

1	Comments of the
2	Jacobs venicle Systems, Inc. (Jacobs)
3 1	the California Air Resources Board (CARB)
4	DE: 2020 Makila Course Stratery
5	RE: 2020 Mobile Source Strategy
7	October 30, 2020
8 9	Jacobs Vehicle Systems (Jacobs) submits these comments to the California Air Resources Board (CARB) for consideration as you develop the 2020 Mobile Source Strategy.
10 11 12	Jacobs appreciates CARB collaborating with stakeholders throughout this significant and complex planning process and providing the opportunity for stakeholders to submit formal feedback on the plan.
13 14 15 16 17 18 19 20	Jacobs Vehicle Systems is the world's leading producer of vehicle retarding and valve actuation technologies and supplies engine retarding and emissions control products to medium and heavy- duty engine and vehicle OEMs world-wide. Jacobs employs over 600 people world-wide with approximately half located in the United States. The majority of those are involved in manufacturing. For decades, Jacobs engine retarding products have been demonstrated to last the life of the vehicle and this mindset is also applied to our newer emissions-driven valvetrain components, so we can support the longer warranty requirement that are phased in as part of the recent CARB Omnibus proposed legislation.
21 22 23 24 25	Jacobs supports the overall goal of California (and all of the US) for cleaner air and fewer pollutants. We see that electric vehicles are feasible and an ever-growing segment of light and medium-duty vehicles in the near term. We further believe that there will be a fully-electric segment of the heavy-duty vehicle population in the future, starting with "return to base" and suburban vehicles with stop/start drive cycles.
26 27 28 29 30	That being said, the MSS seems to have a singular focus on ZEV's and beyond noting several previously passed rulings, (HDI/M, HD Omnibus and a few others), it doesn't seem to encourage further improvement of the Internal Combustion Engine (ICE). In addition, the majority of funding noted here is targeted for charging stations, electric vehicle incentives and other ZEV-related expenditures.
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We believe that there are a significant number of heavy-duty vehicle applications that will require longer distance and/or heavy-load operation where battery technology and electrical infrastructure capacity, (as you note on page 82 of the MSS), has not been sufficiently developed to economically support these applications without government subsidies. Because of these limitations, without a huge breakthrough in battery technology and infrastructure improvement, we believe the ICE will be the dominant prime mover in these applications for the next several decades, in spite of the 2035 target in the ACT regulation to have all of these vehicles fully electric. As noted on page 78 of the MSS, close to half of the heavy-duty vehicles currently operating on California's roads are registered in other states, so it is in California's best interest to continue to regulate ICE's and work with the EPA to lower emission levels from those engines on a national

- 41 level. It seems quite likely that larger, multi-site fleets may simply choose to purchase and license
- 42 their non-ZEV's in other states and yet still drive them in to California, completely bypassing the
- 43 ruling and negating the intended results.

Jacobs feels that CARB's narrow focus on ZEV's will, unfortunately, keep California from
attaining its air pollution reduction goals. We would like to see CARB put in place additional
legislation and attention to continuing to improve the efficiency and lowering the emissions from
ICE-based vehicles via funding additional studies and improvement demonstrations. This will result
in an excellent return on investment for Californians in the long run.

49 Jacobs Vehicle Systems has continued to invest in emissions-reduction technologies for application to internal combustion engines. The good news is that these technologies are rather 50 "fuel-agnostic," and can be applied to combustion engines fueled by gasoline, diesel, bio-diesel, 51 natural gas, hydrogen, dimethyl ether and various other alcohol mixes. Many of these cleaner-52 burning, synthetic, renewable, and "carbon-neutral" fuels are not proven and need research to 53 demonstrate that they can meet the needs of the customers who purchase and use these engines. 54 55 Further, there has to be a certain market adoption in order to incentivize the development of the infrastructure to be able to provide these alternative fuels. All this will take time and effort. 56

57 An anticipated bridge between full-ICE and full-ZEV is the hybrid vehicle which will certainly 58 contain some form of ICE prior to full-ZEV's becoming an economical reality. The industry tends to 59 define this period as the "messy middle" and even the most optimistic estimates say this will 60 continue to be a large segment of heavy-duty vehicles from 2027 through 2040. Considering these 61 engines, their expected wide-spread application, and their impact on the environment will be 62 critical to making these vehicles as efficient and clean as possible.

There is a case to be considered that some of the CARB local emissions goals not being reached, 63 can be attributed to a ZEV-heavy focus, where the market has neither largely adopted it, or found 64 65 the economic value to pursue it. Therefore, a sound strategy would be pursue multiple pathways that allow the market to more easily adopt technology that will achieve CARB's overall objective. 66 There are continued concerns that the process of making BEVs produces a higher carbon output 67 68 that the current ICE, because of the high energy intensity of the manufacturing process of the components for the BEV. Additionally, the energy source and process of generating sufficient 69 70 electricity to power these vehicles needs to be considered, as it does no good to generate clean 71 electricity using a high-carbon fuel as the energy source. The immediate and intermediate deployments of BEVs and ZEVs may improve local use emissions, but total emissions will increase 72 world-wide. 73

These well-to-wheel, or cradle-to-grave studies offer that the ICE with renewable, alternative 74 fuels and combined with various levels of hybridization in the vehicle can provide a valuable carbon 75 76 and emissions improvement for this 'messy middle', and potentially offer overall carbon neutral operation. We ask that CARB also continue to investigate the Life Cycle Analysis of these various 77 78 powertrains with industry partners, and to consider changing long term goals to a more carbon 79 neutral system approach. CARB has exclusively equated ZEVs to be BEV or HEV through its recent 80 rules. We ask that you consider that alternative fuels and powertrains can support the ultimate emissions goal, by including program initiatives that expand that understanding to include 81 renewable fuels in ICEs. 82

84 **Conclusion**

Jacobs supports CARB's overall goals, but California will need market-driven solutions to drive
the ICE to be cleaner, as it will be with us long after the 2035 mandate of all ZEV's sold in California.
We would like to see discussion start for the next phase of emissions reductions beyond the HeavyDuty Operating a time former.

88 Duty Omnibus ruling's timeframe.

89 These standards will help drive adoption of cost-effective emissions reduction technologies to

90 the marketplace and provide better real-world emissions performance for HD powertrains that can

- be realized before 2035, and due to the life cycle of a HD vehicle, will affect air quality for manyyears after.
- 93 For more information, please do not hesitate to contact Robb Janak, Director of New
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