RE: PETITION FOR TEMPORARY EXEMPTION FROM VARIOUS REQUIREMENTS OF THE SAFETY STANDARDS FOR AN ALL-ELECTRIC VEHICLE WITH AN AUTOMATED DRIVING SYSTEM: GENERAL MOTORS, LLC (DOCKET# NHTSA-2019-0016)

Deputy Administrator King:

On behalf of our half million members and supporters, the Union of Concerned Scientists respectfully submits this comment regarding the requested exemption to safety standards requested by General Motors for an electric vehicle with automated driving system (ADS). Autonomous vehicles have the potential to profoundly impact personal mobility in the United States. If proven safe, these vehicles could offer greater mobility options to individuals currently underserved by our current transportation system and may provide more convenient alternatives to individual vehicle ownership. However, increased accessibility and convenience of car trips and the potential for lower travel costs could result in significant increases in passenger miles traveled and, thus, increases in pollution and congestion. While that makes higher occupancy trips and vehicle electrification a necessary components of any sustainable, lower emission autonomous future, such a goal is not reason in and of itself to grant this petition.

In its petition to the agency, General Motors has not provided sufficient data or evidence to demonstrate how ADS technology added to a production model electric vehicle will reduce emissions. Therefore, it is inappropriate to provide an exemption under the field evaluation of a low-emission vehicle provisions (49 USC § 30113(b)(3)(B)(iii)).

Similarly, General Motors has not provided sufficient evidence to demonstrate the safety features of its ADS, even going so far as to exclude data from its test fleets in its petition, in direct contradiction to requirements of the regulation. This fundamental failure to comply with the requirements of the regulation require the Agency to deny to the petitioners at this time an exemption under 49 USC § 30113(b)(3)(B)(ii).

While we have some concerns about granting the petitioner's exemption under 49 USC § 30113(b)(3)(B)(ii), we have largely focused on the lack of a rationale for granting the petitioners' request under 49 USC § 30113(b)(3)(B)(iii) in the comments below. However, we also have concerns with NHTSA's comments on resolving requests for exemption more quickly, which we also address, and have responded directly to the most relevant requests for comment.

NHTSA should not grant General Motors an exemption under 49 USC § 30113(b)(3)(B)(ii)

This section directly responds to the following requests for comment:

1. Which of the two bases for exemption (field evaluation of a new motor vehicle safety feature (30113(b)(3)(B)(ii)) or field evaluation of a low-emission vehicle (30113(b)(3)(B)(iii)) identified by GM in its petition is more appropriate for the

agency to use in analyzing and in granting or denying the petition and why?

2. If the agency determines that its authority to grant exemptions to facilitate the development or field evaluation of a new motor vehicle safety feature is the more appropriate basis under which to evaluate GM's petition, does the petition provide sufficient information to enable the agency to make the required statutory finding as to whether the level of safety is equivalent to or exceeds the level of safety established in the FMVSS from which exemption is sought? If not, what additional information should the agency seek prior to rendering its final determination and why?

8. What studies, data, assumptions, validation test results, scientific reasoning, methodologies, and analyses should a petitioner submit to the agency to validate that its ADS provides safety at least equal to the level of the standards for which an exemption is sought?

19. NHTSA requests comment on how NHTSA should evaluate whether granting this exemption would be consistent with the "public interest" and the Vehicle Safety Act. What elements of the public interest and the Act would be most important in that evaluation?

It is inappropriate to grant the petitioners' request under 49 USC § 30113(b)(3)(B)(ii) because the petitioners have not provided "the results of tests that demonstrate performance which meets or exceeds the safety levels of the standard," including "how far the vehicle deviates from the standard, and the results of any tests showing that the vehicle exceeds the minimum requirements of any Federal standard".[1]

General Motors has neglected to include data required for the exemption

In establishing the parameters by which NHTSA may grant an exemption, the regulation is quite clear as to the burden of data required of the petitioners.[2] Importantly, it is not enough to describe the differences in safety features or explain why safety measures deployed on the vehicle are sufficient. Rather, the request for exemption requires test data which demonstrates that the performance of these safety features meet or exceed the safety requirements.

General Motors has described in detail many of the features on the vehicle and why it believes certain FMVSS requirements are irrelevant to the vehicle for which it is requesting exemption, but it has not provided any test data to the public with its application, despite the requirement that petitioners "shall provide…the results of tests conducted on the safety features that demonstrate performance which meets or exceeds the requirements of the standard."[2]

Without test data demonstrating that these vehicles can operate safely, as required by the regulation, the petition must be denied. Even General Motors acknowledges that "the ADS would be subject to the

[1] *Federal Register* **38** (18), 2694 (1973).
[2] *Ibid*., 2695.

manufacturer's obligation to not introduce a system that creates an unreasonable risk to motor vehicle safety,"[3] so it is unclear how the petitioners justify their complete dearth of data responding to this risk as sufficient in this regard.

General Motors has redacted potentially critical information, limiting public awareness and engagement

It must be noted that General Motors has redacted more than two full pages of information which may possibly relate to the test data required by the regulation.[4] However, these redactions under the guise of "confidential business information" (CBI) are so broad as to make it impossibly vague and insufficient to credibly meet the requirements of the statute and required transparency to the public which ensures it is in the public interest. Furthermore, these redactions likely conceal information which is already, in part, in the public domain and therefore cannot be considered CBI.

General Motors cites in its petition its autonomous test fleet of Chevrolet Bolts, including those deployed "on public roads under real-world conditions in San Francisco, California."[5] As part of this deployment begun in June 2016, the State of California requires certain reports detailing the behavior of such vehicles, including on collisions and disengagements of the ADS. Such reports are public but have been omitted from the General Motors supporting documentation.[6] These reported activities qualify, in part, as test data which *shall* be provided by the petitioners.

Available data on General Motors' ADS indicates abhorrent behavior which raises questions about safety

The data provided to the State of California sheds some light on the behavior of the ADS for which General Motors is requesting exemption. For example, since 2017, GM Cruise vehicles have been involved in at least 69 traffic collisions, the vast majority of which involved the vehicle operating autonomously. These collisions generally did not involve significant human injury or property damage, and there is little evidence that the autonomous vehicle was at legal fault for these collisions. However, the details of the collisions illustrate in many cases the way in which the behavior of the autonomous operation of the ADS does not conform to typical driver behavior, leading to confusion or frustration among other road users.

The small selection of collision reports detailed below are meant to be illustrative of some of the types of incidents involving these vehicles, though they are just a sample:

> "A Cruise autonomous vehicle ("Cruise A V"), operating in autonomous mode, was rear-ended while traveling on Bay Street at Columbus Avenue. The Cruise AV was stopped at a red light in the left of two eastbound lanes. When the light turned green, the Cruise AV began to proceed forward toward the intersection. In the right lane, another vehicle drifted within its lane toward the Cruise AV. The Cruise AV responded by decelerating, and a car following closely behind rear-ended the Cruise AV. The parties exchanged information. The police were not called." (09/18/17)[7]

> "A Cruise autonomous vehicle ("Cruise AV"), operating in autonomous mode in heavy traffic, was involved in a collision while traveling east on Oak Street just past the intersection with Fillmore Street. The Cruise AV was traveling in the center of three one-way lanes. Identifying a space between two vehicles (a minivan in front and a sedan behind)

[3] Petition for exemption, p. 17.
[4] *Ibid*.,, pp. AIII—14-16.
[5] Petition for exemption, p. 8.
[6] Data is maintained and made available to the public by the California Department of Motor Vehicles. The data is online at *www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/testing*.
[7] All dates refer to incident reports for GM Cruise vehicles available online at *www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/autonomousveh_ol316.*

> in the left lane, the Cruise AV began to merge into that lane. At the same time, the minivan decelerated. Sensing that its gap was closing, the Cruise AV stopped making its lane change and returned fully to the center lane. As the Cruise AV was re-centering itself in the lane, a motorcycle that that had just lane-split between two vehicles in the center and right lanes moved into the center lane, glanced the side of the Cruise AV, wobbled, and fell over. At the time of the collision, the Cruise AV was traveling with the flow of traffic at 12mph, while the motorcycle was traveling at approximately 17mph. The motorcyclist got up and walked his vehicle to the side of the road, where the parties exchanged information. 911 was called pursuant to Cruise policy. The motorcyclist reported shoulder pain and was taken to receive medical care, and a police report was taken.
>
> As reported in Traffic Collision Report #170989746, the motorcyclist was determined to be at fault for attempting to overtake and pass another vehicle on the right under conditions that did not permit that movement in safety in violation of CVC 21755(a)." (12/07/17)
>
> "A Cruise autonomous vehicle ("Cruise A V") was traveling southbound on Tenth Street in San Francisco in autonomous mode. The Cruise A V was stopped at a red light with a Mercedes behind it, also stopped. The Cruise A V began moving forward after the light turned green and was traveling at 2 mph when the Mercedes collided with the rear of the Cruise AV. The approximate speed of the Mercedes at the time of impact was 4 mph. None of the occupants of the Cruise AV or Mercedes reported injuries at the scene. The Cruise AV sustained minor damage to its rear bumper. The Mercedes sustained minor visible damage to its front bumper." (03/22/17)
>
> "A Cruise autonomous vehicle ("Cruise AV") was rear-ended while operating in autonomous mode on Bryant Street between 10th Street and 11th Street. The Cruise AV had just made a left turn from 11th Street onto Bryant when a second Cruise autonomous vehicle directly behind operating in conventional mode contacted the rear bumper of the Cruise AV, causing minor scuffs to both vehicles. There were no injuries and the police were not called." (06/11/18)

While inherently anecdotal in nature, these collisions illustrate a core concern about the operation of these vehicles related to the ADS. In the first two examples, the GM vehicle (Cruise AV) responded cautiously to external driver behavior in a way that was unanticipated by the drivers around it. In the third and fourth incidents, a vehicle rear-ended the GM vehicle at low speed in a way that strongly suggests an expectation that the vehicle would accelerate more rapidly. While the autonomous vehicle, and thus the ADS, may not be legally to blame for these incidents, and the incidents are largely not of a severe nature, General Motors has neglected to include any response to such incidents in its petition.

Of further note in the State of California data are incidents in which an autonomous vehicle was switched over to manual mode:

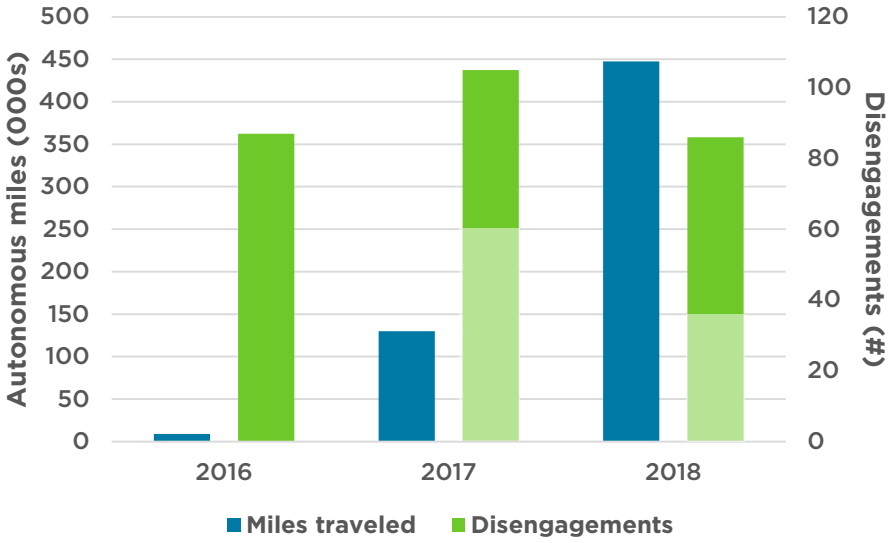
> "A Cruise autonomous vehicle (" Cruise AV"), operating in autonomous mode, was traveling eastbound on 14th Street between Natoma and South Van Ness Streets when the Cruise AV began to yield to a car on its left. The driver of the Cruise AV disengaged from autonomous mode, and shortly thereafter a motorcyclist made contact with the left rear bumper of the Cruise AV, causing damage to the Cruise AV' s rear bumper. There were no injuries and police were not called." (11/15/18)

These disengagements illustrate a core challenge of the vehicle for which General Motors is requesting exemption—while in the currently deployed Cruise AV a driver can take over for the ADS, in the Zero-Emission Autonomous Vehicle (ZEAV) no such hand-off is possible.

The omitted data raises serious questions as to the behavior of GM's ADS which must be addressed

The data in Figure 1 indicates that the raw number of disengagements have remained relatively stable even though miles traveled has greatly increased. Those disengagements are approximately equally attributable to "other road users behaving poorly" and "precautionary takeover."[8]

FIGURE 1. Vehicle miles traveled autonomously and disengagements by General Motors Cruise AVs in San Francisco



While vehicle miles traveled have increased dramatically, driver disengagements have remained relatively stable. Lightly shaded bars indicate that a substantial share of those disengagements continue to be related to precautionary measures taken by drivers (2016 is not differentiated).

Though the rate of disengagement dropping substantially indicates progress, to-date the ADS has continued to need human oversight when driving in precisely the conditions under which GM would like to deploy its ZEAVs. General Motors has not described how either form of disengagement would be handled in its ZEAV, which lack a driver to disengage the ADS. Similarly, while General Motors has noted that the company has "simulation capabilities [which] allow us to look forward and see how the car would have performed absent a takeover,"[9] General Motors has failed to provide such simulation data in addition to its lack of real-world validation data.

Data from its test fleets goes directly to the fundamental question of the safety of these vehicles. Until General Motors has provided the public with adequate data describing the real-world behavior of its test fleet and simulated behavior of the vehicles for which it is requesting exemption, in accordance with the regulation under which they seek exemption,[10] its petition must be denied.

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[8] See GM Cruise LLC Disengagement Reports for 2016, 2017, and 2018, and GM Cruise LLC's Response to Request for Supplemental Information on Annual Autonomous Vehicle Disengagement Report, April 4, 2018, all available online via *www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/testing/*. The disengagement reports for 2016 were not qualified in such a clear manner, while

[9] GM Cruise LLC's Response to Request for Supplemental Information on Annual Autonomous Vehicle Disengagement Report, April 4, 2018, p. 1.

[10] *Federal Register* **38** (18), 2695 (1973).

NHTSA should not grant General Motors an exemption under 49 USC § 30113(b)(3)(B)(iii)

This section directly responds to the following requests for comment:

1. Which of the two bases for exemption (field evaluation of a new motor vehicle safety feature (30113(b)(3)(B)(ii)) or field evaluation of a low-emission vehicle (30113(b)(3)(B)(iii)) identified by GM in its petition is more appropriate for the agency to use in analyzing and in granting or denying the petition and why?

3. If the agency determines that its authority to grant exemptions to facilitate the development or field evaluation of a low-emission motor vehicle is the more appropriate basis under which to evaluate GM's petition, does the petition provide sufficient information to enable the agency to determine whether exempting the vehicle would unreasonably degrade the safety of the vehicle? If not, what additional information should the agency seek prior to rendering its final determination and why?

19. NHTSA requests comment on how NHTSA should evaluate whether granting this exemption would be consistent with the "public interest" and the Vehicle Safety Act. What elements of the public interest and the Act would be most important in that evaluation?

As noted above, it is inappropriate to grant the petitioners' request under 49 USC § 30113(b)(3)(B)(ii). It is also inappropriate to grant the petition under 49 USC § 30113(b)(3)(B)(iii) because the petitioners have not provided "a record of the research, development, and testing establishing that the motor vehicle is a low-emission motor vehicle" [49 USC § 30113(c)(3)]. NHTSA requires that applicants "establish the emission feature of [the] vehicle and that an exemption would aid in its development,"[11] yet the petitioners have not attempted at all to distinguish the emissions impacts of the vehicle for which they are requesting exemption from the production vehicle on which it is based. In fact, the petitioners have inaccurately represented both the applicability of the Clean Air Act and levels of pollution associated with the proposed Zero-emission Autonomous Vehicle (ZEAV). Furthermore, the differences cited by General Motors between the Chevrolet Bolt and the proposed ZEAV do not require field demonstration to determine their efficacy, for which this provision is designed. Therefore, given the potential harm caused both by increased emissions and reduced safety, it is neither in the public interest nor consistent with the Vehicles Safety Act to grant this exemption. This is outlined in greater detail below.

The exemption does not assist in the development of a novel emissions technology

General Motors has requested exemption based on the fact that the vehicle is powered by an electric motor, claiming that this is sufficient for exemption under 49 USC § 30113(b)(3)(B)(iii). However, this is an inaccurate reading of the intent of 49 USC § 30113(b)(3)(B) and the discretion given the Administration. While additional questions about the emissions impacts of General Motors' ZEAV are

[11] *Federal Register* **38** (18), 2694 (1973).

raised in following sections, first and foremost is the fact that the requested exemption does not assist in the development or field evaluation of a low-emission vehicle.

The intent of the Administration as it pertains to the low-emission exemption is clear: "To substantiate the development of a low-emission vehicle, it was proposed that the applicant establish the emission feature of his vehicle and that an exemption would aid in its development".[11] General Motors has claimed that the emission feature of the ZEAV is its electric propulsion; however, in no way does its petition explain why granting this safety exemption furthers the development of this feature. In fact, it is plain from the petition that it does not.

The ZEAV is built upon the same platform as the Chevrolet Bolt, a production electric vehicle (EV) available for sale to consumers and already deployed in General Motors' ridesharing and carsharing fleets. The petitioners themselves have provided adequate evidence for their own field evaluation of the technology without granting this exemption—it is unclear precisely how granting this exemption would add to this evidence, particularly when General Motors already notes its intent to include further deployment of plug-in and hybrid-electric vehicles in similar applications as those for which it is requesting exemption.[12] The petition rattles off a litany of benefits for electrification based on its evaluation of vehicles already deployed:

> *"Electrification offers further advantages in automated vehicles providing mobility-on-demand services. GM electric vehicles have long service intervals for fluids, brake pads, and other features, reducing the maintenance burden for vehicles undergoing high mileage accumulation. And because electric drivetrains are more compact, electric vehicles can provide more spacious interiors than similarly-sized internal combustion engine vehicles."*[13]

Given General Motors' own ample evidence for the benefits of electrification, granting an exemption for a particular vehicle, in this case the ZEAV, does not actually further development of the technology itself, for which its benefits are adequately established. Instead, the question must be raised as to what *additional* emissions technology could be furthered from the ZEAV specifically. For this, the petition actually answers that the vehicle will *increase* emissions, as described below, directly in contrast with the intents of the exemption criterion.

Emissions from vehicles with an Automated Driving System

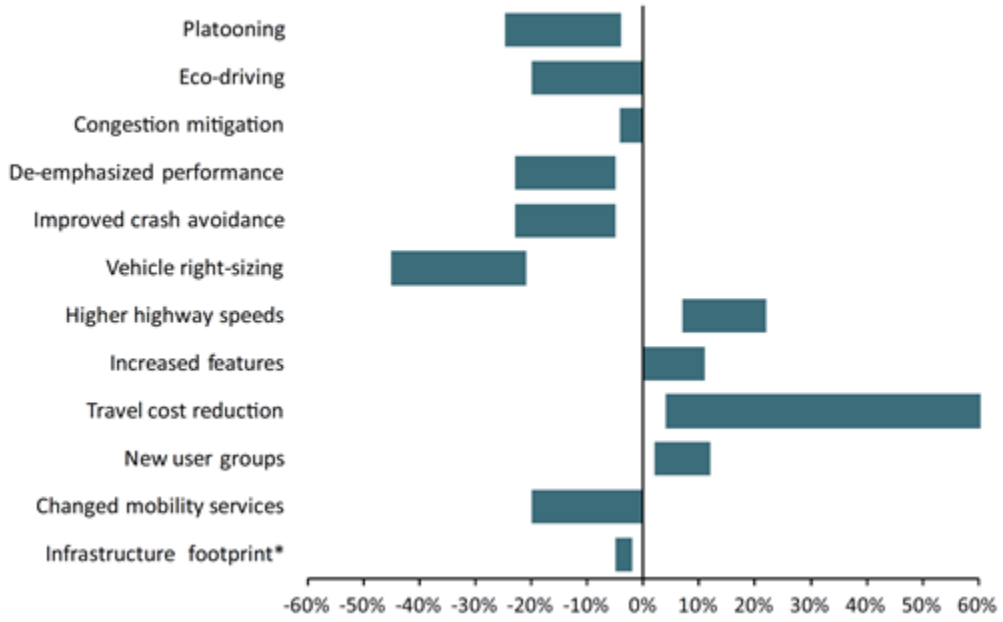
General Motors admits that the vehicles for which it is requesting exemption will consume more energy than its production vehicles.[14] This is consistent with the body of research on vehicles with an automated driving system (ADS), which shows that there is tremendous uncertainty in the overall impacts on emissions from such vehicles, including significant *increases* in overall emissions resulting from increased miles traveled due to unique use cases and potential increases in accessibility, increased energy drawn for operation of the sensors and equipment highlighted by General Motors, additional

[12] "Like the Volt and the Bolt, GM's ZEAV will be part of GM's growing portfolio of electrified vehicles, which now also includes the new Chevrolet Malibu hybrid and the Cadillac CT6 plug-in hybrid electric vehicle. This electric vehicle portfolio will continue to grow, as GM recently announced that it intends to manufacture and sell 20 new electric vehicles by 2023." Petition for exemption, p. 7.
[13] Petition for exemption, p. 10.
[14] *Ibid.*, p. 34.

weight related to redesigned passenger cabins, and the potential for greater traffic speeds (Figure 2).[15] Even research by the automotive industry indicates that ADS on personally-owned vehicles "is likely to benefit long-distance commute and increase vehicle miles travelled" as a result of shifting house demand to "the distant suburbs," where people likely to drive with long commutes.[16]

The emissions impacts of connected and automated vehicles are dependent upon who uses the vehicles, how travel demand and vehicle mileage is affected by their use, and the costs of such travel. All of these things exacerbate the potential for increased emissions from the use of the vehicles covered under the petition, yet General Motors provided absolutely no information or data about such use cases.

FIGURE 2. Percent change in energy consumption due to vehicle automation (from Wadud, et al.[15]).



Research has identified numerous opportunities for both increased and decreased energy use resulting from the use of automated vehicles. The petition from General Motors provides no data whatsoever to ensure that emissions are, in fact, reduced as a result of the deployment of vehicles for which it is seeking exemption.

Emissions from electric vehicles and GM's ZEAV under Section 202 of the Clean Air Act

The petitioners state that the vehicle for which General Motors has requested exemption "is an all-electric, zero-emission vehicle that does not utilize any form of combustion or emit any of the pollutants covered by § 202 of the Clean Air Act."[17]. While the Chevrolet Bolt has no tailpipe emissions, there *are*

[15] Wadud, Z., D. MacKenzie, and P. Leiby, "Help or hindrance? The travel, energy and carbon impacts of highly automated vehicles," *Transportation Research Part A: Policy and Practice* **86**, 1-18 (2016). Online at *https://doi.org/10.1016/j.tra.2015.12.001.*

[16] Slides 7- 9 of presentation by Jean Chu, Toyota Motors North America, at the American Council for an Energy Efficient Economy Forum on Connected and Automated Vehicles, May 6, 2019: "Potential Energy Impacts of Automated Driving: An Overview of Our Research Results." Available online at *https://aceee.org/sites/default/files/pdf/conferences/cav/chu.pdf.*

[17] Petition for exemption, p. 34.

emissions associated with generating the electricity to power the vehicle which can be impacted by automated vehicle technology and which GM ignores. These emissions are regulated by the Environmental Protection Agency (EPA) under the Clean Air Act.

The Clean Air Act refers explicitly not just to the tailpipe of a vehicle but also to emissions control devices, systems, and elements of design and its associated impacts on public health, welfare, and safety.[18] In setting greenhouse gas emissions for light-duty vehicles such as the Chevrolet Bolt, the EPA stated quite clearly that it has the discretion under the Clean Air Act to consider upstream emissions impacts associated with the electricity needed to power battery-electric vehicles and did so.[19]

For a midsize vehicle (comparable to the Chevrolet Bolt), EPA calculated that a battery-electric vehicle would have a greenhouse gas compliance value of about 120 g/mi, compared to a comparable gasoline-powered vehicle's value of 225 g/mi.[20] Additionally, as General Motors noted in its petition, additional energy (and therefore additional emissions) are associated with the use of the vehicles computer system and array of sensors. Additionally, such systems may potentially increase the aerodynamic drag of the vehicle and will increase the weight of the vehicle, though this may be mitigated in part by removal of components associated with the ability for a standard driver to maneuver the vehicle. Ford estimated the increased use of fuel associated with the requisite hardware for a level 4 automated vehicle to be up to nearly 16 percent for some of the large systems found on today's automated vehicles—such an increase would yield a two-cycle value of about 149 g/mi, or nearly a 25 percent *increase* in emissions from the production vehicle already commercially available.[21,22] Simulations by Toyota noted that the 2.5 kW ADS of today reduces efficiency by 28 to 32 percent; even a future system that is 5 times as

[18] 42 USC § 7521(a)(4): "(A) Effective with respect to vehicles and engines manufactured after model year 1978, no emission control device, system, or element of design shall be used in a new motor vehicle or new motor vehicle engine for purposes of complying with requirements prescribed under this subchapter if such device, system, or element of design will cause or contribute to an unreasonable risk to public health, welfare, or safety in its operation or function. (B) In determining whether an unreasonable risk exists under subparagraph (A), the Administrator shall consider, among other factors, (i) whether and to what extent the use of any device, system, or element of design causes, increases, reduces, or eliminates emissions of any unregulated pollutants; (ii) available methods for reducing or eliminating any risk to public health, welfare, or safety which may be associated with the use of such device, system, or element of design, and (iii) the availability of other devices, systems, or elements of design which may be used to conform to requirements prescribed under this subchapter without causing or contributing to such unreasonable risk."

[19] *Federal Register* **75** (88), 25437: "EPA has discretion in this rulemaking under section 202(a) on whether to account for differences in net upstream GHG emissions relative to gasoline produced from oil, and intends to only consider upstream GHG emissions for those fuels that have significantly higher or lower GHG emissions impacts. At this time, EPA is only making such a determination for electricity."

[20] *Federal Register* **75** (88), 25437, fn. 236.

[21] This appears to as an increase of more than 15.6 percent because the subtraction of 56 g/mi upstream emissions from the gasoline vehicle remains the same, while the greenhouse gas emissions from electricity would increase from 177 g/mi to 205 g/mi, a 15.6 percent increase.

[22] Gawron, J.H., G.A. Keoleian, R.D. De Kleine, T.J. Wallington, and H.C. Kim. "Life cycle assessment of connected and automated vehicles: Sensing and computing subsystem and vehicle level effects," *Environmental Science and Technology* **52** (5), 3249-3256 (2018).

efficient would still decrease efficiency by between 7 and 9 percent, indicating that an ADS is not inherently a low-emissions technology.[23]

The exclusion of any emissions data from the ZEAV and lack of comparison with its emissions to the vehicle on which it is based mean that the petitioners have failed both to substantiate that the motor vehicle for which they are seeking exemption is a low-emission vehicle and that the exemption furthers the field evaluation of a low-emission motor vehicle. Because General Motors has failed to meet these most basic requirements of an exemption under 49 USC § 30113(b)(3)(B)(iii), the petition must be denied.[24] The merits of this are discussed in greater detail in the following section.

Rationale for exemption under 49 USC § 30113(b)(3)(B)(iii)

In response to the authority granted NHTSA under the Highway Safety, the Administration laid out specific criteria by which petitions for exemption should be judged.[24] In some instances, these have further been clarified through granted exemptions, many of which have been cited by the petitioners, summarized in Appendix I. The petitioners have summarized 5 specific rationale it believes NHTSA has used when granting exemption under 49 USC § 30113(b)(3)(B)(iii)—however, the petitioners have provided little to no evidence or support for how the vehicles in question support these objectives. Furthermore, the primary rationale for exemption under 49 USC § 30113(b)(3)(B)(iii), that the exemption support low-emission vehicle deployment, is directly at question based on the features of the vehicle and its comparison to a vehicle already in production. For these reasons, the petitioners must be denied exemption under 49 USC § 30113(b)(3)(B)(iii).

Below, we assess the merits of the petitioners' claim with regards to the five objectives provided in the petition itself, as well as the lack of merit pertaining to the overarching objective of the exemption.

<u>Objective #1: Facilitate the development and evaluation of data from road use of the vehicle and improve the petitioner's own expertise</u>

General Motors has provided no explanation whatsoever for why lab or limited non-road demonstration at a test facility is insufficient to carefully monitor and assess the power demand for the proposed vehicle. There is nothing unique about the energy demands for the hardware, whether it is deployed in an electric or gasoline-powered vehicle. It is unclear how peak and average current draw and how that may affect the battery would be uniquely determined only by real-world deployment of these vehicles, when such characteristics are simple to model from an electrical and vehicle engineering perspective.

While General Motors' claim that granting this petition would allow the deployment of such vehicles in their ride-share program, General Motors has not identified any specific data needs that require such exemption. Shared mobility is not unique to the ZEAV, and General Motors already has years' worth of data from its carsharing and ridesharing services, including Maven and Cruise Automation, in both of which the Chevrolet Bolt EV has already been deployed.

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[23] Slide 11 of presentation by Jean Chu, Toyota Motors North America, at the American Council for an Energy Efficient Economy Forum on Connected and Automated Vehicles, May 6, 2019: "Potential Energy Impacts of Automated Driving: An Overview of Our Research Results." Available online at *https://aceee.org/sites/default/files/pdf/conferences/cav/chu.pdf.*

[24] *Federal Register* **38** (18), 2695 (1973).

Objective #2: Facilitate the development of future low-emission vehicle models or allow vehicles on the road while FMVSS-compliant systems are being developed

General Motors' claim that the deployment of these ZEAVs would facilitate the development of future low-emission vehicles is at conflict with the fact that the ZEAV itself will likely increase emissions relative to the Chevrolet Bolt it would replace. In none of the many cases cited by General Motors where NHTSA has granted an exemption under 49 USC § 30113(b)(3)(B)(iii) has the very question of whether there actually would be an emissions benefit by granting such an exemption be in doubt, yet that is precisely the case with this deployment.

There are a number of reasons to expect that deployment of these vehicles would increase emissions relative to the status quo. The proposed ZEAVs start off with as much as a 25 percent penalty relative to the vehicles that they would be replacing as a result of the additional road and accessory loads on the vehicle, as detailed earlier in this comment. Research has already shown significant evidence of "dead-heading" in rideshare applications, which is where General Motors claims these vehicles would be deployed, further increasing the emissions harm of the vehicle by resulting in miles traveled with no passenger.[25] And thus far, evidence shows that rideshare is frequently not replacing car miles traveled but instead either replacing lower-emission forms of travel, including walking and biking, or adding trips that otherwise would have not occurred.[26]

It is important to note here how General Motors' request for exemption differs significantly from previous granted exemptions cited by the petitioners. Previous granted exemptions established a technological improvement in emissions directly resulting from the exemption. In the case of Tesla, cited by the petitioners, NHTSA found "Tesla will be able to use data from computers installed on those vehicles to assist it in optimizing its battery design and vehicle software for future all-electric vehicle offerings."[27] In regards to Think Technology, NHTSA focused on the lack of electrification alternatives in its evaluation, something which is significantly different today with more than 56 plug-in vehicles on the

[25] A. Henao and W.E. Marshall, "The impact of ride-hailing on vehicle miles traveled," *Transportation* (2018), online at *https://link.springer.com/article/10.1007%2Fs11116-018-9923-2;* Komanduri, A., Z. Wafa, K. Proussaloglou, and S. Jacobs, "Assessing the impact of app-based ride share systems in an urban context: Findings from Austin," *Transportation Research Record: Journal of the Transportation Research Board* **2672** (7), 34-46 (2018), online at *https://journals.sagepub.com/doi/10.1177/0361198118796025*; B. Schaller, *The new automobility: Lyft, Uber and the future of American cities* (2018), online at *http://www.schallerconsult.com/rideservices/automobility.pdf*; San Francisco County Transportation Authority, *TNCs & Congestion*, draft report (2018), online at *www.sfcta.org/sites/default/files/content/Planning/TNCs/TNCs_Congestion_Report_181015_Final.pdf.*

[26] L. Rayle, D. Dai, N. Chan, R. Cervero, and S. Shaheen, "Just a better taxi? A survey-based comparison of taxis, transit, and ridesourcing services in San Francisco," *Transport Policy* **45**, 168=178 (2016); Clewlow, R.R., and G.S. Mishra, *Disruptive transportation: The adoption, utilization, and impacts of ride-hailing in the United States*, UC-Davis Institute of Transportation Studies Research Report # UCD-ITS-RR-17-07 (2017), available online at *https://itspubs.ucdavis.edu/wp-content/themes/ucdavis/pubs/download_pdf.php?id=2752;* R. Hampshire, C. Simek, T. Fabusuyi, X. Di, and X. Chen, "Measuring the impact of an unanticipated disruption of Uber/Lyft in Austin, TX," *Social Science Research Network* May 31, 2017, online at *http://dx.doi.org/10.2139/ssrn.2977969*; P.S. Lavieri, *Is the Future of Urban Mobility Shared? Modeling ride-hailing adoption and preferences for ownership and sharing of autonomous vehicles*, Thesis, University of Texas at Austin (2018).

[27] *Federal Register* **76** (188), 60126 (2011).

market according to the industry trade group to which General Motors belongs:[28] "There are, at this time, very few other fully battery-operated vehicles available in the U.S. … Think explained that the exemption would, among other things, permit evaluation and further development of alternative battery concepts, evaluation and further development of vehicle systems based on real-world usage under U.S.-specific driving and storage conditions, [etc.] We agree that the exemption would permit that company to engage in these activities, and thereby make the development or field evaluation of a low-emissions vehicle easier."[29] And as a last example, in the case of Toyota, the public interest is being served because "we [NHTSA] believe that the information Toyota intends to collect through the field operation of these [fuel cell vehicles] will contribute to not only Toyota's development of future FCV models but also the aggregate knowledge of real world use of FCVs."[30]

In contrast to the above examples, General Motors has provided no such documented link or advancement of an emissions technology—rather, they are requesting an exemption based upon emissions benefits of established technology already available and deployed.

Granting the petition under 49 USC § 30113(b)(3)(B)(iii) for a vehicle that has the potential to increase transportation emissions with no evidence provided to the contrary goes directly against the intent of this provision. Furthermore, the petition does not establish how the exemption would further the development of low-emissions technology, in contrast with previous granted exemptions.

It is also worth noting that in the exemptions granted, the petitioners established that the exemption request was a temporary need and provided a clear path to eventual compliance. General Motors' request does not provide a pathway to eventual compliance with the current FMVSS statutes from which they are requesting exemption.

Objective #3: Demonstrate to the public the benefits and viability of low-emission vehicles

General Motors has not provided any explanation for how the ZEAV would demonstrate to the public the benefits of electrification greater than either the Chevrolet Bolt vehicles currently operating in its rideshare fleet or those commercially available to the general public. Deploying electric vehicles in a rideshare application is an appropriate step towards mitigating potential adverse environmental impacts associated with ridesharing, but in this regard there is no difference between the ZEAV and the Bolt. In fact, because the driver of the Bolt EV can serve as a real-time resource for questions any potential rideshare passengers may have about electrification, it could be argued that removing this connection would actually result in *less* public visibility and awareness.

Objective #4: Help evaluate the market for low-emission vehicles

There is no current safety-related hindrance to the adoption of low-emission vehicles. Sales of electric vehicles have continued to increase with the diversity of offerings from the industry. Furthermore, the cases cited by General Motors towards this objective involve the sales of vehicles that required

[28] Alliance of Automobile Manufacturers, *https://autoalliance.org/economy/consumer-choice/electric-vehicles/,* accessed April 22, 2019.
[29] *Federal Register* **74** (154), 40636 (2009).
[30] *Federal Register* **80** (1), 103 (2015).

temporary safety exemption toward a goal of full FMVSS compliance, something that General Motors is not seeking.

General Motors is seeking a safety exemption to determine whether or not they can profit off sales of its ZEAV.[31] It is not in the public interest to put sales ahead of safety on a permanent basis, particularly for vehicles for which the industry has proven it can sell without such exemption.

Objective #5: Expand consumer choices for low-emission vehicles

Considering that General Motors has focused its application on deploying ZEAVs in a ridesharing application, and that the Chevrolet Bolt is already deployed in such applications, it is unclear how granting this exemption would expand consumer choice in any way.

NHTSA should not sacrifice public welfare for expediency or to promote innovation

This section directly responds to the following request for comment:

> 28. Over the history of the Agency, exemption petitions based on some form of safety analysis, as opposed to the much more common type of petition based on a claim of economic hardship, have averaged only 1-2 per year. Typically, these safety-based petitions have involved technologies that affect only a single vehicle function or at least a very narrow range of functions and that were well described and tested. Such petitions were resolved by the Agency's either granting or denying them after soliciting and considering public comments. … The lack of real-world test data could result in lengthy delays and even non-approval. … To address this problem, NHTSA solicits public comment on alternative approaches to analyzing and resolving petitions for exemption from FMVSS in a timely and appropriate way….

The authority under which the National Highway Traffic Safety Administration operates is quite clear (49 USC § 30101):

> *The purpose of this chapter is to reduce traffic accidents and deaths and injuries resulting from traffic accidents. Therefore it is necessary—*
>
> *(1) to prescribe motor vehicle safety standards for motor vehicles and motor vehicle equipment in interstate commerce; and*
> *(2) to carry out needed safety research and development.*

Motor vehicle safety is further defined as "the performance of a motor vehicle or motor vehicle equipment in a way that protects the public against unreasonable risk of accidents occurring because of the design, construction, or performance of a motor vehicle, and against unreasonable risk of death or injury in an accident, and includes nonoperational safety of a motor vehicle" (49 USC § 30101(a)(9)).

[31] Petition for exemption, p. AI-2.

While certain laws have provided the Administrator some discretion in carrying out the authority granted to NHTSA, the focus of the agency must be against "unreasonable risk".

To date, there have been a number of high-profile incidents involving the use of ADS, including at least three fatalities in the United States.[32] Investigations for some of these incidents are still underway, so it remains unclear as to the culpability which can be allocated to the vehicle, the system controlling the vehicle, and the human beings behind the wheels of these vehicles. However, such incidents stress why NHTSA has a responsibility to ensure the safety of both the passengers of vehicles using ADS and any pedestrians, cyclists, and other individuals which will share the road with such vehicles.

Given the potential consequences of approving so-called "innovative" technologies without sufficient data, we continue to urge the agency to err on the side of caution. The Administration has only to look at its own history to understand the error in lowering the bar on FMVSS requirements based upon the technologies industry wishes to sell and market, one example is its history around regulation of "passive restraints."[33] One of the earliest regulatory actions taken by NHTSA involved the requirement of passive restraints, which would eventually lead to the development and deployment of air bags…after more than a decade of delay. In the initial years of the passive restraint requirement, industry sufficiently stalled the development of air bags which could meet requirement. NHTSA then bowed to industry pressure to allow ignition interlocks which forced the use of seat belts as an alternate technology which would suffice for the requirement, to a predictable result—the interlocks were wildly unpopular and therefore short-lived, and while they promoted seat belt usage in their stead, they were not nearly as effective as the air bags initially envisioned by the Administration when setting the requirement. It is unknowable the number of individuals who needlessly lost their lives as a result of NHTSA's action to allow an alternative approach to safety promoted by the industry suffice for FMVSS 208.

In consideration of action based on limited data, NHTSA should take this example to heart—when the limited data is provided by a self-interested party like an automaker, it is the responsibility of NHTSA to seek additional, independently verifiable data in its decisions, even if this should result in delay. NHTSA has the responsibility to protect the welfare of the American people, and part of that responsibility is ensuring that the agency and the public have an adequate opportunity to seek as much data as possible, particularly when considering decisions which have life and death consequences.

The deployment of novel technologies can have a significant impact on local communities, with little data available to understand these impacts. NHTSA ensuring that communities have adequate opportunity to engage with regulators and petitioners around these possible impacts should be a requirement of any field test and offers the opportunity for additional real-world evidence of any such impacts to be considered. For this reason, we are strongly supportive of the agency's suggestion that "for vehicles that would be deployed only within very limited operating areas, [it] go beyond seeking public comment by hosting public meetings or otherwise providing for targeted and transparent public engagement in the intended geographical operating area to allow for full and transparent public discussion of novel safety issues and concerns, emergency response considerations, or other issues of

[32] Tesla Model S, May 7, 2016, Williston, FL; Volvo modified by Uber, March 18, 2018, Tempe, AZ; Tesla Model X, March 23, 2018, Mountain View, CA.

[33] A short, referenced history is documented in Chapter 5 of D. Cooke, *Time for a U-turn: Automakers' history of intransigence and an opportunity for change* (2017), available online at *http://ucsusa.org/automaker-uturn.*

interest to state and local stakeholders regarding the exemption requested and relevant to NHTSA's review of the petition."[34]

We further request that the agency continue to judge the merits of a petition based on an individual petitioner's request—the approval of a similar technology by a different manufacturer should not necessarily result in the same outcome for a future manufacturer, nor should it reduce the data burden of the manufacturer or allow NHTSA to abrogate responsibility for ensuring a thorough, independent review. The automotive industry is quick to point out that the results of technology deployment are dependent upon the specific application,[35] and therefore each application should be considered on its own merits.

Conclusions

NHTSA should not grant General Motors' request for exemption of its ZEAVs under 49 USC § 30113(b)(3)(B)(ii) or (iii), owing to a lack of provided data and questionable benefit to public welfare. While we appreciate that the agency is thinking about how it can fulfill its role during a rapid evolution of technology, we support a rigorous, data-driven process that errs on the side of caution. We further support the agency's suggestion to more directly engage communities that may be directly involved in any pilot projects proposed by automakers.

Sincerely,

Dr. Dave Cooke
Senior Vehicles Analyst
Union of Concerned Scientists

[34] *Federal Register* **84** (53), 10191.
[35] E.g.; NHTSA-2018-0067-11928, p. 6; NHTSA-2018-0067-12073, pp. 138-140; NHTSA-2018-0067-12376, p. 6.