs that could function for a day or few days. This could be a solution for blackouts, although not a long-term solution for remote areas. Micro-grids (local electric grids, potentially powered by solar energy) are also an option in this sector, when long distance power is cut in emergencies or natural disasters. Also noted by comment from CARB Staff Leslie Goodbody: Fuel cells have shown promise for stationary source energy generation.</p> <p>2 - Will the 2020 MMS supersede the San Joaquin Valley Supplement to the 2016 State Strategy for the State Implementation Plan that was included in the SJVAPCD 2018 PM2.5 Plan that has been submitted to USEPA? Also, do your planning scenarios include the specific CARB commitments made in the SJV Supplement.</p> <p>RESPONSE: The 2020 Mobile Source Strategy addresses multiple goals and will not supersede the 2016 State SIP Strategy, or the San Joaquin Valley Supplement to the 2016 State SIP Strategy, which contain the State's commitments to meet specific federal standards. The State SIP strategy is an important element of the attainment strategy for federal PM2.5 standards in the San Joaquin Valley, and we are moving forward to implement all of the measures. Our 2020 Mobile Source Strategy will be a forward-looking effort that builds upon the 2016 State SIP Strategy and lays out a path to meet all of our near-term and long-term goals.</p> | Colby L. Morrow, SoCalGas |
| 6 | <p>Per slide 52, CARB needs to analyze the emissions reductions that will be realized from the recently adopted AB 617 Community Emission Reduction Plans (I know adoption by CARB has been delayed for some). And if there are not significant NOx reductions in the CERP, will CARB change the guidelines for the allotted AB 617 funding?</p> <p>RESPONSE: The Community Emission Reduction Programs are essential in the communities for which they are being developed, and the emissions reductions from these programs will be in addition to the reductions that will be realized from the 2020 Mobile Source Strategy. NOx emissions reductions and reductions of other pollutants that result from the CERP will be incorporated into CARB's emission inventories, but there will not be changes to the guidelines for existing AB 617 funding to target NOx as the pollutant of focus in many communities may be something other than NOx.</p> | Colby L. Morrow, SoCalGas |

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| 7 | <p>Seeing that the agricultural equipment off-road emission reduction targets are dependent upon the FARMER program, is there a plan for consistent and continuous funding?</p> <p>RESPONSE: Funding for FARMER and other incentive programs is a high priority for CARB. In addition, the 2020 Mobile Source Strategy will be provided to the California Legislature upon completion. The current approach for this report will be to include estimates of the funding needs for agricultural equipment and other mobile source sectors, thereby providing the legislature with the information necessary to better consider the needs of the various incentive programs.</p> | Dave Frisbey, Monterey Bay Air Resources District |
| 8 | <p>Do you have a timeline for the release of updated light duty ZEV sales as referenced on slide 20? Will accelerated retirement be part of light duty vehicle scenarios?</p> <p>RESPONSE: The scenario presented on slide 20, is the same one that CARB presented to the Board last summer (July 2019), which is the first new Vision scenario since 2016. More ambitious ZEV sales scenarios are under development. As shown on Slide 17, the phase-in of ZEVs in light-duty or heavy-duty sector will be assisted through multiple tools including manufacturer’s requirements as well as accelerated turnover through fleet requirements and incentive fund. Considering that the climate and air quality targets have changed noticeably, new scenarios are needed to explore strategies for them. Our plan is to finalize these scenarios by Fall 2020.</p> | Dave Reichmuth, Union of Concerned Scientists |
| 9 | <p>As climate activists, we continue to be concerned about ARB’s refusal to include in the mobile source Inventory (slide 9) the GHG emissions associated with the production of liquid fuels.</p> <p>I was part of the CTC Working Group that updated the RTP Guidelines back in 2016. The Draft Guidelines had said that more than 50% of GHG emissions were attributable to mobile sources. After complaints by SCAG and AMBAG, that number was revised down to include only the tailpipe emissions. I protested bitterly, to no avail.</p> <p>By continuing to propagate this accounting trick, the Mobile Source Strategy undercuts its own significance by not acknowledging that it addresses fully 50+% of the Inventory.</p> <p>RESPONSE: We appreciate your comment. We definitely agree that achieving our air quality and climate targets requires emission reduction from both vehicle use (i.e., downstream) as well as fuel production (i.e., upstream side). As part of our scenario development for the mobile source strategies we will definitely consider emissions associated with electricity, hydrogen, and liquid fuel production. This is similar to the 2016 Mobile Source Strategy (MSS), where both upstream and downstream GHG emissions were considered.</p> | David Schonbrunn, Transportation Solutions Defense and Education Fund |

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| 10 | <p>What is the OGV Tier 4 standard being considered in the emissions modeling, and what is its emission reduction potential from the current IMO Tier III standard? Also, what are the technologies being considered for achieving this Tier 4 standard?</p> <p>RESPONSE: CARB will expand on this as we further refine the scenarios throughout summer, including supporting materials. For initial modeling, the scenario assume a 1 g/kw-hr emissions for Tier 4 standard based on the performance of SCR in other large engine applications. Of course, significant additional work will be needed by CARB, US EPA, and the IMO to develop Tier 4 standards for OGV. As described during presentation, staff are currently looking into type of scenarios and technology mixes that will be needed to achieve our mid- and long-term goals.</p> | Elaine Shen, South Coast AQMD |
| 11 | <p>In most slides today, mention about NOx while nothing about HC. Does this mean in a recent science shows NOx has more impact on air quality than HC? or NOx in today's presentation represents HC as well and HC needs to be reduced in terms of air quality/ozone reduction point of view?</p> <p>RESPONSE: While NOx is the key pollutant that must be reduced to achieve the ozone and PM2.5 standards in the South Coast Air Basin and the San Joaquin Valley, the areas with attainment deadlines for the federal standards that are drivers of many of our strategies, reductions in ROG are also important in many areas. In addition to the reductions in NOx that are described on many slides, the strategies in the 2020 Mobile Source Strategy would achieve emissions reductions in hydrocarbons and ROG, and help reduce exposure to toxic diesel particulates in affected communities.</p> | Hideharu (Hide) Takemoto, American Honda Motor |
| 12 | <p>One last question, could you tell us what is "New regulatory concepts" in slide 53, 2nd bullet point?</p> <p>RESPONSE: After CARB adopts a strategy, staff moves forward with the development of actions contained or proscribed in that strategy, but CARB also continues to look for and identify additional regulatory and programmatic concepts that could achieve needed cost-effective emissions reductions. Since the 2016 Mobile Source Strategy, these new regulatory concepts include the Clean Miles Standard, a locomotive emission reduction measure, potential new off-road diesel engine standards, off-road on-board diagnostics requirements, and updated recreational marine boat standards. These strategies will help us achieve our near-term goals in the South Coast.</p> | Hideharu (Hide) Takemoto, American Honda Motor |

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| 13 | <p>When would we need to provide feedback on scenario development and alternative scenarios? And will staff release more info on the assumptions and data that went into the scenarios presented?</p> <p>RESPONSE: Feedback and comments on scenarios are welcomed. Please find staff's contact information on Slide 56 of the workshop presentation (https://ww3.arb.ca.gov/planning/sip/2020mss/pres_marwbnr.pdf).</p> <p>Please note that staff are still fine tuning the scenarios and these scenarios will be finalized by Fall 2020. The underlying assumptions and data are available upon request.</p> | Janet Whittick |
| 14 | <p>In the Mobile Source report (page 152) the use of renewable natural gas derived from biomethane is mentioned as a substitute for diesel. Will RNG be allowed if electrification is not available for heavy duty truck applications?</p> <p>RESPONSE: Use of renewable fuels where electrification is not feasible is one of the strategies for heavy-duty sector, as mentioned on Slide 25. The Low Carbon Fuel Standard is designed to decrease the carbon intensity of California's transportation fuel pool and provide an increasing range of low-carbon and renewable alternatives, which reduce petroleum dependency and achieve air quality benefits. For more information on renewable fuels please visit CARB's LCFS website at: https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard.</p> | John McNamara |
| 15 | <p>What are the "biofuels" that CARB is evaluating to help meet the goals for reduction of diesel and gasoline use by 2045?</p> <p>RESPONSE: "Biofuels" here refer to a variety of low carbon fuels that will reduce GHG emissions to achieve long-term climate goals. For more information on low carbon fuels please visit CARB's LCFS program website at: https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard.</p> | John McNamara, CR&R Environmental Services |

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| 16 | <p>What Renewable Fuels is CARB considering to use if Electrification is not feasible? How will CARB determine if Electrification is not feasible?</p> <p>RESPONSE: The Mobile Source Strategy is going to define the type of technology mixes (e.g., zero emissions and clean combustion technologies) that will be needed to achieve mid-term air quality and long term climate goals. As staff develop the strategies, there will be a comprehensive technology and infrastructure assessment that will be conducted to determine the feasibility of electrification in different sectors.</p> <p>As described on slide 17, achieving air quality and climate goals will require multiple tools, including electrification as well as the use of renewable fuels. The Low Carbon Fuel Standard is designed to decrease the carbon intensity of California's transportation fuel pool and provide an increasing range of low-carbon and renewable alternatives, which reduce petroleum dependency and achieve air quality benefits. For more information on low carbon fuels please visit CARB's LCFS website at: https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard</p> | John McNamara, CR&R Environmental Services |
| 17 | <p>Is CARB going to have a comment period? Are written comments going to be accepted and posted?</p> <p>RESPONSE: Staff is accepting comments and questions throughout development of the 2020 Mobile Source Strategy at mss@arb.ca.gov. Once staff has publically released a draft document in the Fall 2020 timeframe, a more formal written comment period will be established for the public to provide feedback.</p> | Jon Costantino, Tradesman Advisors Inc. |
| 18 | <p>Will the MSS have alternative scenarios? Or just these, which have been described as "hyper ambitious". is there a "more realistic' scenario, or a "least cost, most benefit" scenario?</p> <p>RESPONSE: The scenarios are driven first and foremost by CARB's air quality and climate change goals. While it's true that the upfront cost of cleaner technology (e.g. heavy-duty ZEVs) may be high, incentives programs can help make them more affordable. In addition, there are potential cost savings due to lower maintenance and less fuel consumption. As described during the presentation, staff will continue refine the scenarios presented to ensure that they are technologically feasible and cost effective. Staff plan to finalize these scenarios by Fall 2020.</p> | Jon Costantino, Tradesman Advisors Inc. |

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| 19 | <p>It was mentioned that the Scenarios for Air Quality impacts address the 2027 standards and beyond.</p> <ol style="list-style-type: none"> 1) Why was the 2023 NAAQS standard not included in this scenario analysis? 2) Where is the 2023 analysis found? 3) Is the 2023 planning being updated? <p>RESPONSE: CARB submitted the South Coast 8-hour Ozone SIP Update to U.S. EPA in December 2019, which included a joint CARB/District strategy to achieve the remaining NOx emissions reductions needed to achieve the 80 ppb ozone standard in the South Coast Air Basin in 2023. As described on slide 48 of the workshop presentation, CARB is considering a suite of strategies that will achieve near term (2023 – 2025) as well as longer term (2031 – 2037) emissions reductions needed to meet the national ambient air quality standard for ozone as well as particulate matter. The scenarios included in the 2020 Mobile Source Strategy will inform future submittals related to both near- and long-term targets.</p> | Jon Costantino, Tradesman Advisors Inc. |

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| 20 | <p>Slide 26 doesn't show material usage of CA certified Low NOx until 2025, but Low NOx HD engines are available today. Why are the current Low NOx trucks not assumed to be used, especially given the 2016 plan highlights the need for thousands of near-term 0.02 g/bhp-hr engines.</p> <p>RESPONSE: We do agree that currently there are multiple CNG powered engines meeting California's optional low NOx standard, but currently there are no diesel Low NOx engines available. According to CARB's certification database, the number of low NOx engines sold in California is relatively small, and they do not comprise a significant fraction of the total heavy-duty fleet. We anticipate that with the new heavy duty low NOx engine standard that CARB is considering, there will be a significant penetration of these engines into the fleet.</p> <p>Where can stakeholders find evidence around real-world scalability of HD ZEV that CARB is basing the scenarios in the presentation?</p> <p>RESPONSE: As responded in question #28, in the on-road heavy duty sector, electric drivetrains are well suited to operating in congested urban areas for stop-and-go driving where conventional engines are least efficient. In addition, trucking industry is embracing zero emission technology.</p> <p>As staff develop the strategies, there will be a comprehensive technology and infrastructure assessment that will be conducted to determine the feasibility of electrification in different sectors. CARB's annual Funding Plan for Clean Transportation Incentive for Low Carbon Transportation and the Air Quality Improvement Plan has been making the market and technology assessment for each funded vehicle technology, as shown in the Appendix D (https://ww2.arb.ca.gov/sites/default/files/2019-09/fy1920fundingplan-appd.pdf).</p> <p>Slide #41's final bullet notes "Requesting almost another \$1 billion for future infrastructure programs". Who is requesting from whom? General fund, GGRF? Is it all Utility through CPUC? What does CARB see as the role of private capital in EV infrastructure development? Has any analysis been done on private capital competing utility rate-based programs.</p> <p>RESPONSE: Over the course of 2018 and 2019, the IOUs filed applications with the CPUC requesting nearly another one billion dollars for additional infrastructure programs. For more information please see: https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442463904.</p> <p>With respect to private capital in EV infrastructure development, there is a large opportunity for private capital to support the development of infrastructure and for leveraging state-invested funds.</p> | Jon Costantino, Tradesman Advisors Inc. |

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| 21 | <p>ACC 2.0: If light duty vehicles, and especially new vehicles, now make up a shrinking portion of the NOx emissions inventory at 13%, why would CARB want to add new regulations for criteria emissions if the highest priority is ZEV? New criteria regulations (e.g. OBD, SULEV20, testing) require significant resources from CARB staff, and divert manufacturer's investments away from electrification.</p> <p>RESPONSE: ZEV phase-in takes time. As shown on Slide 20, internal combustion engine (ICE) vehicles will continue to be the major parts of the light-duty vehicle fleet, even under a scenario of 100% sales of ZEVs and PHEVs by 2035. More stringent regulations on ICE vehicles will be needed to achieve our mid-term air quality goals. Achieving clean air goals requires emission reduction across all sectors.</p> | Kevin Curley, Mazda USA |
| 22 | <p>Can you please provide an update on the regulatory timelines/projected Board adoption for the Cargo Handling Equipment and Harbor Craft regulations as these were not included on the "Regulations in Development" slide?</p> <p>RESPONSE: Commercial harbor craft measure is currently in regulatory development, with an estimated board date in 2021. Additional workshops showing potential regulatory measures, as well as updated inventory information, are tentatively scheduled for August 2020. Cargo handling equipment will follow the development in commercial harbor craft, with workshops possible in late 2021. A board date has not yet been set.</p> | Leela Rao, Port of Long Beach |
| 23 | <p>Don't forget about stationary fuel cells. Stationary fuel cells are a zero-emission source for clean stationary power.</p> <p>RESPONSE: Great addition, thank you.</p> | Leslie Goodbody |
| 24 | <p>What do you mean by "accelerated sales"?</p> <p>RESPONSE: Slides 26 and 27 mean "accelerated turnover", which refers to vehicle replacement before its natural retirement. As described on slide 17, this can be achieved through multiple tools such as incentive programs, as well as fleet requirements. Currently there are several incentive programs such as the Carl Moyer Program (Moyer), the Funding Agricultural Replacement Measures for Emissions Reductions (FARMER), or Community Air Protection Program (CAPP) Funds, where scrappage is typically a requirement.</p> | Matthew Schrap |
| 25 | <p>Is that a "sales mandate" for end users?</p> <p>RESPONSE: Usually the "sales mandate" is on manufacturers, instead of "end users". One example of CARB's efforts for heavy-duty ZEV penetration is the Advanced Clean Trucks rule. This requires a certain percentage of heavy-duty truck sales to be ZEVs starting in 2024. This would be a manufacturer requirement.</p> | Matthew Schrap |

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| 26 | <p>Why are cost factors not included with potential regulatory actions rather than being placed at the end?</p> <p>RESPONSE: As a part of the regulatory development and adoption process, all regulatory actions that go before the CARB Board include an evaluation of associated costs.</p> | Michael Coates |
| 27 | <p>I noticed that the on-road motorcycle sector is not included in the MSS, but there is an ongoing rulemaking for this category. Is there a reason it was excluded?</p> <p>RESPONSE: This is a very good questions and we will definitely consider CARB strategies in reducing emissions from on-road motorcycles as we develop the 2020 mobile source strategy. Historically On-Road Motorcycles (ONMCs) have only accounted for a small fraction of all mobile source emissions. However, as emissions from passenger cars continue to decrease, motorcycles become a larger part of the overall emissions inventory. If left alone, Reactive Organic Gas (ROG) emissions from this category are projected to nearly match those of passenger cars by the year 2035, despite making up a small percentage of on-road vehicles and miles traveled. CARB is considering harmonizing with the Euro 5 standards in order to obtain these potentially cost effective emissions reductions. However, there are challenges involved with harmonization, including understanding Euro 5 differences from current CARB testing and certification procedures. A more detailed discussion of the challenges related to harmonization was given in the April 2018 ONMC workshop presentation. CARB is currently working with manufacturers and stakeholders through Technical Working Groups (TWG) to address concerns relating to ONMC regulatory development and challenges related to harmonization with EU standards. For more information on the ONMC regulatory development please see: https://ww2.arb.ca.gov/our-work/programs/road-motorcycles/onmc-regulatory-development</p> | Michael D. Geller, Manufacturers of Emission Controls Association |

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| 28 | <p>I was hoping to drill down a little on how CARB plans to determine where electrification is not feasible. It seems like the question is more about the feasible rate of electrification in many areas, which can be limited by things like consumer demand/preference/need and infrastructure needs. For example, there are some available models of battery electric heavy-duty trucks, but the question is how quickly these can penetrate into the fleet. However, this type of analysis relies upon several assumptions that are variable over time. Does CARB plan on looking at a potential suite of technology solutions based on current and projected electrification penetration scenarios? Is the plan to periodically revisit and revise the feasibility determination (e.g., in successive MSS updates)?</p> <p>RESPONSE: We appreciate your comments and are looking forward working with you as we develop the 2020 Mobile Source Strategy. CARB staff have worked with industry in areas where electrification has made progress or is in early stages.</p> <p>Today, in the on-road heavy duty sector, electric drivetrains are well suited to operating in congested urban areas for stop-and-go driving where conventional engines are least efficient. Battery-electric and fuel-cell electric trucks, buses, and vans already are being used by fleets that operate locally and have predictable daily use where the trucks return to base to be charged or fueled. Currently there are more than 70 different models of zero-emission vans, trucks and buses that already are commercially available from several manufacturers. Most trucks and vans operate less than 100 miles per day and several zero-emission configurations are available to serve that need. As technology advances, zero-emission trucks will become suitable for more applications. Most major truck manufacturers have announced plans to introduce market ready zero-emission trucks in the near future. Zero-emission trucks have higher upfront costs but have lower operating costs than conventional trucks. We understand that today, the total cost of ownership in California can be comparable to conventional trucks for certain duty cycles without grants or rebates. As battery prices fall and technology continues to improve, the total cost of ownership is expected to become more favorable. Incentives are currently available to offset some or all of the higher vehicle capital costs and some of the early infrastructure costs to help fleets begin transitioning to zero-emission vehicles now.</p> <p>In the off-road sector, particularly airports, ports, industrial facilities (forklifts) share the benefit of having equipment stay at one location that generally already has significant electrical infrastructure (although this may need significant upgrades for charging). CARB is also developing a research contract to model off-road engine use to determine where diesel-electric hybrids may be a viable solutions. CARB will continue to evaluate all technologies, from fuel cell, hybrids, electrification and needed</p> | Michael D. Geller, Ph.D., Manufacturers of Emission Controls Association |
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| | <p>infrastructure, and traditional SCR and DPF solutions by industry sector to determine strategies. No two sectors share the same operation characteristics.</p> <p>For several off-road sectors, we recognize that advanced emission controls on combustion engines will continue to serve a critical role in achieving our air quality goals. For example, ocean-going vessels, locomotives, and harbor craft are expected to continue to rely upon the internal combustion engine as the predominant power source. These expectations will continue to be outlined in the Mobile Source Strategy, and agency staff will continue to work with MECA, engine manufacturers, and other stakeholders to identify the vision for current and future roles of emission control solutions, such as DPF or SCR systems.</p> <p>CARB will monitor technology development among all mobile source sectors, and will continue assessing the feasibility of electrification in different sectors as we develop new policies and plans. Infrastructure planning will be an integral part of ongoing tracking of technology development. In addition to the capital costs to purchase and install charging equipment, there will be impacts to the grid at large, which will need to be managed by local utilities, the California Energy Commission, the California Public Utilities Commission, and the California Independent System Operator. Two examples of broader grid impacts include planning for increased capacity on the grid, and resiliency and providing electricity during emergency power outages. SB 44 requires a frequent update to Mobile Source Strategy document; we will ensure to capture the progression of the advanced technologies and supporting infrastructure in future mobile source strategy documents.</p> | |
| 29 | <p>For Ocean Going Vessels, will CARB staff be including vessel speed reduction as original proposed in the Scoping Plan?</p> <p>RESPONSE: Although CARB updated at-berth emissions in 2019, updates to the other OGV modes are expected in 2020. The VSR program will be reflected in the updated inventory for vessels transiting into and out of ports. Voluntary measures for vessel speed reduction have been successfully implemented at some of the largest ports in California (e.g., Ports of Los Angeles, Long Beach and San Diego) and have seen high participation rates (e.g., 90% and 85% participation at 20 and 40 nautical miles respectively at the Port of Los Angeles). With the success of voluntary measures, CARB is evaluating the need for a statewide regulatory program.</p> | Michael Murphy, BAAQMD |

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| 30 | <p>What discussions have you had with manufacturers that leads you to think that a certified Tier V engine will be available for off-road construction equipment 2025?</p> <p>RESPONSE: The scenario is intended to show that Tier V engines are needed in 2025, not that CARB has finished the regulatory development process and have already written the standards themselves. The initial technology to go past Tier 4 standards has been evaluated within a research contract funded by CARB (not yet released), however final reductions and the technology mix needs further development and work. The development of Tier V standards will need to take place between US EPA, CARB, and manufacturers, to tackle the technical hurdles. Meeting California’s air quality and climate goals requires significant emissions reductions from the off-road sector, and the new emissions standard will be one the many tools that CARB is considering to achieve those goals.</p> | Mike Lewis, Lewis & Co |
| 31 | <p>Could you please post on your website the script you are using for today’s presentation?</p> <p>The recording is not as useful as the script. There is a lot of useful information you provided.</p> <p>RESPONSE: Yes – It is now available at [Link].</p> | Peter Okurowski, CEA Consulting |
| 32 | <p>Your process schedule for 2020 appears unaffected by COVID-19. Could you please discuss the internal considerations and criteria for what remains on schedule and what issues might be delayed?</p> <p>RESPONSE: CARB is required by SB 44 to update the Mobile Source Strategy for the medium- and heavy-duty vehicle sectors by January 1, 2021. While the totality of the impacts of COVID-19 are still unknown, CARB staff is moving forward with development of this strategy to ensure that we meet the SB 44 deadline.</p> <p>In regards to development and Board action on regulations or programs that are discussed as a part of the Mobile Source Strategy, CARB staff continue to work towards dates for board consideration as were previously scheduled, but there is the possibility of delays. Staff are also actively evaluating impacts that the COVID-19 pandemic may have on regulated entities, and these impacts may be taken into consideration as regulatory development and implementation move forward.</p> | Ryan Kenny, CleanEnergy |

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| 33 | <p>Slide 52 mentions the need for incentive funding for South Coast and San Joaquin Valley. Your Low Carbon Transportation colleagues want to eliminate funding for low NOx trucks. Because the biggest near-term reductions in NOx and PM come from low NOx trucks, how do you reconcile your slide and their intentions?</p> <p>RESPONSE: Near-term emissions reductions from turnover of on- and off-road vehicles in the South Coast and San Joaquin Valley is critical, and incentive funding is an important piece of that effort. While the focus of the Low Carbon Transportation program is on reducing greenhouse gas emissions, it is not the only source of available funding. CARB is working to determine how to best utilize currently identified funding. CARB takes a portfolio approach to our suite of incentive programs and there are other programs that can fund low-NOx engines, including Carl Moyer, the Community Air Protection Program, and FARMER. CARB staff continues to look for and identify ways to achieve cost-effective emissions reductions in both the South Coast and the San Joaquin Valley.</p> | Ryan Kenny, CleanEnergy |
| 34 | <p>My question is similar and I'm still confused--is the percentage listed above the various dates for the Medium or Heavy Duty trucks the population of ZEV trucks on the road or the percentage of new sales?</p> <p>RESPONSE: These are the percentages of ZEV trucks on the road.</p> | Sasan Saadat |
| 35 | <p>And could you let us know if there are data tables available for slides 26 and 27 indicating the number of ZEVs needed on the road?</p> <p>RESPONSE: The data tables for slides 26 and 27 are available upon request. The data was sent to Sasan Saadat on March 27 and April 1.</p> | Sasan Saadat |
| 36 | <p>Could someone explain how such a high population of ICE medium and heavy duty trucks can remain on road in 2045 and still meet the carbon neutrality climate targets?</p> <p>RESPONSE: Generally, trucks stays longer on the road as compared to cars. Additionally, California is home to two of the largest container ports in the country, and there are a large number of heavy-duty diesel vehicles such as line haul trucks, registered in other states and countries that travel on California's highways and roads to bring freight and commerce into and out of the state. Therefore, while the scenarios were developed with the goal of maximizing the zero emission vehicle penetration, there will still be a fraction of heavy duty fleet that will use combustion engines. As described, we will definitely consider the use of renewable fuels where electrification is not feasible.</p> | Sasan Saadat |

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| 37 | <p>My question on slide 27 is where are the billions for infrastructure and trucks coming from?</p> <p>RESPONSE: The scenario shown on slide 27 is driven by CARB’s long-term climate goals. A top-down approach is used to show numbers of ZEVs and Low NOx trucks needed to meet these goals.</p> <p>While zero-emission vehicles currently have higher capital cost, and need associated infrastructure, their operational and maintenance cost is lower. In addition, during the long-term timeframe of this strategy, vehicle costs will come down as volume increases, and increased volume will be supported by incentives and regulations. Incentive programs to support advanced clean technologies and infrastructure have been developed to offset incremental costs, such as Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP), and the Moyer program. CPUC also approved transportation electrification projects under SB 350 to support implementation of zero-emission vehicle deployment. For more information please see CARB’s Heavy-Duty Investment Strategy document located at: https://ww2.arb.ca.gov/sites/default/files/2019-09/fy1920fundingplan-appd.pdf. Private investment will also be important to support the development of infrastructure and to leverage public funds.</p> | Sean Robledo Edgar, Clean Fleets |
| 38 | <p>The 2016 Strategy prioritized Short Lived Climate Pollutant reductions. If RNG and Low NOx engines deliver huge reductions and are available today why are they essentially ignored in this effort?</p> <p>RESPONSE: RNG and Low NOx engines have not been ignored and are identified as an important path to reducing NOx emissions, actually incentivized under the Low Carbon Fuel Standard. Looking forward CARB will need to assess how to further reduce NOx emissions in the transportation sector, which will include evaluating options for electrification. For the state’s climate goals, there will be a broader effort to better understand how RNG can decarbonize the natural gas grid.</p> | Sean Robledo Edgar, Clean Fleets |

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| 39 | <p>These questions relate to Slide 27: Can you walk through the slide again? On what basis can CARB think that 2024 would or could be the start of an aggressive ZEV purchasing cycle? The truck manufacturers (e.g. EMA) told the Board last December that billions in infrastructure and customer incentives would be needed to begin to develop “beachhead” markets like utility and refuse trucks. Where are those billions coming from? How aggressive could ZEV’s be deployed if the trucks are just beginning to emerge and truck plants are stopping production today?</p> <p>Also, please advise how or if natural gas use fits in this scenario. I see “Low NOx diesel” starting in 2024 but no CNG or renewable natural gas (RNG). If battery electric heavy duty vehicles will take several years to develop, the where do CNG/RNG and Low NOx engines fit in terms of the priority that CARB has adopted in the Short-Lived Climate Pollutant Reduction Strategy?</p> <p>RESPONSE: As described during the workshop, slide 27 does not specify the fuel type for the low NOx technology. We do agree that currently there are multiple CNG powered engines meeting California’s optional low NOx standard, but currently there are no diesel Low NOx engines available. According to CARB’s information, the number of low NOx engines sold in California is relatively small, and they do not comprise a significant fraction of the total heavy-duty fleet. We anticipate that with the new heavy duty low NOx engine standard that CARB is considering, there will be a significant penetration of these engines into the fleet.</p> <p>The scenario shown on slide 27 is driven by CARB’s long-term climate goals. A top-down approach is used to calculate the numbers of ZEVs and Low NOx trucks needed to meet these goals. The phase-in of ZEVs is a combination of multiple regulations, incentives, and other strategies as presented on slide 17. The near-term penetration for ZEVs is mainly due to the proposed Advanced Clean Truck (ACT) regulation. As indicated by blue and orange areas of “Federal Low NOx” and “CA Cert. Low NOx”, the Low NOx technologies can be either diesel or CNG.</p> | Sean Robledo Edgar, Clean Fleets |
| 40 | <p>These questions relate to Slide 33: Who is making “Tier 5” and what is it? Have the manufacturers provided CARB with information that this is technologically feasible, commercially available, functional and at what cost? If the answer to any of these questions is no then how can you possible model this? Thanks.</p> <p>RESPONSE: See answer to question 30.</p> | Sean Robledo Edgar, Clean Fleets |

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| 41 | <p>These questions relate to Slide 47: South Coast and San Joaquin have testified that tens of thousands of cleaner than standard trucks are needed in the very near future to have any hope of getting into attainment. Would it not make sense to incentivize the greatest number of commercially available low NOx and ZEV trucks now? The present lack of available incentives means that fleets that are already struggling to meet Truck and Bus Regulation compliance, which is in doubt given the current truck plant shutdowns.</p> <p>RESPONSE: See answer to question 33.</p> | Sean Robledo Edgar, Clean Fleets |
| 42 | <p>I participated on your workshop yesterday and was surprised to see that Slide 47 does not include the financial assistance offered through NRCS for reducing emissions. In 2010, NRCS signed with US EPA-Region 9, CARB, and the San Joaquin Valley APCD to ensure that incentive-based emissions reductions from in-use mobile farm equipment improvements be SIP creditable. This collaboration is reflected in CARB’s 2019 San Joaquin Valley Farm Equipment Control Measure. From 2009 through 2019, NRCS has invested \$211 million for California producers to improve their mobile off-road farm equipment, of which the majority of the investments were applied to San Joaquin Valley producers. NRCS plans to continue obligating about \$20 million for California producers through 2023, the life of this Farm Bill. Any assistance CARB can do to recognize our collaboration that overall benefits the public and helps farmers with reducing diesel exhaust emissions prior to regulatory deadlines is appreciated.</p> <p>RESPONSE: CARB definitely recognizes the important work of NRCS in reducing emissions in the agriculture sector. NRCS funding has been an important part of our efforts to achieve emissions reductions through the turnover of agricultural engines and equipment. NRCS funding is represented in the charts on Slide 47 in the “Other” category. In future presentations we will work to ensure that the measures do not appear to skip the significant contributions from NRCS.</p> | Ted Strauss, USDA NRCS |
| 43 | <p>How does CARB plan to accelerate Tier 3 OGV beginning in 2025?</p> <p>RESPONSE: The scenarios show the need for Tier 3 OGV acceleration. The proposed At Berth Regulation provides a flexible pathways achieve reduction requirements. Tier 3 OGVs are a compliance pathway to meet NOx emissions requirements and will likely accelerate visit frequency. In discussion with air districts, incentivizing and funding mechanisms for clean vessel visits have been discussed. Clearly, any action to increase Tier 3 vessels would be the product of extensive work with the OGV industry, ports, and air districts on effective strategies and viability.</p> | Thomas Jelenic |

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| 44 | <p>Based on your analysis and observations, what key factors and shortfalls have occurred to cause California’s VMT/GHG goals to be way off track? What does CARB plan to do different to get back on track?</p> <p>RESPONSE: CARB’s look at the data in 2017-2018, showed that there are many contributing factors and shortfalls contributing to the lack of progress in VMT/GHG. See our 2018 Progress Report (https://ww2.arb.ca.gov/sites/default/files/2018-11/Final2018Report_SB150_112618_01_ExecutiveSummary.pdf). For example, the data show that the portion of commuters driving alone to work instead of carpooling, taking transit, walking or cycling is rising in almost every region. The supply of housing in many regions is a small fraction of the need, particularly homes affordable to low-income communities, which is contributing to lengthening commutes. The overall ratio of dollars planned to be spent on roads versus on infrastructure for other modes in the largest regions of California has shown remarkably little shift. This is not to say that no positive policy change has taken place in this area. In fact, CARB identified many innovative regional approaches to using transportation dollars to support housing, land use, accessibility, transit, and active transportation goals, partnering with local jurisdictions on delivering alternative mode plans and projects, and more. On the whole, however, CARB finds that the state’s current structure of policies and lack of incentives will continue to produce and exacerbate insufficient results unless further shared responsibility, changes in authority or mandates and incentives, and strong, deliberate, collaborative action is taken by state, regional, and local policymakers to foster a policy environment that enhances the way we live, work, and travel. To address these entrenched challenges, substantive changes are needed, with increased focus and leadership from the State, regional, and local agencies in close coordination. CARB will be developing a future VMT Action Plan with the intent of providing a framework and concrete set of actions to steer the State to successfully reducing VMT. We are also currently engaging with the Governor’s office, sister agencies involved in transportation and housing, and local and regional planners on topic specific workgroups to help develop VMT reducing support actions.</p> <p>Given the significant contribution of pollution generated in the heavy-duty truck sector, what does the agency plan to do to increase certainty of regulation. Specifically, what support signals do you plan to offer, if any, for low NOx trucks to make sure we hit our 2023 and 2031 federal ozone attainment goals for the San Joaquin Valley and South Coast air basins? What role, if any, does the state’s Low Carbon Fuel Standard play into your analysis?</p> <p>RESPONSE: As mentioned on Slide 25, clean combustion technology, low carbon fuels, and zero emission vehicles are the key fuel/technology mixes that CARB is considering to achieve its short-, mid- and long-term goals. In</p> | Todd R. Campbell, Clean Energy |
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2020, CARB is planning to consider a regulatory proposal to reduce oxides of nitrogen (NOx) emissions from new on-road heavy-duty vehicles greater than 10,000 pounds gross vehicle weight rating (GVWR). CARB staff's proposal would reduce emissions by comprehensively addressing heavy-duty engine certification and in-use testing requirements, including by lowering the emissions standards, better controlling emissions during cold start and at low loads, strengthening the durability demonstration procedures, lengthening warranty and useful life, and expanding the amount of engine operation subject to in-use testing requirements. For more information on CARB's Low NOx Omnibus program please see: <https://ww2.arb.ca.gov/our-work/programs/heavy-duty-low-nox>

In addition to cleaner combustion technologies, the Low Carbon Fuel Standard is also designed to decrease the carbon intensity of California's transportation fuel pool and provide an increasing range of low-carbon and renewable alternatives, which reduce petroleum dependency and achieve air quality benefits. For more information on low carbon fuels please visit CARB's LCFS website at: <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard>

What do you expect the differences will be in terms of emissions and/or in-use testing requirements between California's low NOx vehicles and federal low NOx vehicles? What significance, if any, does this mean for air quality or climate goals?

RESPONSE: Emission differences between California certified and federal certified Low NOx engines will be dependent on the ongoing rulemakings, which have not been finalized yet. For the next step, staff will evaluate emission benefits of the proposed scenarios. More details will be shared during public meetings. Also for more information on CARB's Low NOx Omnibus program please see: <https://ww2.arb.ca.gov/our-work/programs/heavy-duty-low-nox>

How does a hyper ambitious ZEV penetration strategy combined with accelerated turnover of older vehicles reduce federal low NOx vehicles on California's roads? What assumptions were made? Do your assumptions depend upon federal action in terms of ZEV adoption, turnover, or is CARB seeking to limit out-of-state truck access in some way? As you know, our inability to directly regulate out-of-state trucks is proving to be a significant challenge for our most impacted regions to improve air quality.

RESPONSE: Regarding the "hyper ambitious" scenario presented on slide 27, staff assumed that all vehicles purchased by fleets in CA that are model year 2024 and newer regardless of where they're purchased must meet the ZEV phase-in requirements, so a much larger fraction of the newer vehicles are heavy-duty ZEVs instead of Low NOx. Currently a significant fraction of the heavy duty vehicles registered in California were originally

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| <p>sold as new in other states and were brought into California as a used truck. In order to achieve our air quality and climate goals, there is a need for strategies that will transform these trucks into zero emission technologies.</p> <p>How are older heavy-duty vehicles defined under the hyper ambitious ZEV penetration strategy discussed on slide 27? How do you plan to improve future input for these workshops moving forward if COVID-19 persists? This current format feels somewhat constrained and incomplete.</p> <p>RESPONSE: Since we cannot predict when or if in-person workshops will be permitted during development of the 2020 Mobile Source Strategy, staff is accepting comments and questions throughout the development process at mss@arb.ca.gov. Once staff has publically released a draft document in the Fall 2020 timeframe, a more formal written comment period will be established for the public to provide feedback.</p> <p>Also, can we get a copy of your script for this presentation? Thank you. RESPONSE: Yes – It is now available at [Link].</p> | |

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| 45 | <p>We appreciate the thorough presentation of scenarios and technology deployments needed to achieve health-protective air and climate standards. The role of CARB in the development of zero emission technology rules across the broad transportation sector, comprehensive enforcement strategies, more stringent engine standards/turnover and other regulations is clear - we look forward to continued engagement on those strategies.</p> <p>We also appreciate the inclusion of VMT reduction strategies in the presentation. My question is whether you could speak to engagement with sister agencies, local and regional planners, etc. in the development of the MSS or more broadly. The engagement and active participation across jurisdictions will be critical to ensuring progress given key findings that we are not on track to meeting SB 375 targets.</p> <p>The transition to zero emission technologies and expansion of healthier transportation choices are key priorities and we look forward to working with staff in support of these efforts.</p> <p>RESPONSE: CARB appreciates your engagement with the Mobile Source Strategy updates. While developing the strategies, staff will collaborate with other local and state agencies on different aspects of the Mobile Source Strategy including infrastructure and VMT reduction strategies. CARB has recently established a new division called Sustainable Transportation and Community Division (STCD), with the focus on sustainable transportation policy development. This division has been working closely with local and regional transportation planners to promote sustainable communities and improved transportation choices that result in curbing the growth in VMT.</p> <p>CARB plans to develop a future VMT Action Plan that provides a framework and concrete set of actions to steer the State to successful VMT reduction. We agree that engagement and active participation with our State and regional, and local partners will be key to that effort's success. Currently, CARB is part of a number of topic specific workgroups with our sister agencies working to develop actions that affect VMT and that we will draw from for the Action Plan effort; specifically, we are working with the Governor's Office of Planning and Research on a multi-agency workgroup to identify ways to improve regional planning outcomes in California, with California State Transportation Agency on their efforts to align transportation investments to reduce emissions and prepare for climate change pursuant to Executive Order N-19-19, with Caltrans on SB 743 implementation of new transportation impact analyses.</p> | Will Barrett, American Lung Association in California |

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| 46 | <p>Slide 26 - What's the composition of heavy-duty pre-2010 trucks after 2023 (after Truck and Bus Regulation Requirement)?</p> <p>RESPONSE: These are mainly trucks that are exempt from the Truck & Bus rule such as public trucks or solid waste collection vehicles, or are using specific provisions under Truck & Bus rule (e.g., low use). For more information on vehicles exempt from the Truck & Bus rule please see: https://ww3.arb.ca.gov/msprog/onrdiesel/documents/tbfinalreg.pdf</p> <p>Slide 31 (CHE) - The baseline projections for Tier 4f seem optimistic (about 70% in 2020). The Tier 4f percentage of CHE in 2018 at the Ports of Los Angeles and Long Beach is only about 30% showing slower trend in replacing older equipment. Recommend updating the baseline inventory/projection for CHE category based on latest available data.</p> <p>RESPONSE: CARB plans to revise the cargo handling emissions inventory in the next 12 months and will look closely at this issue.</p> | Zorik Pirveysian, SCAQMD |