WSPA

Submitted via email to: Ariel.Fideldy@arb.ca.gov

October 21, 2020

Ms. Ariel Fideldy
Air Pollution Specialist, Air Quality Planning and Science Division
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: California Air Resources Board 2020 Mobile Source Strategy Draft Document

Dear Ms. Fideldy:

On October 7, 2020, California Air Resources Board (CARB) held a public workshop on the 2020 Mobile Source Strategy (2020 MSS) Draft Document[1], which was released on September 30th. The Western States Petroleum Association (WSPA) appreciates the opportunity to provide comments on the 2020 MSS draft document.

WSPA recognizes the challenges that California and ARB face in meeting its air quality improvement and greenhouse gas reduction goals. The transportation sector will be integral in any solution. We look forward to continuing to work with ARB towards these goals.

WSPA notes with great concern several areas where the 2020 MSS fails to deliver practical and timely mobile source solutions to meet the State's legislative and federal obligations, and also a number of questions and concerns related to various technical and programmatic elements of the 2020 MSS. CARB's singular focus on electrification would result in the failure to deliver near-term emission reduction obligations committed under the 2016 MSS and 2016 Mobile Source State Implementation Plan (SIP), which were critical to the South Coast and San Joaquin Valley ozone attainment demonstrations.

The key concerns surrounding the 2020 MSS include:

- Does not meet SB 44 obligations to provide a comprehensive strategy for the deployment of medium-duty and heavy-duty vehicles and recommend "reasonable and achievable" goals for meeting federal ambient air quality standards and reducing greenhouse gas (GHG) emissions;
- Lack of a transparent and inclusive public process for this important strategy development, particularly one that CARB may wish to rely upon for future rulemaking;
- Does not address the State of California's near-term emission commitments under CARB's 2016 Mobile Source State Implementation Plan[2];
- Does not adequately consider a multi-technology vehicle pathway and the role of renewables in fuels as well as the grid;
- Modeling does not reflect potential roles of Cap-and-Trade in meeting emission goals;
- Failure to conduct a feasibility assessment on a zero-emission vehicle (ZEV) centric pathway or the proposed accelerated ZEV turnover;
- Lack of a robust funding and cost analysis to meet SB 44 requirements;

[1] 2020 Mobile Source Strategy Discussion Draft. Available at https://ww2.arb.ca.gov/sites/default/files/2020-09/Workshop_Discussion_Draft_2020_Mobile_Source_Strategy.pdf Accessed: October 2020.

[2] CARB 2016 State Strategy for the State Implementation Plan for Federal Ozone and PM2.5 Standards (State SIP Strategy) Available at: https://ww2.arb.ca.gov/resources/documents/2016-state-strategy-state-implementation-plan-federal-ozone-and-pm25-standards. Accessed October 2020

- Does not incorporate the impact of lost revenues from fuel taxes and any potential implications for ZEV program funding
- Does not consider future electric grid reliability and availability of infrastructure that would be needed to support a potential transition to a ZEV fleet

In light of these key concerns, WSPA asks that CARB redevelop the 2020 MSS to meet both the state's legislative obligations under SB 44, including near-term State Implementation Plan (SIP) emission targets. To do so, CARB should build out and evaluate multiple scenarios beyond the singular pathway proposed in the current MSS draft. This includes scenarios assessing the increased use of renewable liquid and gaseous fuels and low-NOx technologies, as well as the use of market-based emission reduction strategies like Cap-and-Trade, to meet emission reduction goals. CARB should present a comprehensive technical and economic analysis that considers all potential pathways to meeting both near- and long-term climate and air quality goals before it determines a recommended strategy.

We provide further detail of these concerns below and welcome the opportunity to discuss these issues with CARB staff.

1. FAILURE TO MEET SB 44 OBLIGATIONS

The 2020 MSS Draft fails to meet the regulatory requirements of Senate Bill 44 (SB 44), under which CARB is obligated "to update the state board's 2016 mobile source strategy to include a **comprehensive strategy** for the deployment of medium-duty and heavy-duty vehicles" to help meet **federal ambient air quality standards and reduce greenhouse gas (GHG) emissions.** As part of the comprehensive strategy, CARB is required to "recommend **reasonable and achievable goals**, based on specified factors, for reducing emissions from medium-duty and heavy-duty vehicles by 2030 and 2050." CARB's 2020 MSS draft meets neither of these SB 44 requirements.

The draft 2020 MSS **does not present a comprehensive strategy** to address the state's air quality and climate targets. The MSS ignores near-term air quality goals, health benefits and obligations under the federal Clean Air Act, instead focusing solely on long-term goals, which was also admitted by CARB during the October 7th public workshop. Second, it fails to consider multi-technology solutions that could achieve both near- and long-term climate and air quality goals in a likely more cost-effective manner. It does not include a cost-benefit analysis to objectively and transparently develop a strategy for medium- and heavy-duty vehicles. The focus on long-term goals alone, with its aggressive emphasis on vehicle fleet electrification, renders the draft 2020 MSS an incomplete strategy that fails to meet near-term criteria pollutant reduction requirements. Our independent work suggests that expanded implementation of low-NOx vehicles, coupled with increased introduction of renewable liquid and gaseous fuels, can deliver earlier and more cost-effective benefits than a ZEV-centric approach.

Further, the draft 2020 MSS **does not present reasonable and achievable goals** to achieving emission reductions. It lacks explicit policies and measures to meet upcoming emission goals and instead presents indeterminate concepts that fail to be supported by clear actions and timeline. As echoed by participants in the October public workshop, it is not possible to evaluate feasibility of these concepts without considering the associated measures and implementation strategies. Further, CARB writes that "the strategies and scenarios described below **do not reflect a market feasibility analysis**, but rather were identified as strategies that are technically possible but most likely **only under optimal policy and market conditions**." CARB fails to demonstrate market feasibility, and the 2020 MSS does not provide the policies needed to achieve its proposed pathways. In presenting "concepts" in lieu of measures and modeling scenarios that are only technically possible under "optimal policy and market conditions" the CARB 2020 Draft MSS fails to offer a comprehensive strategy with reasonable and achievable pathways to meet California's air quality and GHG goals.[3]

[3] 2020 Mobile Source Strategy Discussion Draft. Available at https://ww2.arb.ca.gov/sites/default/files/2020-09/Workshop_Discussion_Draft_2020_Mobile_Source_Strategy.pdf Accessed: October 2020.

2. LACK OF A TRANSARENT AND INCLUSIVE PUBLIC PROCESS

CARB has failed to conduct a transparent, fair and inclusive process of developing the 2020 MSS. The process has been rushed from the outset and the public has not been given time to understand the various elements of the 2020 MSS.

We therefore ask and encourage CARB to accept and consider comments up to the planned December Board consideration, and even into 2021 and future years, as the MSS continues to evolve.

Serious deficiencies by CARB in timing of the 2020 MSS process include (but are not limited to):

- Releasing the workshop notice and 2020 MSS draft document on September 30th, less than 5 working days before the 2020 MSS workshop date;
- Releasing the 2020 MSS draft document only 2 months before proposed final hearing by the CARB Board on December 10, 2020;
- Conducting only one public workshop between the release of the draft 2020 MSS and final Board hearing for adoption of the 2020 MSS;
- Imposing a comment period of only 22 days post-release of the draft MSS document, and less than 14 days after the public workshop on October 7, 2020;
- Failing to hold a workshop on either the draft or updated META toolkit – a fundamental basis for the scenario upon which the 2020 MSS is based – and thus providing little information at all on the technical aspects and related assumptions or opportunity for stakeholder feedback on the tool. (The discussion during the October workshop lasted approximately 10 minutes in total and was merely a walkthrough of the individual tabs of the on-road and off-road META workbooks without any discussion of the calculations and assumptions within the tool.)
- Failing to post public written comments submitted to CARB on the META toolkit;
- Failing to post the list of questions and comments submitted during the public workshop.

Further, CARB has not been transparent in handling of public comments. For example, at the October 2020 MSS workshop, WSPA representatives submitted questions and comments in the Chat function that were not read aloud, nor were these comments/questions shared publicly before the comment deadline. We understand that other stakeholders also submitted questions/comments that were not addressed or presented during the workshop. It is antithetical to the public process to deny stakeholder access to all public comments made until after the comment deadline.

CARB states on its website that the agency's processes ensure that "all stakeholders and community voices are heard."[4] Nonetheless, the process for the 2020 MSS has shown a lack of transparency where it has been difficult for stakeholders to meaningfully engage. The untimely release of meeting/workshop materials as well as the failure to hold a reasonable number of workshops is among the many shortcomings of this process.

Further, SB 44's January 1, 2021 deadline should not be used as an excuse considering that SB 44 was passed in August of 2019. CARB had 16 months to develop the 2020 MSS and an entire legislative session to request additional time if needed. As shown in the table below, the 2020 MSS timeline offered few opportunities for stakeholder inputs as compared to the 2016 MSS timeline. While stakeholders had two distinct workshops to offer comments on the 2016 MSS Vision Tool (as well as targeted presentations to the South Coast Air Quality Management Plan Advisory Group and others), CARB did not have stakeholder

[4] CARB Rulemaking Webpage. Available at: https://ww2.arb.ca.gov/rulemaking. Accessed: October 2020.

workshops on the META tool, a Vision Tool successor which was used to develop scenarios for the 2020 MSS.

2016 MSS Timeline		2020 MSS Timeline[1]	
2012	Public Workshop for Vision 1.0[2]	March 25, 2020	First Public Workshop
March, 2015	Public Workshop for Vision 2.0[3]	April 23, 2020	Presentation to the Board
September 30, 2015	Discussion Draft MSS Released[4]	August 5, 2020	Beta META tool Released (***No Workshop***)
October, 2015	Vision 2.0 Model Released[2]	September 30, 2020	Discussion Draft MSS Released
October 16, 2015	Draft MSS Public Workshop[5]	October 2, 2020	Draft META tool Released (***No Workshop***)
October 19, 2015	Deadline for Written Public Comments[4]	October 7, 2020	Draft MSS Public Workshop
October 22, 2015	Presentation to the Board[5]	October 21, 2020	Deadline for Written Public Comments[6]
May, 2016	Vision 2.1 Model Released[2]	November, 2020	Proposed Updated Draft Release[7]
May 16, 2016	Final 2016 MSS Released[5]	December 10, 2020	Final Board Hearing[7]

Notes:
[1] CARB 2020 MSS Webpage. Available at: https://ww2.arb.ca.gov/resources/documents/2020-mobile-source-strategy. Accessed October 2020.
[2] CARB 2016 MSS. Available at: https://ww3.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf. Accessed October 2020.
[3] Vision 2.0 Memo. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-06/vision2.1_scenario_modeling_system_general_documentation.pdf. Accessed October 2020.
[4] 2016 MSS October 22 Public Meeting Notice. Available at: https://ww3.arb.ca.gov/regact/nonreg/2015/mobilesourcestrategy.pdf. Accessed October 2020.
[5] CARB 2016 MSS Webpage. Available at: https://ww2.arb.ca.gov/resources/documents/2016-mobile-source-strategy. Accessed October 2020.
[6] 2020 MSS October 7th Public Webinar Notice. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-09/2020_MSS_October_Webinar_Notice.pdf. Accessed October 2020.
[7] 2020 MSS October Workshop Presentation. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-10/2020_MSS_October_Webinar_Presentation.pdf. Accessed October 2020.

In short, CARB has failed to conduct an inclusive or transparent process. The Administrative Procedures Act (APA) should have been followed in the development of the 2020 MSS as it is a model for ensuring adequate public participation during such an important strategy development, particularly for one that CARB may wish to rely upon for future rulemaking.

3. MAJOR COMMENTS ON THE 2020 MSS

The draft 2020 MSS published by CARB contains several programmatic and technical elements that raise questions and appear to have been incorporated into the MSS without due consideration of existing state obligations and feasibility assessments. A summary of the major questions and issues noted by WSPA are presented below, with more detailed comments included in Attachment A.

3.1. The 2020 MSS Draft does not address near-term emission goals and state obligations

At the March 25, 2020 workshop[5], CARB assured stakeholders that the 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**." CARB staff went further to say that "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." Nonetheless, this messaging was completely reversed in the 2020 MSS draft document.

[5] 2020 MSS, March 25, 2020 Workshop Recording. Available at: https://www.youtube.com/watch?v=TKXxMZVvyFU. Accessed October 2020.

As emphasized by both the 2020 MSS draft document and CARB staff during the October 7th workshop, the draft 2020 MSS strategies are aimed at addressing long-term emission goals (i.e., post 2030) and completely ignore near-term (i.e., 2023-2031) emission reductions, including State Implementation Plan (SIP) obligations to the extreme ozone non-attainment areas [e.g., South Coast Air Quality Management District (SCAQMD) and San Joaquin Valley Air Pollution Control District (SJVAPCD)]. Rather, CARB has now adopted rules (e.g., Advanced Clean Truck and Omnibus rules) that disincentivize the increased use of low-NOx technologies that were key to the 2016 MSS emission reduction commitments. So, under the Draft 2020 MSS, the state's non-attainment areas and disadvantaged communities would not see appreciable air quality improvements for at least another decade.

It is imperative that CARB reflect the urgency in addressing criteria and greenhouse gas emissions now. CARB needs to address the state's near-term commitments to reducing emissions and improving public health in extreme ozone non-attainment areas as part of a comprehensive mobile source strategy.

Our independent work suggests that expanded implementation of low-NOx vehicles, coupled with increased introduction of renewable liquid and gaseous fuels, can deliver earlier and more cost-effective benefits than a ZEV-centric approach.

3.2. The 2020 MSS Draft failed to properly analyze for and consider viable alternatives including a multi-technology pathway

In the first public workshop, CARB staff stated 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)."[6] Again, CARB's current MSS strategy differs significantly from that proposed in March. The 2020 MSS Draft presents an optimistic scenario of medium- and heavy-duty vehicle electrification as a means of achieving long-term climate and air quality goals. CARB has not acknowledged the numerous uncertainties with such a strategy, including (but not limited to) maturity in battery electric vehicle (BEV) technology especially for long-haul heavy-heavy duty truck (HHDT) uses, operational implications of BEVs in terms of charging times/windows and vehicle range, readiness of the future electric grid to support large-scale vehicle electrification, additional infrastructure costs for vehicle charging and grid upgrades, high BEV procurement costs, or funding available to incentivize adoption of BEVs.

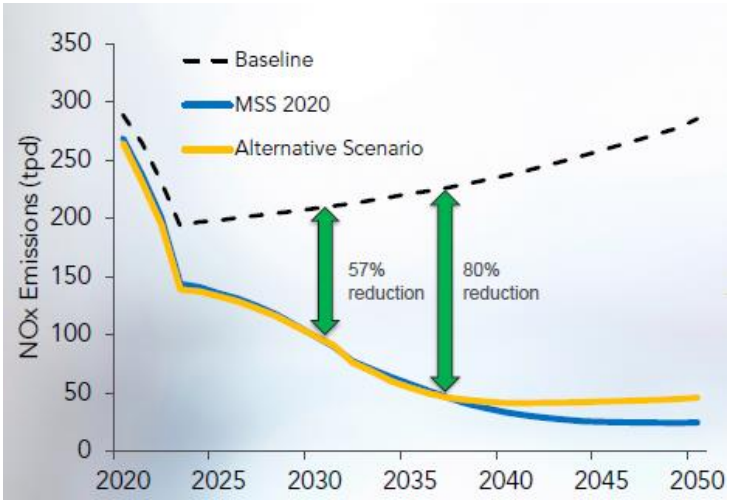
In the 2020 MSS, CARB presented and then summarily discarded an alternative concept involving cleaner internal combustion engine (ICE) technology in spite of achieving the same level of NOx benefits as a ZEV-only strategy (please refer to the following figures from the 2020 MSS public workshop). Further, while the October workshop presentation included a graph of the projected NOx emissions from the alternative scenario, CARB did not include both the projected NOx and GHG reductions from the alternative scenario into the Draft 2020 MSS document. This selective consideration of results from the alternative low-NOx scenario is unacceptable and is a misleading portrayal of the potential pathways to meeting emission reduction requirements. In the 2020 MSS document, CARB's ZEV-centric scenario has only been compared with a baseline conventional fossil fuel scenario but should instead also include technologies and fuels that show similar if not better cost-effectiveness. CARB is adopting a position where California's mobile source strategy should only be ZEV centered, when in fact, both ZEV and cleaner liquid fuel technologies should be viewed as complementary strategies that can be used together in a cost-effective manner to achieve emission reductions.

Further, the Draft 2020 MSS does not consider a scenario under which an increased use of renewable liquid and gaseous fuels in Low-NOx vehicles is evaluated as a pathway to reducing GHG emissions. This is at odds with the Low Carbon Fuel Standard (LCFS) program and other related efforts to promote production of these renewable fuels. A shift to a complete BEV-focused fleet would leave current investments into renewable fuel feedstocks and infrastructure stranded. When asked at the October workshop about the potential GHG reductions from the use of renewable fuels, CARB staff responded that such an analysis was

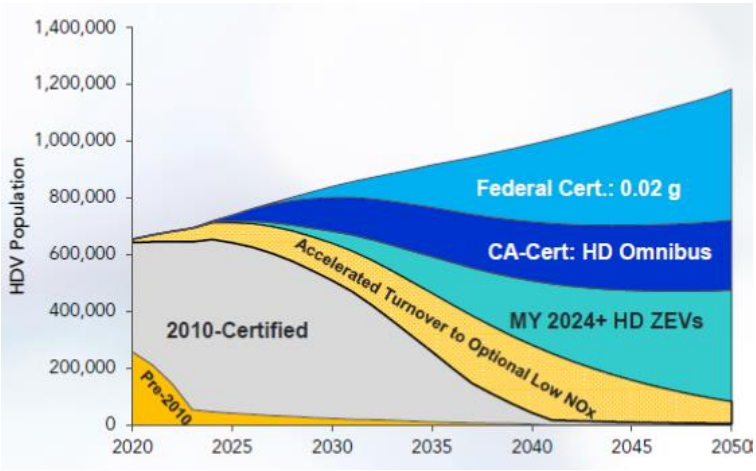
[6] 2020 MSS, March 25, 2020 Workshop Recording. Available at: https://www.youtube.com/watch?v=TKXxMZVvyFU. Accessed October 2020.

not conducted. Through a purely singular focus on electrification, CARB has failed to explore lower-cost pathways to achieving emission reductions from already existing technologies.

NOx Emissions from MSS 2020 and Alternative Low-NOx Scenarios (figure from CARB 2020 MSS October 2020 Public Workshop)[7]



Heavy-Duty Vehicle (HDV) Population for Alternative Low-NOx Scenario (figure from CARB 2020 MSS October 2020 Public Workshop) [8]



Given the economic and technological uncertainties of a single technology strategy, CARB should mitigate the current economic strain and meet near-term emission goals by delivering and promoting the lowest cost, most reliable fuels to the state—not eliminate them. Thus, the 2020 MSS must explore multiple scenarios that consider multi-technology pathways.

3.3. The 2020 MSS does not include contributions of Cap-and-Trade in reducing future emissions

Cap-and-Trade has played and will continue to play an important role in helping the state meet its GHG emission reduction goals. The role of Cap-and-Trade will continue to grow as the constantly increasing floor

[7] 2020 Mobile Source Strategy October Public Workshop Presentation, Slide #48. Available at https://ww2.arb.ca.gov/sites/default/files/2020-10/2020_MSS_October_Webinar_Presentation.pdf. Accessed: October 2020.

[8] 2020 Mobile Source Strategy October Public Workshop Presentation, Slide #47. Available at https://ww2.arb.ca.gov/sites/default/files/2020-10/2020_MSS_October_Webinar_Presentation.pdf. Accessed: October 2020.

price will send an important price signal for all carbon-reducing technologies. Given this contribution, emission reductions from the program should be taken into account when modeling the 2020 MSS. Failing to include the contribution from program in the analysis renders the work incomplete.

3.4. The 2020 MSS light-duty vehicle assumptions fail to consider alternative pathways

The 2020 MSS light-duty vehicle (LDV) scenarios are guided by the Governor Newsom's Executive Order (EO) N-79-20, which established a goal for 100 percent of California sales of new passenger cars and trucks be zero-emission by 2035[9] While this executive order is the governor's policy, it does not excuse CARB from meeting APA and Clean Air Act (CAA) obligations to put forth rules and regulations that are cost-effective and technologically feasible. Further, the executive order does not exempt CARB from completing a comprehensive analysis to review other alternatives that can serve to better achieve the state's air quality and climate goals. As stated in Section 4.2, multiple scenarios with the inclusion of multi-technology pathways must be analyzed for both the heavy-duty truck sector and the light-duty vehicles as well. Such an analysis must address existing concerns among light-duty ZEVs, some of which include cost, vehicle battery range, fueling time and infrastructure.

Additionally, the 2020 MSS relies on the proposed Advanced Clean Cars II (ACCII) regulation to meet the goals presented in their MSS scenarios. As seen in the table below, there is a substantial gap between the proposed GHG standards under CARB's 2017 ACC Midterm review and the current 2020 SAFE rule. As CARB prepares to move forward with increasingly aggressive emission standards in the proposed ACCII regulation, CARB should consider re-evaluating these proposed standards in light of pending litigation.[10] These considerations could then be incorporated into the overall planning of the LDV mobile source strategy.

[9] https://www.gov.ca.gov/2020/09/23/governor-newsom-announces-california-will-phase-out-gasoline-powered-cars-drastically-reduce-demand-for-fossil-fuel-in-californias-fight-against-climate-change/

[10] Available at: https://ww2.arb.ca.gov/carbs-comments-safe-proposal. Accessed: June 2020.

Estimated Average Required CAFE and CO_2 Standards						
Passenger Vehicle Standards		**CARB Advanced Clean Cars Regulation[1]**		**Federal Standards**		
		2012 Original Rule	**2017 Midterm Review**	**2012 Original Rule[2]**	**2017 Midterm Review[3]**	**2020 SAFE Rule[2]**
CO_2 Standards		166 g/mi CO_2 by MY 2025	153-167 g/mi CO_2 by MY 2025	163 g/mi CO_2 by MY 2025	173 g/mi CO_2 by MY 2025	202 g/mi CO_2 by MY 2026
Average Fleetwide Fuel Economy	mpg equivalent[4]			54.5 mpg_e by MY 2025	51.4 mpg_e by MY 2025	44.1 mpg_e by MY 2026
	mpg with other efficiency adjustments[5]	--	--	49.7 mpg by MY 2025	--	40.5 mpg by MY 2026
Annual Stringency Increase		--	--	~4% Annual Increase[6]	~5% Annual Increase[7]	1.5% Annual Increase

Notes:

1 CARB Advanced Clean Cars Regulation is specific to California vehicles. These estimates pertain to the California fleet. Per CARB's "deemed to comply" provision, CARB was committed to allowing compliance with the 2012 and 2017 federal standards to be deemed as compliance for California CO_2 standards. CARB's estimates for National fleet-wide CO_2 emission rate is 163 g/mi by MY 2025 in the 2012 original rule and 175g/mi by 2025 in their 2017 review. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-01/ACC%20MTR%20Summary_Ac.pdf. Accessed: June 2020.

2 Available at: Table II-5. https://www.govinfo.gov/content/pkg/FR-2020-04-30/pdf/2020-06967.pdf, in Table II-5. Accessed: June 2020.

3 Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100QQ91.pdf. Accessed: June 2020.

4 Mile per gallon equivalent (mpg_e) is the corresponding fleet average fuel economy value if the entire fleet were to meet the CO_2 standard compliance level through tailpipe CO_2 improvements that also improve fuel economy. This is provided for illustrative purposes only, GHG standards are not expected to be met only with fuel efficiency technology.

5 As the federal CO_2 standards provide credit for reducing leakage of air conditioner refrigerants and/or switching to lower global warming potential (GWP) refrigerants, and these actions do not affect fuel economy, this value represents the corresponding fuel economy requirements.

6 Available at: https://www.govinfo.gov/content/pkg/FR-2012-10-15/pdf/2012-21972.pdf. Accessed: June 2020.

7 Available at: https://www.epa.gov/newsreleases/us-dot-and-epa-put-safety-and-american-families-first-final-rule-fuel-economy-standards. Accessed: June 2020.

Abbreviations:

CAFE – Corporate Average Fuel Economy, CO_2 – carbon dioxide, g- grams, mi – miles, mpg – mile per gallon

mpg_e- mile per gallon equivalent, MY - Model Year

3.5. Feasibility of CARB's accelerated ZEV turnover scenario has not been demonstrated

CARB states in the 2020 MSS that "approximately 94,000 heavy-duty vehicles that would need to be scrapped and replaced with zero-emission technologies" in order to achieve 2031 O_3 attainment goals in the South Coast and San Joaquin Valley, but also notes that "this scenario does not specify the exact mechanism of accelerated turnover". CARB had previously proposed an accelerated turnover concept in the 2016 MSS, where it was estimated that "by 2023, approximately 100,000 to 150,000 trucks would need to have engine technologies that meet or exceed a 0.02 g/bhp-hr. low-NOx standard." These trucks and associated emission reductions have failed to be realized by CARB regulations. In both the 2016 and 2020 MSS, CARB has failed to develop regulatory mechanisms and funding sources under which this volume of older vehicles can be scrapped and replaced as opposed to being sold and transferred to another state. Further, CARB has assumed ZEV sales of heavy-duty vehicles would increase to 100% by 2035, well beyond what the current Advanced Clean Truck (ACT) rule mandates. From the ZEV market assessment from Appendix E of the ACT regulation, only 11% of zero-emission trucks in the market have received a "suitability distribution" score of 1, indicating that the truck meets all four CARB assessed fleet operational needs (loading, routes/range, infrastructure charging, and battery space constraints).[11] In light of major

[11] CARB ACT ISOR, Appendix E. Available at: https://ww3.arb.ca.gov/regact/2019/act2019/appe.pdf. Accessed October 2020.

stakeholder concerns about the ACT rule sales targets, CARB has not provided analysis to show that this level of fleet turnover and sales is feasible, much less the most cost-effective emission reduction path.

CARB's 2020 MSS envisions a future where almost all new trucks must be BEVs (or possibly fuel-cell vehicles). CARB followed the same path in its Innovative Clean Transit (ICT) rule and recent real-world experience is yielding significant differences from CARB's assumptions during rulemaking. For example, some transit agencies have found that zero emission buses (ZEBs) are unable to be used on many of their "route blocks" (a route block is a vehicle schedule, the daily assignment for an individual bus). The Victor Valley Transit Agency found that ZEBs can only be used on 15 of their 56 route blocks, with the optimistic assumption that ZEBs are able to achieve ranges of 250 miles.[12] Rather than allowing the use of commercially available low-NOx (0.02 g/bhp-hr. NOx) CNG buses that can achieve similar NOx reduction and that can even operate on renewable CNG often times with a negative carbon intensity, CARB has only provided fleet operators the option to use the much more expensive fuel-cell buses as an alternative to BEVs. These types of "real-world" concerns are not addressed in the 2020 MSS, despite stakeholder concerns expressed in the 2016 MSS development and in related CARB rulemakings.

Currently, heavy-duty battery electric trucks are only just entering the market with very few readily available for purchase today.[13] These vehicles are currently being pilot tested by the original equipment manufacturers (OEMs) such as Volvo[14] and BYD,[15] to assess if they can meet the needs of the trucking industry. The biggest barriers faced by battery electric trucks include the initial purchase price of these vehicles, long charge times for recharging these vehicles, lower payloads due to the weight of batteries, inadequate on-site charging infrastructure, complex utility rate structures, and uncertainty associated with operation during power outages.[16,17] Given these significant real-world barriers to electrification, CARB must demonstrate that the accelerated ZEV turnover scenario is a feasible pathway forward.

3.6. The 2020 MSS Draft lacks a robust analysis of necessary funding and cost to meet emission goals and requirements of SB 44

In Chapter 4, Table 4 of the Draft 2020 MSS, CARB underestimates the funding needed to achieve their proposed technology trajectories in the near-term by omitting on-site charging and public utility infrastructure costs in their cost estimates. Again, CARB has selectively presented data to support their singular focus on electrification rather than conducting a full and complete cost analysis for all potential alternatives. As charging infrastructure costs represent significant upfront cost to fleet and vehicle owners, Table 4 should include the necessary infrastructure costs that come with operating ZEVs if the document desires to provide an accurate summary of the costs required for a ZEV transition. This is not the first time CARB has underestimated the cost of a ZEV transition. In the CARB ACT regulation, CARB staff conducted an analysis of the total cost of ownership for electric vehicles.[18] Nonetheless, the ACT ISOR projects electricity costs that are lower than those reported by the US Energy Information Administration's (EIA) Annual Energy Outlooks (AEO) in 2018[19] and 2019[20] and as such overstates the operational cost benefit for BEVs.

---

[12] Presentation by the Victor Valley Transit Agency at the 2019 California Desert Air Working Group. Available at: https://www.mdaqmd.ca.gov/home/showdocument?id=6973. Accessed October 2020.

[13] Available at: https://www.greenbiz.com/article/8-electric-truck-and-van-companies-watch-2020. Accessed: June 2020.

[14] Available at: Volvo Lights Project https://www.volvotrucks.us/innovation/electromobility/. Accessed: June 2020.

[15] Available at: BYD pilots https://cleantechnica.com/2018/06/01/byd-opens-up-about-its-electric-truck-plans-cleantechnica-exclusive/. Accessed: June 2020.

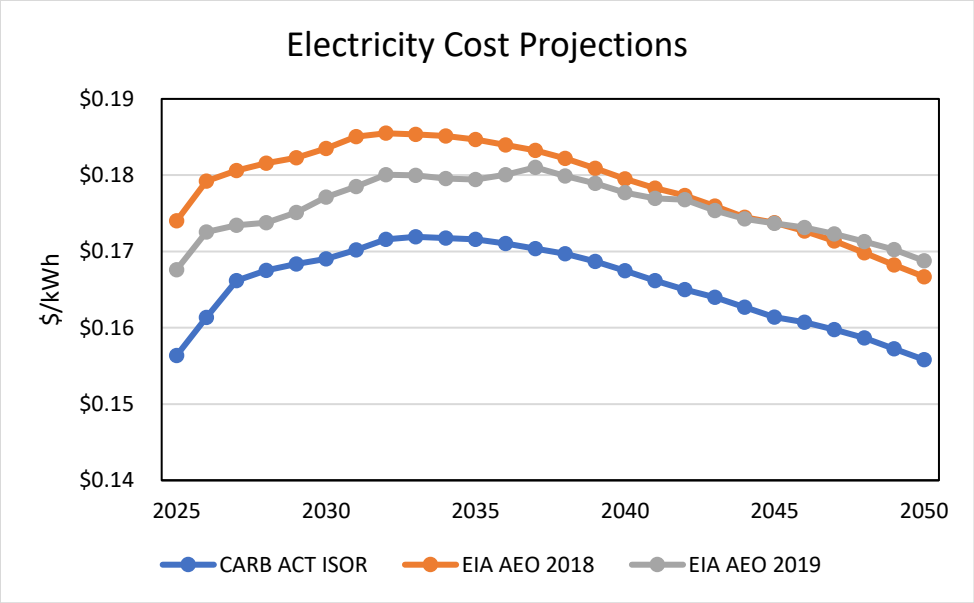
[16] Available at: https://www.pressroom.ups.com/pressroom/ContentDetailsViewer.page?ConceptType=PressReleases&id=1539256974387-450. Accessed: June 2020.

[17] Available at: https://www.ttnews.com/articles/electric-truck-integration-poses-challenges-fleets-study-shows. Accessed: June 2020.

[18] CARB ACT Draft TCO Calculator. Available at: https://ww2.arb.ca.gov/sites/default/files/2019-05/190508tcocalc_2.xlsx. Accessed July 2020

[19] US EIA Annual Energy Outlook 2019, Table 3-Pacific Region Costs. Available at: https://www.eia.gov/outlooks/archive/aeo18/. Accessed: July 2020

[20] US EIA Annual Energy Outlook 2019, Table 3-Pacific Region Costs. Available at: https://www.eia.gov/outlooks/archive/aeo19/. Accessed: July 2020.



Additionally, as discussed in Section 4.3, recent reports from transit agencies[21,22,23,24] have shown that CARB projections[25] in the ICT regulation are significantly different from real world experiences. As seen in the graph below, these reports have demonstrated that Transit operators face BEV charging infrastructure costs significantly higher than CARB ICT estimates.[26]

[21] AC Transit Rollout Plan. Available at: http://www.actransit.org/wp-content/uploads/AC-Transit-ZEB-Rollout-Plan_06102020.pdf. Accessed September 2020

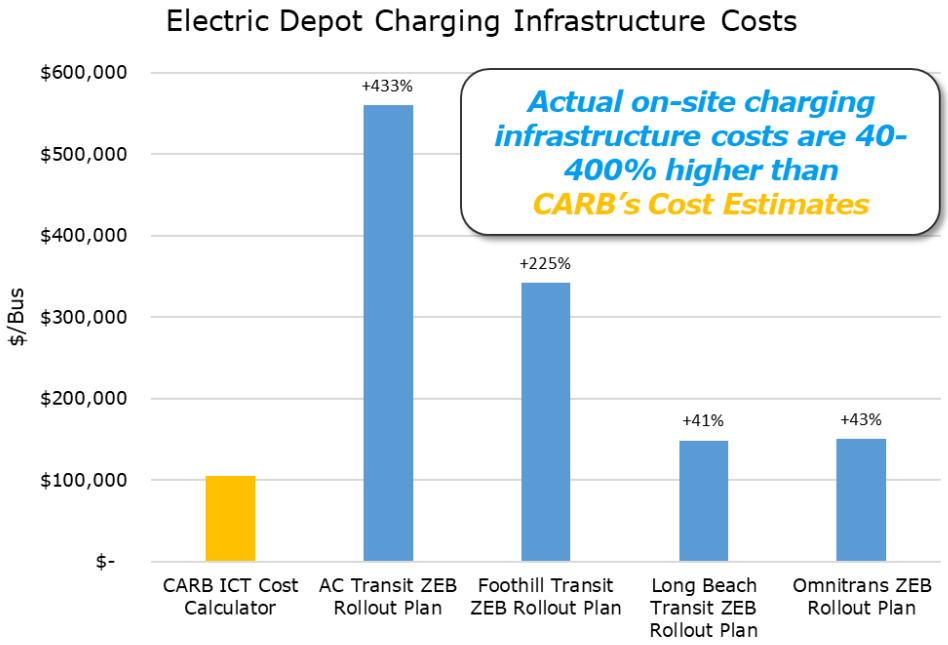
[22] Foothill Transit Rollout Plan. Available at: http://foothilltransit.org/wp-content/uploads/2014/05/Burns-McDonnell-In-Depot-Charging-and-Planning-Study.pdf. Accessed September 2020

[23] Long Beach Transit ZEB Rollout Plan. Available at: https://cafcp.org/sites/default/files/Long-Beach-Transit-Zero-Emission-Rollout-Plan.pdf. Accessed September 2020

[24] Omnitrans ZEB Rollout Plan. Available at: https://www.gosbcta.com/wp-content/uploads/2020/05/Final-Omnitrans-Rollout-Plan.pdf. Accessed September 2020

[25] CARB ICT Cost Calculator. Available at: https://ww2.arb.ca.gov/resources/documents/battery-electric-truck-and-bus-charging-cost-calculator. Accessed September 2020

[26] CARB ICT Cost Calculator. Available at: https://ww2.arb.ca.gov/resources/documents/battery-electric-truck-and-bus-charging-cost-calculator. Accessed September 2020



Further, Chapter 4 of the Draft MSS did not estimate the funding needed to meet the technology trajectory of the alternative Low-NOx scenario. In doing so, CARB has failed to assess the economic feasibility of all possible pathways to meeting the state's climate and air quality reduction goals.

3.7. The 2020 MSS Draft has not identified the required levels of funding needed to meet emission goals

CARB has not identified the incentive funding sources needed to meet emission goals. The funding sources listing in Chapter 4 of the 2020 MSS are clearly insufficient to meet the funding needs estimated in Table 4 of the MSS. In fact, several funding programs are scheduled to sunset in the coming years, with many programs funded by the state legislature experiencing a loss in funding capacity due to cuts in the state budget. A list of these funding programs is provided in Appendix A. Further, the economic impact of the COVID-19 pandemic (e.g., a State budget deficit of $54.3 billion in March 2020)[27] imply further potential funding constraints. The loss of these funding sources may reduce the available incentive funding needed for key incentive programs, as well as the 2020 MSS proposed vehicle miles traveled (VMT) reduction program.

Not only has CARB has chosen to adopt a costly and uncertain strategy at a time when the state and individuals can least afford it, CARB has also failed to assure stakeholders of the availability of funding given the projected loss in incentive sources that can result from a single technology approach. This includes the loss of lost tax revenues from reduced sales of diesel and gasoline fuel modeled in the 2020 MSS scenarios. In the 2020-2021 Fiscal year, the California Department of Transportation expects to generate approximately $7.5 B of revenues from state taxes on gasoline fuel and approximately $2.2 B through taxes on diesel fuel.[28] These represent approximately 55% of the state's transportation revenues, which are used to support transportation infrastructure maintenance activities within the state (Road Maintenance and Rehabilitation Account, State Highway Account, etc.), public transportation and other accounts. The Draft MSS scenarios indicate that by 2045, statewide fuel reductions from on-road mobile sources of 9.3 B GGE and 2.2 B DGE from 2020 consumption levels would be achieved (Chapter 5, Table

[27] 2020 Mobile Source Strategy Discussion Draft. Available at https://ww2.arb.ca.gov/sites/default/files/2020-09/Workshop_Discussion_Draft_2020_Mobile_Source_Strategy.pdf Accessed: October 2020.

[28] California Transportation Financing Summary Fiscal Year 2020-21, Chart F. Available online at: https://dot.ca.gov/-/media/dot-media/programs/budgets/documents/2020-21-california-transportation-financing-package.pdf Accessed: October 2020.

11), which amounts to approximately $5.6 B of potentially lost revenue from gasoline fuel taxes and $1.9 B from diesel fuel taxes (assuming current tax rates).[29]

CARB must acknowledge the lost state tax revenues resulting from their MSS scenarios and the potential effect this would have on funding the State's essential transportation infrastruture development and maintenance, public transportation and other transportation needs.

3.8. CARB has not addressed issues of electric grid reliability and availability of infrastructure required to support a fleet transition to ZEVs

CARB has again provided conflicting comments on the assessment of electric grid reliability within the 2020 MSS. In the March workshop, CARB staff assured stakeholders that there would be a "comprehensive technology and infrastructure assessment that will be conducted to determine the feasibility of electrification in different sectors." In the October workshop, various stakeholders again raised concerns on the electric grid's reliability and availability to support a fleet transition to ZEVs. In this instance, CARB noted on several occasions that the electricity grid will need to evolve to support increased electrification loads from ZEVs, but that other departments within state government (e.g., CPUC, CEC) are responsible for implementing the necessary infrastructure upgrades. Neither the 2020 MSS document or workshop acknowledged numerous constraints that challenge the electric grid currently (e.g., ageing infrastructure, load balancing during high demand periods, public safety power shutoffs, imbalance of renewable resources leading to the duck curve), let alone the potential impacts of large-scale vehicle electrification proposed by the 2020 MSS scenarios. The document or workshop also did not discuss the required increased electricity demand for the scenarios, even though that information is available in the Draft META tool. Furthermore, the cost estimates presented in the 2020 MSS do not include investments in vehicle chargers and grid infrastructure that are foundational to achieving BEV penetration at the scale proposed in the 2020 MSS scenarios.

If the feasibility of 2020 MSS strategy relies heavily on the reliability of the electric grid, CARB cannot satisfy SB 44 obligations by deflecting considerations of electricity infrastructure to other entities. By refusing to discuss or incorporate infrastructure concerns into the 2020 MSS, CARB has failed to meet the feasibility requirements stipulated in SB 44.

4. 2020 DRAFT META TOOL - HIGH LEVEL COMMENTS

The Mobile Emissions Toolkit for Analysis (META)[30] is a fundamental component of the 2020 MSS and underpins the scenarios and emission reductions published in the 2020 MSS. WSPA reiterates that CARB has failed to be transparent in the development and usage of the META tool, and has not held a workshop on either the draft or updated META toolkit. The most concerning aspect regarding the META tool is that CARB has not provided clear explanations, justifications or citations for key assumptions and inputs within the model. The comments summarized below, and expanded upon in Appendix B, reflect issues that were able to be discerned from review of the model to date. A more robust set of feedback towards improving the model and making it more representative can only be provided with a deeper understanding of the tool.

4.1. Deficiencies in the META tool needed to meet SB 44 Requirements

Senate Bill 44 (SB 44) requires CARB "to update the state board's 2016 mobile source strategy to include a comprehensive strategy for the deployment of medium-duty and heavy-duty vehicles" to meet federal ambient air quality standards and reduce greenhouse gas (GHG) emissions. As part of the comprehensive strategy, CARB must also "recommend reasonable and achievable goals, based on specified factors, for reducing emissions from medium-duty and heavy-duty vehicles by 2030 and 2050."

[29] State excise and other taxes were assumed to be 61 cents per gallon (cpg) for gasoline fuel and 86 cpg for diesel fuel as of 1/1/2020. Data obtained from the American Petroleum Institute State Motor Fuel Taxes, available online at: https://www.api.org/~/media/Files/Statistics/StateMotorFuel-OnePagers-January-2020.pdf. Accessed: October 2020.

[30] Draft META Tool, October Draft Version. Available at: https://content.govdelivery.com/accounts/CARB/bulletins/2a3e7dc. Accessed October 2020.

The META tool contains a number of deficiencies that result in the tool, and consequently, the 2020 MSS, not meeting the requirements of SB 44:

- The META tool emission and fuel usage results do not match those reported in the 2020 MSS draft and the October workshop presentation;
- The META tool does not allow the user to model potential GHG emission benefits from increased adoption of renewable fuels for medium- and heavy-duty vehicles nor does it consider the available supply of renewable fuels and potential carbon intensity (CI) reductions over time;
- The META tool does not allow the user to evaluate upstream GHG emissions from vehicle fuel usage, nor does it evaluate changes in tire wear and brake wear PM from BEVs that are typically heavier and create more PM emissions, thereby not fully representing the total change in well-to-wheel emissions from a given vehicle and fuel technology shift;
- The META tool contains unrealistic assumptions on the energy efficiency of BEVs and aggressive BEV sales targets (that even go beyond those presented in the ACT rule for which stakeholders expressed serious concerns in being able to achieve);
- The META tool does not evaluate costs associated with transitioning California's vehicle fleet to BEV or Low-NOx technologies, which should form the basis to select a cost-effective approach to achieving State emission reductions;
- The META tool does not include clear explanation, justification and citations for key assumptions and inputs used in the model, such as EER value for BEVs and calculation of the vehicle turnover rate required to meet South Coast ozone targets. Further, it is unclear if current Cap & Trade regulations were taken into consideration in the modeling of baseline emissions.

Given that the META tool underpins the results of the 2020 MSS scenarios, it is imperative that CARB address the deficiencies in the META tool so that it is useful in supporting the development of an economy-wide strategy for achieving emission reductions from on road vehicles.

4.2. The META tool assumes an unrealistically high BEV efficiency

The META Tool's assumes an energy efficiency ratio (EER) of 5.0 for Class 4-8 battery electric vehicles (BEVs). This is inconsistent with CARB's ACT Initial Statement of Reasons (ISOR)[31] which indicates test data suggesting lower BEV EER values for trucks traveling at higher speeds. In fact, CARB's ACT Total Cost of Ownership calculator[32] assumed a MY2024 BEV energy economy of 0.57 mile/kWh (corresponding to a BEV EER of approximately 3.0 based on a diesel HHDT fuel economy of 7.03 miles/gallon). Use of a higher EER leads to a systemic underestimate of the electricity that would be required by BEVs and consequently, understating the costs necessary for CARB's proposed BEV-centric approach.

4.3. The META tool calculates higher emissions from low-NOx vehicles than required regulatory limits

The META tool is inconsistent with the recently adopted Low-NOx Omnibus rule in calculating NOx emissions from low-NOx vehicles. For example, the META tool calculates NOx emissions from a MY2032 Low-NOx vehicle at year 5 (~400,000 miles) to be 71% lower than a conventional diesel vehicle whereas the Omnibus regulation requires that MY2032 vehicles have 90% lower NOx emissions relative to current diesel standards at 435,000 miles. Similarly, while the META tool models emissions from a low-NOx vehicle at ~800,000 miles to be 60% lower than a diesel vehicle, the Omnibus regulation requires that low-NOx vehicle emissions must be 80% below current diesel standards at a similar mileage.

[31] CARB ACT ISOR Appendix G. Available at: https://ww3.arb.ca.gov/regact/2019/act2019/appg.pdf. Accessed September 2020.

[32] CARB Cost Calculator- Draft Advanced Clean Trucks Total Cost of Ownership Discussion Document. Appendix H. Available at: https://ww3.arb.ca.gov/regact/2019/act2019/apph.pdf. Accessed: July 2020.

This represents a significant misrepresentation of the emissions from a Low-NOx vehicle, and CARB must ensure that its tool accurately represents the effects of proposed rulemaking and capture resulting emission reductions in an internally consistent manner.

4.4. The META tool does not evaluate upstream emissions from electricity generation, nor does it include the capability to model use of renewable fuels

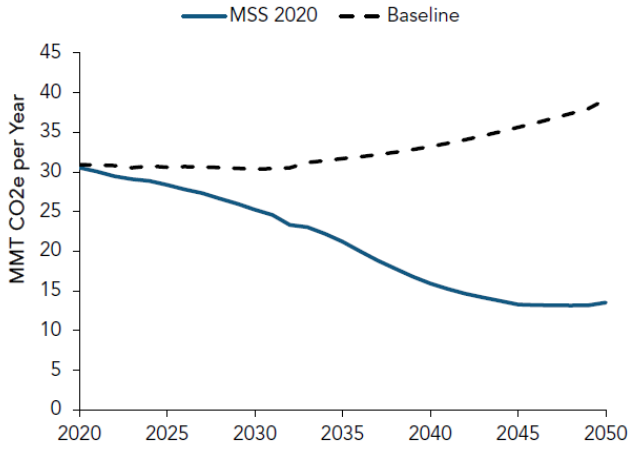
The META tool does not calculate upstream emissions from the modeled vehicle fleets. As BEVs have significant upstream emissions relative to conventional gasoline and diesel fuels, the META tool must present well-to-wheels GHG emissions for all vehicle technologies it assesses in order to be transparent about the impacts of transitioning California's vehicle fleet to other technologies.

Further, the META tool does not allow the user to model GHGs from renewable fuels (biodiesel, renewable diesel, renewable natural gas (RNG), etc.) and their GHG emission benefits (some of which may be negative carbon fuels such as RNG from diary digester gas). The inability to model renewable and alternative transportation fuels is a significant omission of potential pathways to achieving the GHG reduction targets of 40% below 1990 levels by 2030 and 80% below 1990 levels by 2050,[33] as well as carbon neutrality by 2045.[34,35]

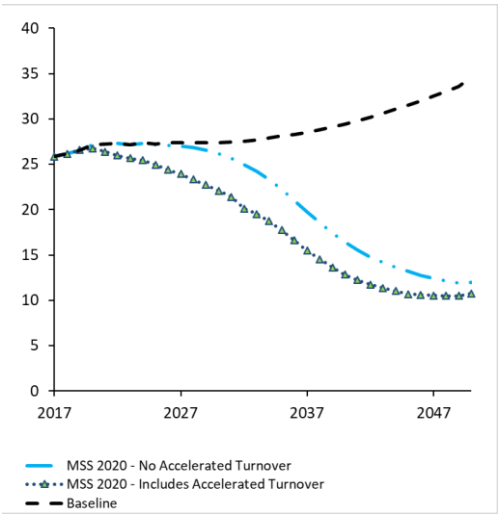
While we note that the calculations in the 2020 MSS Draft document do account for upstream emissions, this information must be presented alongside vehicle tailpipe emission reductions calculated in the META tool so that the well-to-wheels impact on GHGs from vehicle technology shifts is apparent. Currently, the GHG emissions presented in the META tool do not account for upstream emissions and as such, do not match the statewide well-to-wheels emission charts reported in the draft MSS. In doing so, CARB is presenting an overly optimistic view of the electrification scenario. CARB must provide the calculations for how they arrive at the upstream GHG emissions in the META tool.

GHG Emissions reported in 2020 MSS Draft tool

Figure 24 - Statewide Well-To-Wheel GHG Emissions from Heavy-Duty Vehicles



GHG Emissions (MMT/yr.) reported in Draft META



CONCLUSION

In summary, the 2020 MSS Draft fails to meet state legislative and federal obligations, including that the 2020 MSS does not deliver required reductions to non-attainment areas and environmental justice communities in the next 10-15 years as committed to in the 2016 MSS State Implementation Plan. Not only

[33] Available at: https://ww3.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf. Accessed: June 2020

[34] 2020 CARB MSS Public Workshop Presentation. Available at: https://ww3.arb.ca.gov/planning/sip/2020mss/pres_marwbnr.pdf. Accessed: June 2020. 2020 CARB MSS

[35] 2020 CARB MSS Informational Update to the Board. Presentation available at: https://ww3.arb.ca.gov/board/books/2020/042320/20-4-3pres.pdf. Accessed June 2020.

are we deeply concerned about CARB's inadequate public process to facilitate and receive stakeholder comment, we wonder to what extent does CARB intend to use those comments in a document it will release less than a month after receiving them. It is not possible that the November revision could meaningfully reflect and respond to stakeholder comments, including the lack of planning-level economic and market feasibility assessments and that CARB has neglected to present and/or substantiate key assumptions that undergird its ZEV-centric strategy. Given the urgency to meet required air quality and GHG emission goals in the coming years, the 2020 MSS must provide a comprehensive strategy with reasonable and achievable goals as stipulated by SB 44. Most importantly, the 2020 MSS Draft lacks the consideration of multi-technology pathways, a complete economic and technological feasibility assessment of a ZEV-centric strategy with an accelerated turnover, and planning for an increased reliance on an already challenged electric grid. The key assumptions incorporated to the Draft META model lack citations and justification, restricting its public usefulness in assessing multi-technology pathways.

In light of these key concerns, WSPA asks that CARB redevelop the 2020 MSS to meet both the state's legislative obligations under SB 44, including near-term State Implementation Plan (SIP) emission targets. To do so, CARB should build out and evaluate multiple scenarios beyond the singular pathway proposed in the current MSS draft. This includes scenarios assessing the increased use of renewable liquid and gaseous fuels and low-NOx technologies, as well as the use of market-based emission reduction strategies like Cap-and-Trade, to meet emission reduction goals. CARB should present a comprehensive technical and economic analysis that considers all potential pathways to meeting both near- and long-term climate and air quality goals before it determines a recommended strategy.

WSPA appreciates the opportunity to comment on the 2020 MSS Draft and welcomes any further discussion CARB would like to have on these issues.

Sincerely,

Tiffany K. Roberts,
Vice President, Regulatory Affairs
Western States Petroleum Association

ATTACHMENT A
DRAFT 2020 MOBILE SOURCE STRATEGY: DETAILED COMMENTS

This appendix provides additional detailed comments on CARB's 2020 Mobile Source Strategy (2020 MSS) Draft document.

A.1 The 2020 MSS Does not address near-term emission goals and state obligations.

As emphasized by both the 2020 MSS draft document and CARB staff during the October 7th Workshop, the draft 2020 MSS strategies are aimed at addressing long-term emission goals (i.e., post 2030) and completely ignore near-term (i.e., 2023-2031) emission reductions, including State Implementation Plan (SIP) obligations to the extreme ozone non-attainment areas [e.g., South Coast Air Quality Management District (SCAQMD) and San Joaquin Valley Air Pollution Control District (SJVAPCD)]. This is in spite of the fact that CARB is now adopting rules (e.g., Advanced Clean Truck and Omnibus rules) that disincentivize increased use of low-NOx technologies that were key to the 2016 MSS emission reduction commitments.

The Draft 2020 MSS fails to deliver the near-term commitments made under the 2016 MSS and fails to offer any alternative measures that might accomplish meet CARB's commitments which are needed to meet the 2023 and 2031 attainment milestones.

The Draft 2020 MSS states: *"The concepts contained in the 2020 Strategy are less defined than the measures included in the 2016 Strategy, in part due to the accelerated timeframe. The concepts, though, will continue to be developed and translated into measures for the next State SIP Strategy and other CARB planning documents over the coming years."*

CARB fails to acknowledge that the San Joaquin Valley Air Pollution Control District (SJVAPCD) and South Coast Air Quality Management District (SCAQMD) are both required to develop State Implementation Plans (SIPs) that address 2023 O_3 attainment deadlines and required mobile source emission reductions. As emphasized by staff from SJVAPCD during the 2020 MSS workshop, these districts do not have "coming years" to implement and achieve these reductions—these reductions are required now.

The Draft MSS states: *"Regardless of near-term challenges with levels of incentive funding or timing of federal regulatory action, CARB is moving forward to address mobile source emissions and will take action where possible to lower emissions now. For the near-term, there is potential for emissions reductions from newer programs that are expected to be considered by the Board over the next year including the Clean Miles Standard program to regulate ride-hailing services, the Advanced Clean Fleets rule to require fleets to incorporate ZEVs into their fleet in combination with the ACT regulation, the locomotive emission reduction measure, and amendments to the Commercial Harbor Craft regulation. In addition, there are newer regulatory concepts discussed later that are in earlier phases of development but will likely achieve reductions in time for the mid-term 2030, 2031, and 2037 deadlines."*

The 2020 MSS draft does not detail or quantify the emission reductions from "newer programs" to meet near-term goals nor does it provide a timeline for how CARB plans to meet the 2023 target. On the contrary, as emphasized above, the ACT rule would fail to deliver required near-term reductions and stakeholders have stated that it disincentivizes the use of other low-NOx technologies that could deliver those benefits in the interim.

For the South Coast Air Basin, CARB is failing to deliver over 34 tons/day of NOx reductions through incentives for low-NOx trucks that it committed to by 2023 under the 2016 MSS and 2016 California SIP.[36,37] Further, stakeholders have noted that CARB is now adopting rules (e.g., Advanced Clean Truck and Omnibus rules) that disincentivize increased use of low-NO_x technologies that were key to the 2016

[36] For the South Coast Air Basin, CARB committed to 34 tons/day of NOx reductions in 2023 (through incentivizing over 150,000 low-NOx trucks) and an additional 11 tons/day of NOx reductions in 2031 (incentives for an additional 54,000 low-NOx trucks). A majority of the proposed reductions come from "Further Deployment of Cleaner Technologies" approved under Section 182(e)(5) of CAA.

[37] 2016 SCAQMD AQMP, Chapter 4. Available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/chapter4.pdf?sfvrsn=4. Accessed September 2020.

commitments (including an additional 11 ton/day NOx reduction in 2031 through incentives for an additional 54,000 low-NOx trucks). Under the Draft 2020 MSS, the State's non-attainment areas and disadvantaged communities would not see appreciable air quality improvements for at least another decade.

CARB needs to specify how it plans to address the State's near-term commitments to reducing emissions and improving public health in extreme ozone non-attainment areas as part of its mobile source strategy.

A.2 The 2020 MSS Draft does not consider a multi-technology pathway.

CARB's scenarios and 2020 MSS strategy is at odds with its statement on the importance of low-NOx vehicles. CARB writes: *"Trucks certified to CARB's previous optional low NOx standard are currently in-use, and as such, are highly important for achieving more near-term SIP deadlines…It is expected that trucks manufactured to meet this standard…will contribute significant near-term NOx reductions for attainment, as well as to near-source risk reduction in and around disadvantaged communities."*

Despite emphasizing the need for a low-NOx Standard in the statement above, CARB has not only disregarded the alternative Low-NOx scenario but also reduced the fleet mix percentage for low-NOx vehicles in the main scenario from the fleet mixes presented during the March 2020 Workshop[38].

	October Draft 2020 MSS[39] HDV Fleet Mix		March 2020 MSS Presentation[40] HDV Fleet Mix	
Year	Low-NOx	ZEV	Low-NOx	ZEV
2031	20%	24%	23%	21%
2037	27%	48%	31%	44%
2050	22%	77%	24%	76%

A.3 The 2020 MSS Draft lacks a robust analysis of funding and cost needed to meet emission goals and requirements of SB 44

In Chapter 4, Table 4 of the Draft 2020 MSS, CARB underestimates the funding needed to achieve their proposed technology trajectories in the near-term by omitting on-site charging and public utility infrastructure costs in their cost estimates. Again, CARB has selectively presented data to support their singular focus on electrification rather than conducting a full and complete cost analysis for all potential alternatives. As charging infrastructure cost represent significant upfront cost to fleet and vehicle owners Table 4 must include the necessary infrastructure costs that comes with operating ZEVs if the document desires to provide an accurate summary of the costs required for a ZEV transition. This is not the first time CARB has underestimated the cost of a ZEV transition. In the CARB ACT regulation, CARB staff conducted an analysis of the total cost of ownership for electric vehicles.[41] Nonetheless, the ACT ISOR projects electricity costs that are lower than those reported by the US Energy Information Administration's (EIA) Annual Energy Outlooks (AEO) in 2018[42] and 2019[43] and as such overstates the operational cost benefit for BEVs.

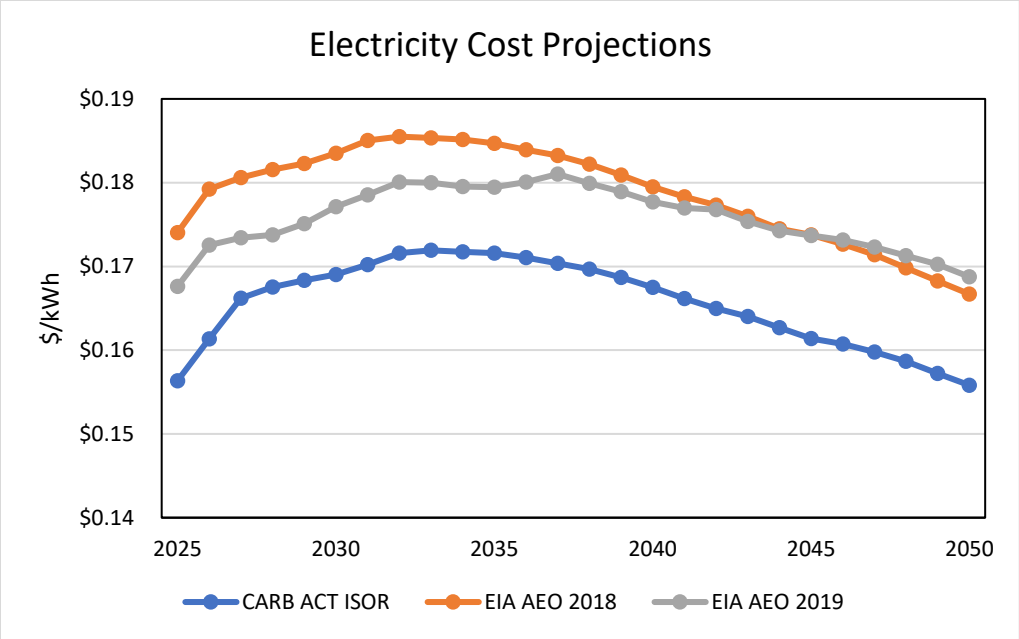
[38] Available at: https://ww2.arb.ca.gov/resources/documents/2020-mobile-source-strategy. Accessed: October 2020.
[39] Available at https://ww2.arb.ca.gov/sites/default/files/2020-09/Workshop_Discussion_Draft_2020_Mobile_Source_Strategy.pdf Accessed: October 2020.

[40] Available at: https://ww2.arb.ca.gov/resources/documents/2020-mobile-source-strategy. Accessed: October 2020.

[41] CARB ACT Draft TCO Calculator. Available at: https://ww2.arb.ca.gov/sites/default/files/2019-05/190508tcocalc_2.xlsx. Accessed July 2020

[42] US EIA Annual Energy Outlook 2019, Table 3-Pacific Region Costs. Available at: https://www.eia.gov/outlooks/archive/aeo18/. Accessed: July 2020

[43] US EIA Annual Energy Outlook 2019, Table 3-Pacific Region Costs. Available at: https://www.eia.gov/outlooks/archive/aeo19/. Accessed: July 2020.



Additionally, as discussed in Section 4.3, recent reports from transit agencies[44,45,46,47] have shown that CARB projections[48] in the ICT regulation are significantly different from real world experiences. As seen in the graph below, these reports have demonstrated that Transit operators face BEV charging infrastructure costs significantly higher than CARB ICT estimates.[49]

[44] AC Transit Rollout Plan. Available at: http://www.actransit.org/wp-content/uploads/AC-Transit-ZEB-Rollout-Plan_06102020.pdf. Accessed September 2020

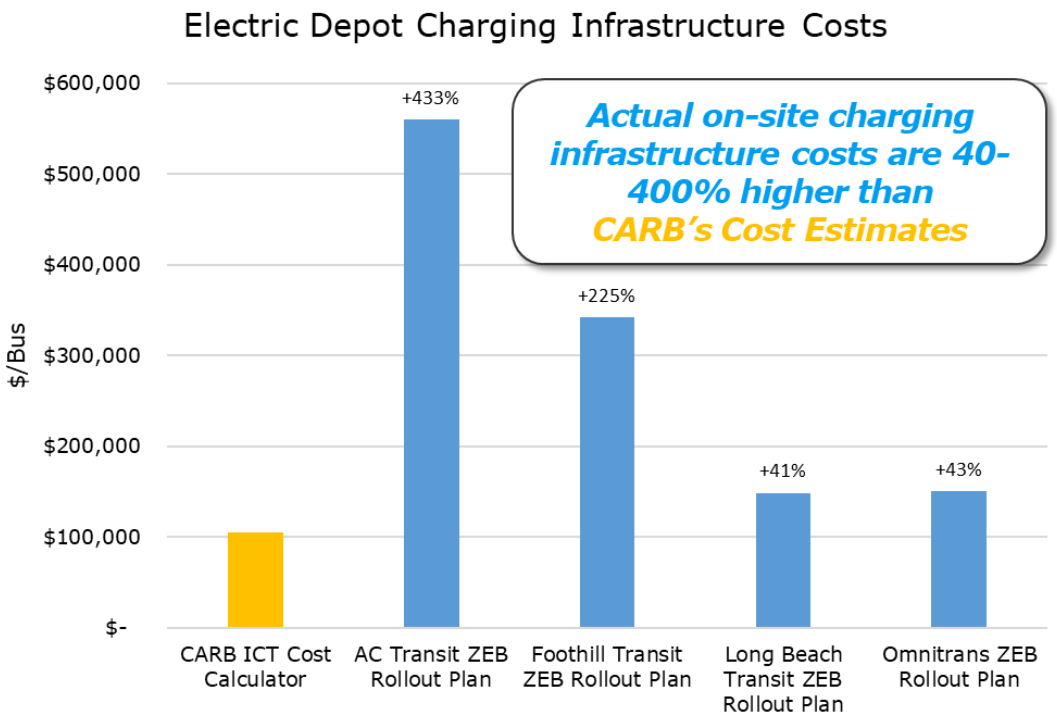
[45] Foothill Transit Rollout Plan. Available at: http://foothilltransit.org/wp-content/uploads/2014/05/Burns-McDonnell-In-Depot-Charging-and-Planning-Study.pdf. Accessed September 2020

[46] Long Beach Transit ZEB Rollout Plan. Available at: https://cafcp.org/sites/default/files/Long-Beach-Transit-Zero-Emission-Rollout-Plan.pdf. Accessed September 2020

[47] Omnitrans ZEB Rollout Plan. Available at: https://www.gosbcta.com/wp-content/uploads/2020/05/Final-Omnitrans-Rollout-Plan.pdf. Accessed September 2020

[48] CARB ICT Cost Calculator. Available at: https://ww2.arb.ca.gov/resources/documents/battery-electric-truck-and-bus-charging-cost-calculator. Accessed September 2020

[49] CARB ICT Cost Calculator. Available at: https://ww2.arb.ca.gov/resources/documents/battery-electric-truck-and-bus-charging-cost-calculator. Accessed September 2020



Additionally, as shown in the figure below, CARB's ACT regulation estimates **heavy-duty** battery costs using assumptions from Bloomberg's **light-duty** battery prices with a five-year delay. As a result, HDV BEV purchase costs in 2024 are assumed to be half the cost of a 2018 HDV BEV.

Figure 4: Battery price history and projections

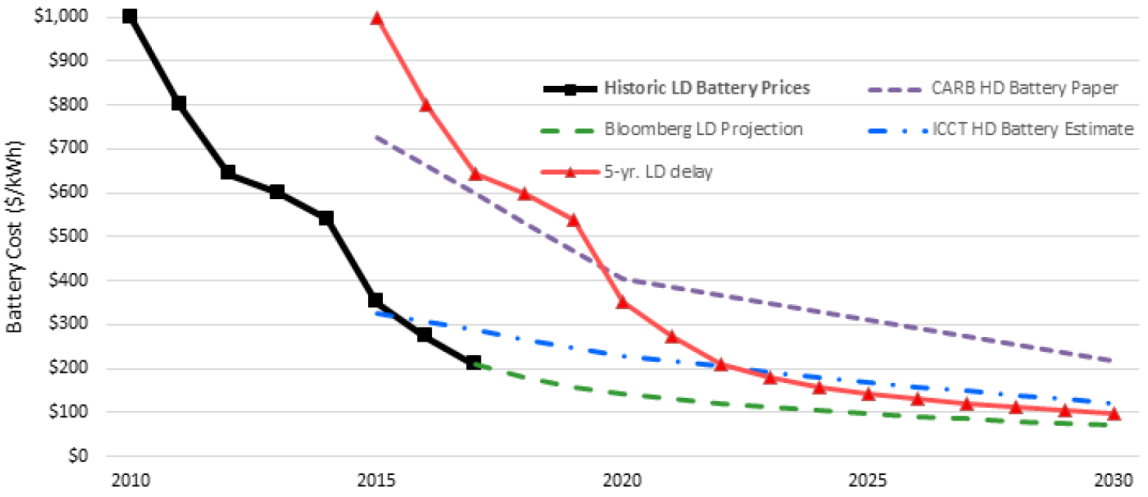


Figure from CARB ACT ISOR, Appendix H[50]

[50] CARB ACT ISOR Appendix H, Total Cost of Ownership Analysis. Available at: https://ww3.arb.ca.gov/regact/2019/act2019/apph.pdf. Accessed July 2020.

BEV Purchase Cost by Battery Cost Source (CARB ACT TCO Calculator[51])

	CARB HD Battery Paper[52]	**CARB ACT ISOR* (Bloomberg 5-yr LD Delay[53])**	ICCT HD Battery Estimate[54]	Bloomberg LD Projection[55]
2018 BEV Purchase Cost**	$437,706	**$474,732**	$288,368	$238,944
2024 BEV Purchase Cost**	$320,374	**$223,769**	$236,111	$193,251

* Indicates the basis of costs used in CARB's ACT ISOR[56]. The values shown in this table represent outputs from the CARB Cost Calculator,[3] which are slightly different from those shown in Table 5 of the CARB ACT ISOR[57] document.

** These costs assume the purchase of a 510kWh BEV and do not include tax. These costs estimates are derived from CARB Cost Calculator[3] using EV battery costs projections from CARB, Bloomberg and ICCT.

Further, Chapter 4 of the Draft MSS did not estimate the funding needed to meet the technology trajectory of the alternative Low-NOx scenario. In doing so, CARB has failed to assess the economic feasibility of all possible pathways to meeting the state's climate and air quality goals.

A.4 The 2020 MSS Draft does not quantify the required levels of funding needed to meet emission goals

The Draft 2020 MSS emphasizes that funding and incentive programs are needed to meet near-term emission goals. *"Attainment of the ozone standard in 2023 remains a challenge for the South Coast Air Basin. While some of the needed reductions will be achieved through regulatory measures included in the 2016 Strategy and related SIPs, reductions from federal measures and/or funding are needed to achieve a majority of the remaining NOx reductions that are necessary to meet this standard… In the near term, incentive programs to promote and accelerate the use of advanced technologies will be key to meeting our pre-2030 air quality goals."*

Despite this statement, CARB has not identified sufficient incentive funding needed to meet their emission goals. The existing sources of funding listing in Chapter 4 of the 2020 MSS is insufficient to meet the funding needed estimated in Table 4 of the MSS. In fact, as shown in the table below, several funding programs are scheduled to sunset in the coming years, with many programs funded by the state legislature experiencing a loss in funding capacity due to cuts in the state budget. Further, the economic impact of the present COVID-19 pandemic (e.g., a State budget deficit of $54.3 billion in March 2020)[58] imply further cuts to incentive funding. Thus, CARB has failed to assure stakeholders of the availability of funding needed to meet its projected scenarios.

CARB must provide a clear pathway forward on how it plans to achieve the levels of funding and incentivization required to implement the scenarios outlined in the 2020 MSS and deliver the forecasted long-term emission reductions.

[51] CARB ACT Draft TCO Calculator. Available at: https://ww3.arb.ca.gov/regact/2019/act2019/apph.pdf. Accessed July 2020

[52] CARB 2016 Battery Cost for Heavy-Duty Electric Vehicles. Available at: https://www.arb.ca.gov/msprog/bus/battery_cost.pdf. Accessed: August 2020.

[53] Bloomberg 2019 Better Batteries Report. Available at: https://www.bloomberg.com/quicktake/batteries. Accessed: August 2020.

[54] 2017 ICCT ZEV Report. Available at: https://theicct.org/sites/default/files/publications/Zero-emission-freight-trucks_ICCT-white-paper_26092017_vF.pdf. Accessed: July 2020

[55] Bloomberg 2019 Better Batteries Report. Available at: https://www.bloomberg.com/quicktake/batteries. Accessed: August 2020.

[56] CARB ACT ISOR Appendix H, Total Cost of Ownership Analysis. Available at: https://ww3.arb.ca.gov/regact/2019/act2019/apph.pdf. Accessed July 2020.

[57] CARB ACT ISOR Appendix H, Total Cost of Ownership Analysis. Available at: https://ww3.arb.ca.gov/regact/2019/act2019/apph.pdf. Accessed July 2020.

[58] 2020 Mobile Source Strategy Discussion Draft. Available at https://ww2.arb.ca.gov/sites/default/files/2020-09/Workshop_Discussion_Draft_2020_Mobile_Source_Strategy.pdf Accessed: October 2020.

Vehicle Funding Programs	Vehicle Class	Funding Sources	Sunset Dates/ Status
Carl Moyer Program[59]	HDV	The Program is authorized at $69 million per year sourced from: • SB 1107 Smog Abatement Fee • AB 923 Tire Fee AB 923 authorizes air districts to increase vehicle registration surcharge of $2 to pay for specific clean air incentive programs. AB 923 funds "have become the primary source of the 15% Moyer match". Nineteen air districts have adopted the $2 Moyer fee. [60]	SB 1107 funds do not have a sunset date. AB 923 funds will sunset in **2023.**
Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP)[61]	HDV	Program Funding sources include: • Air Quality Improvement Program (AQIP) Funds allocated by the State Budget. AQIP 2020-21 proposed funding for HVIP is $25 million • "Other sources" which may include cap and trade and "returned funds from cancellations or an off-cycle appropriation."	"Following lower than anticipated proceeds from the Cap-and-Trade auction in May 2020, HVIP's oversubscribed FY 2019-20 allocation has declined…New market uncertainty and unprecedented fiscal crises—that have left the program on hold since November 2019" For the 2020-2021 year, the board agreed to **reduce all voucher amounts by 20%.** Fleet and manufacturer voucher caps and limitations on eligibility among other strategies are also being considered to meet the decline in funding availability.
Clean Off-Road Equipment Voucher Incentive Project (CORE)[62]	Off-Road Vehicles	Fiscal Year 2017-2018 Funding Plan allocated $44 million to CORE through AQIP.[63]	On August 4, 2020, CORE closed to new vouchers applications as all of the $44 million funding allocation to CORE had been reserved. The program will open again "should funding be available in the future".

[59] Carl Moyer Program Guidelines, 2017 Revisions. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-06/2017_cmpgl.pdf. Accessed October 2020.
[60] Carl Moyer Program Guidelines, 2017 Revisions. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-06/2017_cmpgl.pdf. Accessed October 2020.
[61] Clean Transportation Incentives September Discussion Document. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-09/fy2021_fp_discussion_document_0.pdf. Accessed October 2020.
[62] Clean Transportation Incentives September Discussion Document. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-09/fy2021_fp_discussion_document_0.pdf. Accessed October 2020.
[63] CARB CORE Webpage. Available at: https://ww2.arb.ca.gov/our-work/programs/clean-off-road-equipment-voucher-incentive-project/about. Accessed October 2020.

Vehicle Funding Programs	Vehicle Class	Funding Sources	Sunset Dates/ Status
USDA Environmental Quality Incentives Program (EQIP) Farm Bill	Off-Road Vehicles	National Program administered by Natural Resources Conservation Service (NRCS) to support on-farm mobile engines to reduce NOx, VOC and PM.	EQIP funds will sunset on September 30, **2023**[64]

A.5 CARB has not ensured electric grid reliability and availability of infrastructure required to support a fleet transition to ZEVs

In the October workshop, various stakeholders raised concerns on the electric grid's reliability and availability to support a fleet transition to ZEVs. CARB noted on several occasions that the electricity grid will need to evolve to support increased electrification loads from ZEVs, but that other State agencies (e.g., CPUC, CEC) are responsible for implementing the necessary infrastructure upgrades. Neither the 2020 MSS document or workshop acknowledged numerous constraints that challenge the electric grid currently (e.g., ageing infrastructure, load balancing during high demand periods, public safety power shutoffs, imbalance of renewable resources leading to the duck curve), let alone the potential impacts of large-scale vehicle electrification proposed by the 2020 MSS scenarios. The document or workshop also did not discuss the required increased electricity demand for the scenarios, even though that information is available in the Draft META tool. Furthermore, the cost estimates presented in the 2020 MSS do not include investments in vehicle chargers and grid infrastructure that are foundational to achieving BEV penetration at the scale proposed in the 2020 MSS scenarios.

If the feasibility of 2020 MSS strategy relies heavily on the reliability of the electric grid, CARB cannot satisfy SB 44 obligations by deflecting considerations of electricity infrastructure to other entities. By refusing to discuss or incorporate infrastructure concerns into the 2020 MSS, CARB has failed to meet the feasibility requirements stipulated in SB 44.

[64] Congressional Research Service, 2020 Guide to Agricultural Conservation Programs. Available at: https://fas.org/sgp/crs/misc/R40763.pdf. Accessed October 2020.

ATTACHMENT B
DRAFT META TOOL: DETAILED COMMENTS

This appendix provides detailed comments on CARB's META tool, which was used by CARB in support of the 2020 MSS Draft scenarios.

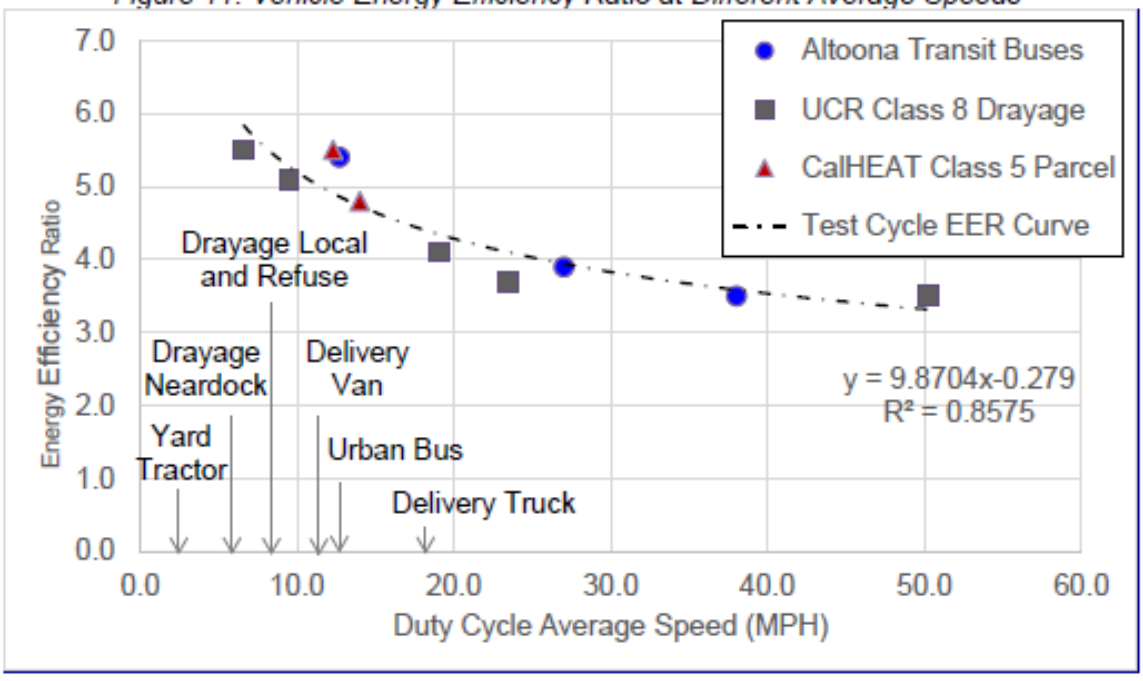
B.1 The META tool assumes an unrealistically high BEV efficiency

META Tool overestimates the energy efficiency of battery electric vehicles, potentially underestimating the electricity consumption needed to support a battery electric fleet. The META tool should be updated to be consistent with previous CARB ACT analysis and to reflect a range of EERs based on vehicle use type.

The META Tool's assumes an energy efficiency ratio (EER) of 5.0 for Class 4-8 battery electric vehicles (BEVs). As seen in the figure below, this is inconsistent with CARB's ACT ISOR[65], which reports that fuel economy can vary greatly depending on average vehicle speed, with higher average vehicle speeds resulting in considerable efficiency penalties.

The ACT economic analysis of truck ownership costs[66] assumes a range of EERs for BEVs based on vehicle use type. Given their higher average speeds of about 48 mph, class 8 electric day cabs in CARB's ACT Total Cost of Ownership calculator[67] assumed a MY2024 BEV energy economy of 0.57 mile/kWh (corresponding to a BEV EER of approximately 3.0 based on a diesel HHDT fuel economy of 7.03 miles/gallon). By using a constant EER ratio of 5.0 for BEVs across all heavy-duty vehicle types, the CARB META model does not accurately reflect the energy consumption needed for a heavy-duty fleet. As such, the model risks overestimating the energy efficiency of BEVs, particularly for heavy duty trucks that travel at higher speeds.

Figure 11: Vehicle Energy Efficiency Ratio at Different Average Speeds



Vehicle EERs at Different Average Speeds from Appendix G of CARB ACT ISOR[68]

[65] CARB ACT ISOR Appendix G. Available at: https://ww3.arb.ca.gov/regact/2019/act2019/appg.pdf. Accessed September 2020.

[66] CARB ACT ISOR Appendix H. Available at: https://ww3.arb.ca.gov/regact/2019/act2019/apph.pdf. Accessed September 2020.

[67] CARB Cost Calculator- Draft Advanced Clean Trucks Total Cost of Ownership Discussion Document. Appendix H. Available at: https://ww3.arb.ca.gov/regact/2019/act2019/apph.pdf. Accessed: July 2020.

[68] CARB ACT ISOR Appendix G. Available at: https://ww3.arb.ca.gov/regact/2019/act2019/appg.pdf. Accessed September 2020.

B.2 The draft META tool calculates higher emissions from Low-NOx vehicles than mandated regulatory limits.

On August 28, 2020, CARB held a hearing on the Low-NOx Omnibus rule with updates to the NOx emission standards for Low-NOx medium-duty and heavy-duty diesel vehicles. (Table 1). For 2024- 2026 MY proposed regulation requires that manufacturer's demonstrate emissions compliance for the full useful life of the vehicle. For model years 2027 and beyond, the proposed regulation allows for a less stringent NOx standard after a truck mileage of 435,000 miles.

CARB Proposed HD Low NOx Emission Standards[69]

Model Year	Proposed NOx Standard FTP/RMC (g/bhp-hr.)	Comparison to Current Diesel Standard
2024-2026	0.050	75% below current diesel standards
2027-2030	0.020 (At 435,000 miles)	90% below current diesel standards
	0.035 (At 600,000 miles)	83% below current diesel standards
2031 and beyond	0.020 (At 435,000 miles)	90% below current diesel standards
	0.040 (At 800,000 miles)	80% below current diesel standards

The Low-NOx vehicle emissions in the META model range from 4-40% of emissions from conventional diesel vehicles depending on vehicle age (i.e., reduction of 60-96% below conventional diesel vehicle standards). For example, the META tool assumes the following scaling factor for NOx emissions from a Model Year 2032 Low-NOx T7 tractor comparted to a diesel T7 tractor:

[69] CARB Proposed HD Omnibus Regulation. August 2020 Public Workshop Presentation. Available at: https://ww3.arb.ca.gov/board/books/2020/082720/20-8-2pres.pdf. Accessed October 2020.

Low NOx scaling factors for a California MY2032 T7 tractor in the META tool

Calendar Year	Vehicle Category	Model Year	Age	Odometer	Low NOx Scaling Factor - CA
2031	T7 tractor	2032	-1	0	0.04
2032	T7 tractor	2032	0	76,909	0.11
2033	T7 tractor	2032	1	153,817	0.17
2034	T7 tractor	2032	2	229,820	0.22
2035	T7 tractor	2032	3	310,702	0.25
2036	T7 tractor	2032	4	395,128	0.29
2037	T7 tractor	2032	5	488,987	0.32
2038	T7 tractor	2032	6	558,039	0.34
2039	T7 tractor	2032	7	615,841	0.36
2040	T7 tractor	2032	8	669,492	0.37
2041	T7 tractor	2032	9	719,284	0.38
2042	T7 tractor	2032	10	765,588	0.39
2043	T7 tractor	2032	11	800,000	0.40
2044	T7 tractor	2032	12	800,000	0.40
2045	T7 tractor	2032	13	800,000	0.40
2046	T7 tractor	2032	14	800,000	0.40
2047	T7 tractor	2032	15	800,000	0.40
2048	T7 tractor	2032	16	800,000	0.40
2049	T7 tractor	2032	17	800,000	0.40
2050	T7 tractor	2032	18	800,000	0.40

The draft META tool calculates NOx emissions from Low-NOx vehicles at year 5 (~400,000 miles) to be 71% lower than a conventional diesel vehicle (scale factor of 0.29). However, per the Omnibus regulation, MY2032 vehicles are mandated to have 90% lower NOx emissions relative to current diesel standards at 435,000 miles. Similarly, while the META tool models emissions from a Low-NOx vehicle at ~800,000 miles to be 60% lower than a diesel vehicle (scale factor of 0.40), the Omnibus regulation requires that Low-NOx vehicle emissions must be 80% below current diesel standards at a similar mileage.

This represents a significant misrepresentation of the emissions from a Low-NOx vehicle, and CARB must ensure that its tool accurately represents the effects of proposed rulemaking and capture resulting emission reductions in an internally consistent manner.

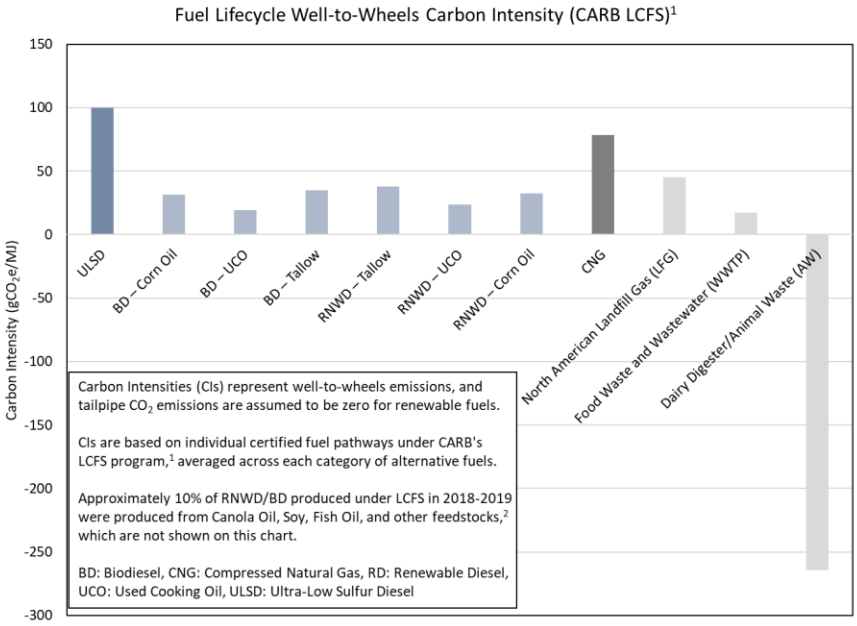
B.3 Draft META tool does not allow users to calculate emission reductions from alternative vehicle fuels.

The draft META tool does not explore potential emission reductions from renewable fuels, such as renewable diesel (RD) and renewable natural gas (RNG). As seen in Figure 3 below, renewable fuels have the potential to significantly reduce the lifecycle carbon intensity of diesel and NG trucks. Renewable and alternative transportation fuels present potential pathways to achieving the GHG reduction targets of 40% below 1990 levels by 2030 and 80% below 1990 levels by 2050,[70] as well as carbon neutrality by 2045.[71,72]

[70] Available at: https://ww3.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf. Accessed: June 2020

[71] 2020 CARB MSS Public Workshop Presentation. Available at: https://ww3.arb.ca.gov/planning/sip/2020mss/pres_marwbnr.pdf. Accessed: June 2020.

[72] 2020 CARB MSS Informational Update to the Board. Presentation available at: https://ww3.arb.ca.gov/board/books/2020/042320/20-4-3pres.pdf. Accessed June 2020.



Fuel Lifecycle well-to-wheels CI from CA LCFS program[73,74]

B.4 Draft META tool does not calculate upstream emissions from vehicle fuel usage.

The META tool does not calculate upstream emissions from the modeled vehicle fleets. CARB's CA-GREET model estimates the carbon intensity (CI) of electricity in 2018 to be 82.92gCO2e/MJ (as seen in the Table below). As BEVs have significant upstream emissions relative to conventional gasoline and diesel fuels, the META tool must present well-to-wheels GHG emissions for all vehicle technologies it assesses in order to be transparent about the impacts of transitioning California's vehicle fleet to other technologies. While we note that the calculations in the 2020 MSS Draft document do account for upstream emissions, this information must be presented alongside vehicle tailpipe emission reductions calculated in the META tool so that the well-to-wheels impact on GHGs from vehicle technology shifts is apparent.

Transportation Fuel Carbon Intensities (CIs) from CA-GREET[75]

Fuel	Upstream CI gCO_2e/MJ	Tailpipe gCO_2e/MJ	Total Well-to-Wheels CI gCO_2e/MJ
CA ULSD	25.59	74.86	100.45
Compressed Natural Gas (CNG)	18.38	60.73	79.21
Electricity	82.92	0	82.92

[73] CARB LCFS Fuel Pathway Table, October 2020 update. Available at: https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/current-pathways_all.xlsx, updated 10/13/2020. Accessed October 2020.

[74] CARB LCFS Reporting Tool Quarterly Summaries, Q4 2019. Available at: https://ww3.arb.ca.gov/fuels/lcfs/dashboard/quarterlysummary/20200430_q4datasummary.pdf. Accessed July 2020

[75] CARB LCFS Fuel Pathway Table, October 2020 update. Available at: https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/current-pathways_all.xlsx, updated 10/13/2020. Accessed October 2020.

B.5 The META tool does not include additional tirewear and brakewear PM from BEVS

The META tool does not analyze non-exhaust $PM_{2.5}$ emissions. Due to increased vehicle weight, existing studies[76,77] report that light duty BEV tire wear $PM_{2.5}$ emissions and entrained dust emissions may be respectively 18% and 24% higher than diesel and gasoline counterparts. CARB's paved road dust calculation methodology, which is sourced from AP-42 emission factor calculations, has also demonstrated that entrained road dust and tire wear PM emissions increase as a function of vehicle weight.[78] Given the passing of AB 2455 which increases the weight limit for natural gas and electric battery vehicles by 2,000 pounds, increasing vehicle weight can further exacerbate non-exhaust $PM_{2.5}$ emissions.[79] By omitting the analysis of non-exhaust $PM_{2.5}$ emissions, the META model is potentially overstating the $PM_{2.5}$ emission reductions from the transition to BEVs.

B.6 The version of EMFAC2017 used in the META tool does not appear to be publicly accessible

The META tool appears to be based on data from EMFAC2017 that does not appear to be publicly accessible (EMFAC2017 (v1.0.2) Emissions Inventory (Activity: mpo008)). CARB noted in their October workshop that the EMFAC database was based on a version used by Metropolitan Planning Organizations (MPOs) in Califronia. CARB needs to make this data publicly available, or at the very least discuss the key differences between this database and the version of EMFAC2017 available to the public.

[76] Non-Exhaust PM Emissions from Electric Vehicles, Achten et. Al. 2016. Available at: http://www.soliftec.com/NonExhaust%20PMs.pdf. Accessed October 2020.

[77] Non-Exhaust Emissions from Road Transport, Organization for Economic Co-operation and Development (OECD) 2020. Available at: http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/EPOC/WPIEEP(2020)4/FINAL&docLanguage=En. Accessed October 2020.

[78] CARB Miscellaneous Process Methodology 7.9, Entrained Road Travel, Paved Road Dust. Available at: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/full7-9_2018.pdf. Accessed October 2020.

[79] Assembly Bill 2455. Available at: http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200AB2455. Accessed October 2020.