

Additional Questions for the Record

Answers to questions from The Honorable Michael C. Burgess M.D.

- 1. In your opinion, are advances in conventional internal combustion engine technology (i.e., non-hybrid) sufficient by themselves to achieve the current standards for model year 2025? If not, could you please provide your estimates for how much of each of the following technologies (as defined in the TAR) will be required to achieve the current standards for model year 2025: (a) mild hybrid, (b) full hybrid, (c) plug-in hybrid electric vehicle, and (d) electric vehicle.**

Our team has not performed the type of modeling that is required to answer this question in a quantitative way. The National Research Council (2015) report did some relevant modeling for mid-sized cars and determined that the 2025 CAFÉ standards could be met without widespread implementation of full hybrids, diesels or electric vehicles. The Center for Automotive Research (2016) takes a different view, based on their finding that EPA and NHTSA are overestimating the fuel-saving impact of packages of multiple technologies. If multiple technologies do not save as much fuel as the agencies project, then the manufacturers will be forced to make greater use of the more expensive non-ICE technologies. From the automotive supplier community, we have seen conflicting statements in the trade press – some suggesting that full hybrids and plug-ins will not be required and some saying that they will be required by 2025. If implementation of “stop-start” systems is defined as a “mild hybrid”, then our impression is that there is broad consensus that many vehicle manufacturers will use mild hybrid technologies to help comply with the standards. Given that vehicle manufacturers will have to comply with both the federal programs and the California Zero Emission Vehicle program within the same time frame (at least in the ten ZEV states that account for 30% of the new vehicle fleet), and given that California no longer awards ZEV credits for fuel-saving refinements to the ICE or to full hybrids, it is clear that manufacturers will need to make major investments in expensive electrification technologies or hydrogen fuel cell technologies.

- 2. According to Table ES- 3 of the TAR, EPA’s compliance pathway for meeting the MY2025 GHG standards envisions that 44% of vehicles would use higher compression ratio, naturally aspirated gasoline engines. If a manufacturer does not have that type of engine in any of its vehicles today, what steps would it have to take in order to integrate that type of engine in its product line, and how long would it take for it to reach a 44% penetration rate?**

Our team does not have the expertise to answer this question. We recommend that you consult with Wally Wade, a retired Ford engineer who is also a distinguished member of the National Academy of Engineering. He was also a member of the 2015 National Research Council committee on fuel-saving technologies.

- 3. In the TAR, the EPA states that in its modeling, “the California Zero Emission Vehicles (ZEV) program is considered in the reference case fleet; therefore, 3.5% of the fleet is projected to be full EV or PHEV in the 2022-2025 timeframe due to the ZEV program and the adoption of that program by nine additional states.” TAR at ES-10. Since a significant portion of the required GHG reductions will be met through manufacturing electric-drive vehicles for the ZEV mandate, shouldn’t EPA have considered those costs in its assessment of the costs of the regulation? If EPA had considered the costs of producing electric-drive vehicles, what impact would that have had on the cost estimates in the TAR?**

Yes, we believe that it would have been more informative – for agency policy makers and for stakeholders, the White House and the Congress – if the TAR had included a complete analysis of the ZEV program as it interacts with the federal programs. After all, California has enacted the ZEV program pursuant to an EPA waiver provided to the California Air Resources Board under the Clean Air Act. While there may be some lawyers in EPA or DOT or CARB who think that the ZEV program should be considered separately from federal CAFÉ and GHG programs, the regulated industry must – in the final analysis – implement a suite of technologies that comply with all three programs in the same time frame. At a minimum, the agencies should have presented one set of analyses that include the ZEV program and one set of analyses that exclude the ZEV program. The overall cost estimates of the three programs would have been larger than the costs of the two programs, since the ZEV program requires vehicle manufacturers to implement costly plug-in vehicles or hydrogen fuel cell vehicles. Regardless of whether the agencies agree to include the additional ZEV analysis in the final TAR, I respectfully recommend that Congress request that comprehensive ZEV-related analyses be conducted by an independent body such as GAO, CBO or the National Research Council.

- 4. You mentioned that your program received some funding from the automotive industry. What are the terms of your agreement, and do you believe that funding by the automotive industry has influenced the findings of your study?**

Our team at IU-SPEA currently has a grant from the Alliance of Automobile Manufacturers to analyze the macroeconomic ramifications of the federal and ZEV programs. Like all grants at IU, the grant is structured in a way that ensures that the IU research team will undertake the study independently and will draw its own conclusions. We are also working with a formal peer review advisory panel to further ensure the objectivity of our findings. Our final report is scheduled for completion at the end of January 2017.