

May 20, 2019

Deputy Administrator Heidi R. King
National Highway Traffic Safety Administration
U.S. Department of Transportation
1200 New Jersey Ave, SE
West Building, Ground Floor, Room W12 – 140
Washington, DC 20590

RE: Docket No. NHTSA-2019-0016

Dear Deputy Administrator King,

Securing America's Future Energy (SAFE) is pleased to submit the following in regard to the request for comments on the *General Motors, LLC – Petition for Temporary Exemption from Various Requirements of the Safety Standards for an All-Electric Vehicle with an Automated Driving System* ("Petition").

SAFE is a Washington, D.C.-based advocacy organization. As part of its mission, SAFE is dedicated to supporting policy to reduce U.S. dependence on oil and improve energy security. This mission has been pursued in partnership with the Energy Security Leadership Council (ESLC), which is co-chaired by Fredrick W. Smith, Chairman, President, and CEO of FedEx Corporation, and General James Conway (Ret.), the 34th Commandant of the U.S. Marine Corps. SAFE believes that automated vehicle technology will serve the national interest by accelerating adoption of electric vehicles and reducing oil consumption, along with a range of other significant public benefits. As such, we support policies that will catalyze the deployment of automated vehicle technology and maximize the societal benefits of the technology.

I. Introduction

The last decade has seen remarkable progress in the development of highly automated vehicles ("AVs"), which are now in the earliest stages of public deployment.¹ As the technology continues to develop rapidly and evolve, policymakers have been faced with the challenge of developing a regulatory framework that appropriately balances the exciting opportunities offered by AVs with one that assures confidence in the safety of these vehicles.² SAFE has worked with this Administration on its Automated

¹ See, e.g., Kirsten Korosec, "Waymo launches self-driving car service Waymo One," *TechCrunch*, December 5, 2018.

² Amitai Bin-Nun, "Autonomous Vehicles In 2019: Rise of Safety Assurance," SAFE, January 2, 2019.

Driving Systems 2.0 and AV 3.0 policy guidance and looks forward to building on this collaboration in the current process.

SAFE has a long history of advocating for policies to advance the national welfare and we are following the development of AV safety regulations with keen interest. We appreciate the agency's interest in promoting both innovation and the development of safety practices in relation to AVs. Over the last several years, SAFE has taken a leadership role in studying, promoting, and working with government, industry, and other stakeholders to advance sound public policy solutions. We have found that AVs can provide significant societal benefits around safety, enhanced energy security, and accessibility. The outcome of this proceeding and related exemption petitions will have direct bearing on the AV industry's investment in safety development and innovative vehicle designs that unlock the full benefits of AVs.

AVs have been tested on public roads for several years in a number of states, and some are currently in the early stages of deployment.³ At the federal level, earlier policy guidance from the Department stated that AVs are legal on public roads, specifying that, "if a vehicle is compliant with the existing [Federal Motor Vehicle Safety Standards (FMVSS)] regulatory framework and maintains a conventional vehicle design, there is currently no specific federal legal barrier to an HAV [highly automated vehicle] being offered for sale."⁴ Certain states have implemented additional requirements related to registration and reporting requirements, and operating conditions.⁵ In short, if a company retrofits a car or truck with sensors and computation to give it AV functionality, the vehicle would remain legal if there were no other design changes were made.

As AV technology continues to develop, developers are considering how to redesign vehicles to better fit the needs of particular markets and consumers. This proceeding has been initiated because an AV developer has proposed a vehicle design that would render its vehicles noncompliant with FMVSS. The request for an exemption stems not from the automation of the vehicle – developers do not need specific permission to deploy an AV – but the desire to bring to market an AV with a modified design.

NHTSA has the authority to grant exemptions from FMVSS subject to specific criteria, and the petitioner has submitted their explanation for why they believe their vehicle qualifies for exemption. The Administration has requested public comment on whether the petitioner has satisfied the requirements of the basis for exemption, if additional information ought to be submitted, and, if so, what information would allow NHTSA to make a determination regarding the vehicle design. At the close of the comment period, NHTSA will review submitted comments and determine if and under what conditions an exemption may be granted.

³ See, e.g., Kirsten Korosec, "Waymo launches self-driving car service Waymo One," *TechCrunch*, December 5, 2018.

⁴ U.S. Department of Transportation, *Federal Automated Vehicle Policy: Accelerating the Next Revolution In Roadway Safety*, September 2016.

⁵ National Conference of State Legislatures, "Autonomous Vehicle State Bill Tracking Database," April 29, 2019.

II. Significance of Exemption Proceeding

As the Department has acknowledged, this proceeding is particularly important and is being closely followed as a window into the Department's thinking on this issue.⁶ This is the first time the agency is evaluating the safety of new designs for a vehicle controlled entirely by an automated driving system (ADS).⁷ Additionally, the agency has sought public input as to whether certain information or documentation of the ADS functionality should be required from the petitioners or future petitioners in similar proceedings, which would represent the first time that explicit requirements for ADS performance have been put in place.

Beyond the immediate question of whether the petitioner will be allowed to deploy an innovative, low-emission vehicle, approval of the exemption petition or a decision outlining a clear pathway to a successful exemption petition will incentivize the petitioner and other industry stakeholders to invest in new designs that may better meet market needs and enhance the societal benefits of the technology.

SAFE's position is that just as AV technology develops over time, so too should the regulatory structure that supports it. As AV testing has expanded, the Department has funded critical research, issued guidance, encouraged the exchange of safety-related information between industry, government, other stakeholders, and the broader public, as well as begun the long process of updating the FMVSS. Exemptions are an important tool for the Department to continue to exchange detailed information about industry's safety practices and gradually build a regulatory philosophy and set of requirements to regulate the design of AVs. If conducted carefully, the exemption petition process will offer insight to industry and other stakeholders as to the eventual form of a more comprehensive regulatory framework, offering industry greater certainty on regulatory risk by narrowing the scope of potential regulatory frameworks. A transparent regulatory process will enhance public confidence in AV technology.

If the Department's examination of the pending petition establishes that the exemption process offers a transparent and reasonable pathway to approval, this will help establish this mechanism as a viable interim regulatory mechanism for vehicle innovation. On the other hand, if the Department does not outline a clear pathway to approval for this or other petitions, it would increase the regulatory risk of investing in AV technology, with potential adverse consequences for industry. Development of business models or use cases dependent on new vehicle designs will significantly slow or be ceded to international markets. In our view, this would not be in the public interest, as there will certainly be key use cases and benefits that will be tied to the need for an exemption, at least until the Department puts in place a more comprehensive regulatory framework.

We structure the comments as follows. In this section, we have outlined the critical role this proceeding will play in the long-term evolution of AV regulation and design. In Section III, we will argue that the

⁶ While this proceeding is non-precedential, it is being closely observed by stakeholders who will see the Department's responses to current petitions as indicative of likely future action in relation to AVs.

⁷ NHTSA, "General Motors, LLC – Receipt of Petition for Temporary Exemption From Various Requirements of the Safety Standards for an All-Electric Vehicle With an Automated Driving System," Docket No. NHTSA-2019-0016, March 13, 2019.

public interest is served by the development of AVs and, more specifically, a clear pathway to FMVSS exemptions. In Section IV, we will articulate several high level legal and public interest principles that we believe should inform NHTSA's response to this and similar petitions. Finally, in Section V, we apply these principles to the questions the Department has posed in response to the Petition.

III. Automated Vehicles and a Pathway to Exemptions are in the Public Interest

We urge the Department to consider not just the discrete petition before it, but the broader implications of this proceeding on the development of AVs. In this section, we first make the argument that there is a very strong public interest in the development of AVs. We then connect it to this proceeding by advancing the case that a reasonable pathway towards exemptions can accelerate the development of AVs with innovative designs, as well as have a positive impact on the development of AVs more generally.

A. Benefits of AVs

Automated vehicles are poised to offer significant benefits to society if deployed at scale. A recent study commissioned by SAFE showed that, by 2050, annual social and economic benefits could total as much as \$800 billion.⁸ Factors contributing to these benefits include increased road safety, decreased energy consumption, and myriad social improvements.

1. Safety

Each year, nearly 40,000 Americans are killed in traffic accidents and millions more are injured enough to seek emergency care. There is a significant amount of economic and societal harm associated with these accidents – nearly \$1 trillion per year.⁹ Ninety-four percent of these crashes are caused, in whole or in part, by mistakes made by human drivers.¹⁰ By transitioning to AVs and removing the human driver, the physical, economic, and societal harm from roadway accidents could be significantly reduced. Even when accounting only for significant driver errors, such as distraction, inebriation, and speeding, researchers found that the annual benefit from reduced economic cost and increased quality-of-life would exceed \$500 billion.¹¹

2. Energy & Emissions

Our national dependence on oil is driven by our transportation system, with 92 percent of U.S. transportation energy coming from oil.¹² This reliance comes as a significant cost. Each year, the U.S.

⁸ SAFE, *America's Workforce and the Self-Driving Future: Realizing Productivity Gains and Spurring Economic Growth*, June 2018.

⁹ SAFE, *America's Workforce and the Self-Driving Future: Realizing Productivity Gains and Spurring Economic Growth*, June 2018.

¹⁰ NHTSA, *Critical Reasons for Crashes Investigated in the National Motor Vehicle Crash Causation Survey*, February 2015.

¹¹ SAFE, *America's Workforce and the Self-Driving Future: Realizing Productivity Gains and Spurring Economic Growth*, June 2018.

¹² EIA, "Use of Energy in the United States Explained: Energy Use for Transportation," May 23, 2018.

military spends roughly \$81 billion protecting global oil supplies.¹³ Additionally, transportation is our nation's largest source of greenhouse gas emissions.¹⁴

There is considerable evidence that AVs will be first deployed through an on-demand shared model (like today's transportation network companies), and that those vehicles will be electric.¹⁵ SAFE research has shown that the majority of current AV test vehicles are electric, supporting the assertion that future AVs will be electric.¹⁶ Increased adoption of electric vehicles would significantly reduce the amount of oil consumed by the transportation sector, leading to as much as \$58 billion in annual public benefits and reducing national security concerns associated with oil dependence.¹⁷ Automation may also drive efficiencies in the trucking sector and delivery vehicles.¹⁸

3. Accessibility for Underserved Populations

AVs are likely to increase mobility for individuals with disabilities. In the United States, six million individuals with disabilities experience barriers to mobility, including an inability to drive, limited finances, and inadequate access to public transportation and paratransit services.¹⁹ These restrictions in mobility can lead to reduced economic opportunities, social isolation, and poorer health.²⁰ Research has shown that automated vehicles would provide individuals with disabilities with access to 2 million job opportunities and could result in savings of \$19 billion in health care expenditures.²¹ Furthermore, automated delivery vehicles can provide those with an inability to drive with access to goods for an affordable cost.

AVs may increase job access for economically disadvantaged regions. Lower travel costs and increased average travel speed as a result of vehicle automation may lead to more job options for workers.²² For workers, an increased pool of commutable jobs means a greater likelihood of finding employment that suits their talents and needs.

While there is work to be done in preparing for AV deployment and ensuring their deployment maximizes benefit to society, the large potential upside argues for a strong public benefit in encouraging their deployment.

¹³ SAFE, *The Military Cost of Defending the Global Oil Supply*, September 21, 2018.

¹⁴ EPA, "Fast Facts on Transportation Greenhouse Gas Emissions," July 2018.

¹⁵ Robbie Diamond and Amitai Bin-Nun, "Self-Driving Cars: Road to Deployment", Written Testimony to the House Committee on Energy and Commerce, Subcommittee on Digital Commerce and Consumer Protection, February 14, 2017.

¹⁶ SAFE, *America's Workforce and the Self-Driving Future: Realizing Productivity Gains and Spurring Economic Growth*, June 2018.

¹⁷ SAFE, *America's Workforce and the Self-Driving Future: Realizing Productivity Gains and Spurring Economic Growth*, June 2018.

¹⁸ SAFE, *Heavy-Duty Innovation: Energy, Automation, and Technology in the Trucking Sector*, November 2017.

¹⁹ SAFE, *Self-Driving Cars: The Impact on People with Disabilities*, January 2017.

²⁰ SAFE, *Self-Driving Cars: The Impact on People with Disabilities*, January 2017.

²¹ SAFE, *Self-Driving Cars: The Impact on People with Disabilities*, January 2017.

²² SAFE, *America's Workforce and the Self-Driving Future: Realizing Productivity Gains and Spurring Economic Growth*, June 2018.

B. Full Consideration and Appropriate Approvals of Exemption Petitions Serve the Public Interest

While the petition in front of the Department specifically addresses a single vehicle design, the implications of this proceeding are far broader. We specifically urge the Administration to consider that: 1) receptivity towards petitions will lead to greater investment in innovative vehicle designs and increase public benefit associated with such designs, and 2) petitions are perhaps the most effective way for both the government and the public to learn about the current state AV safety development – and for the government to grow its regulatory philosophy and framework as AVs mature. Both of these benefits will be lost if the petition is not seen as a viable pathway for innovative vehicle designs.

1. New Vehicle Designs Can Increase The Public Benefits Of AVs

Some of the most significant impacts of AVs will be realized through enabling broader changes in the transportation system. In particular, AVs are likely to enable the growth of on-demand, shared, electrified transportation, with a corresponding reduction in personally-owned travel.²³ Over time, automation will impact vehicle design, which has significant potential to enhance the benefits of the technology.

For example, despite the fact that over 85 percent of household trips have one or two occupants, the vast majority of new vehicles purchased in the United States are light trucks with room for five or more occupants.²⁴ This is because American consumers typically purchase vehicles that meet all of their needs, even if most trips could be served with smaller, more efficient vehicles. Generally, vehicles designed for specific use cases such as urban travel have not been successful.²⁵ If significant volumes of trips are being served through shared platforms, it is more likely that a more efficient vehicle tailored for a specific use case will be successful. The RAND Corporation estimated that custom-designed small urban vehicles could generate significant gains in fuel efficiency.²⁶

Similarly, it is quite expensive – sometimes tens of thousands of dollars – to retrofit a single vehicle to be accessible for individuals with disabilities.²⁷ Allowing more flexibility on designs may make it easier to deploy accessible AVs on a shared platform where they can reach a greater number of people than privately owned vehicles.

One such example of an innovative vehicle design with positive energy contributions is before the Administration in another exemption petition proceeding.²⁸ Several companies have proposed replacing deliveries that are done today with cars or medium-duty trucks with small electric vehicles, including the

²³ SAFE, *A National Strategy for Energy Security: The Innovation Revolution*, May 2016.

²⁴ SAFE analysis based on data from 2017 National Household Travel Survey; David Phillips, “U.S. market mix speeds toward 70% light trucks,” *Automotive News*, April 8, 2018.

²⁵ Joseph White, “Daimler will pull Smart mini-cars out of United States, Canada,” *Reuters*, April 29, 2019.

²⁶ James M. Anderson, Nidhi Kalra, Karlyn D. Stanley, Paul Sorensen, Constantine Samaras, and Oluwatobi A. Oluwatola, *Autonomous Vehicle Technology: A Guide for Policymakers*, RAND Corporation, 2016.

²⁷ SAFE, *Self-Driving Cars: The Impact on People with Disabilities*, January 2017.

²⁸ Nuro, “Petition for Exemption from Certain Provisions of Federal Motor Vehicle Safety Standard, No. 500,” October 19, 2018.

Nuro R2X, which is the subject of an exemption petition. Any trip by a car with an internal combustion engine that is replaced by an electric vehicle is a win for energy security and is in the public interest. A KPMG analysis found that automated vehicles could travel 26 billion miles for deliveries by 2040, which could result in fuel savings of up to 1 billion gallons.²⁹ SAFE analysis of shopping trips, food delivery, and last-mile package delivery has found that over 800 million gallons of fuel per year could be saved through automated delivery.³⁰

2. Positive Government Engagement On Exemption Petitions Would Help Develop AV Safety And Regulation

As we described in Section II, the exemption petition proceeding is an important moment in the development and governance of AVs. Currently, the Department is ensuring the safety of AVs using existing vehicle safety rules and is in the process of creating additional vehicle safety standards more directly suited to AVs. Several petitioners have come forth to claim that current FMVSS regulations place constraints on the use cases of AVs without any corresponding safety benefit. Approval of the petition's request for an exemption – or even a clear statement regarding what is required for a successful petition – will signal that the Department is continuing to develop its ability to engage with the complex regulatory challenges emerging from the AV space.

On the other hand, a rejection of the petition by the Department without a clear indication of what would be required for a successful petition would have the potential for significant negative ramifications. First, it would signal to AV developers and the broader industry that there is a very high level of regulatory risk for innovative vehicle designs and that benefits associated with such designs will be deferred for years to come. Additionally, it would signal that the regulatory system is not progressing on a trajectory which would develop into a comprehensive, pro-innovation framework for AV deployment in a reasonable time frame.

IV. Principles Governing Exemption Petitions

While the Section 555 exemption process was not designed to be the primary means of regulating a broad new set of vehicle functionalities such as automation, if deployed properly it can be used as an effective interim framework to promote both innovation and safety. Exemption petitions should be decided by a combination of legal interpretations and value judgments as to what is in the public interest. The Department has posed numerous questions related to its decision and data requirements for the exemption petition. To aid in this decision, SAFE has formulated key principles that are relevant to many of the Department's questions. For the remainder of this section, we articulate our philosophy

²⁹ KPMG estimated several scenarios for incremental package delivery VMT ranging from a 30 to 50 percent decline in household shopping trips. Removing the assumed 1.5x and 3x increases in order frequency, this would be between 15 billion and 26 billion miles converted to electric autonomous delivery from current shopping trips. Using the EPA-estimated average fuel economy for 2017, 24.9 mpg, fuel savings would fall between 615 million and 1 billion gallons; KPMG, *Autonomy delivers: An oncoming revolution in the movement of goods*, 2018; EPA, "Highlights of the Automotive Trends Report," March 2019.

³⁰ SAFE analysis

for evaluating exemption petitions. In the next section, we apply these principles to as many questions as possible.

A. The Relevant Safety Baseline is a FMVSS-Compliant AV, Not A Human-Driven Vehicle

The Section 555 exemption petition process has generally been used when the development of a new vehicle technology – whether a safety feature or a low-emissions technology – leads to non-compliance with one or more FMVSS standards. In this case, the automation of the vehicle by itself does not necessitate or directly lead to non-compliance with the standard.³¹ The vehicle in this petition and in similar ones is non-compliant with FMVSS not because it is an AV, but because its automation has allowed for differing design philosophies. The Department expressed this understanding in a 2016 letter to Chris Urmson, then at Google, stating, “While L4 automation is the impetus behind these design decisions, it is Google’s design decisions [and not automation itself] that create the uncertainty over how to apply FMVSS to Google’s proposed vehicle.”³²

It bears repeated emphasis that AVs do not require exemptions before testing or even commercial deployment on public roads. If AVs are designed to be FMVSS-compliant, that is sufficient for them to be legal on public roads in the eyes of the federal government. The safety of these vehicles is regulated through the Department’s recall and rulemaking authorities and has been the subject of enforcement bulletins and policy guidance.

As such, the plain reading of the relevant statutes laying out the bases for exemption suggest that, for the bases suggested in petitions thus far, an exemption would be considered based on the differential in safety between a FMVSS-compliant and non-compliant vehicle. The language for the “safety feature” exemption (49 U.S.C. 30113(b)(3)(B)(ii)) requires demonstration that the “level of safety of the features is equivalent to or exceeds the level of safety established in the standard from which exemption is sought.” Exemptions sought on the grounds of “development or field evaluation of a low-emission motor vehicle” (49 U.S.C. 30113(b)(3)(B)(iii)) are statutorily required to establish that an exemption would not “unreasonably lower the safety level of that vehicle”; in both cases, the language implies that the key consideration is the safety implications of non-compliance as it relates to the specific standards for which an exemption is being requested.

This strongly implies that there should be no burden on petitioners to demonstrate the AV can perform the driving task safely. That said, the public interest is served by a level of transparency on the part of developers on the safety of ADS systems, and this will be addressed in a separate principle later in this section. In short, to meet the legal requirements for this standard, the relevant baseline for comparison is an AV that complies with FMVSS standards. Since such vehicles are currently permitted on public roads – and even for commercial deployment – without any premarket burden of proof for the ADS performance, the plain reading of the statute implies that AVs seeking exemptions need to demonstrate their safety relative to those vehicles.

³¹ In contrast, in 2014, Toyota filed for an exemption for FMVSS No. 305 in order to commercialize a fuel cell vehicle. In that case, Toyota argued that commercializing the vehicle necessitated non-compliance with the standard.

³² NHTSA, “Letter to Chris Urmson, Director, Self-Driving Car Project,” 2016.

This distinction has been emphasized in past proceedings, such as the agency’s response to 2011 and 2012 petitions from Tesla and Wheego respectively. In these petitions, Tesla and Wheego both sought temporary exemption from electronic stability control (ESC) requirements of the FMVSS. When commenters protested that ESC had proven safety benefits, NHTSA responded, “While the agency continues to believe that ESC has a substantial effect on the number of vehicle crashes, the relevant inquiry is not the effectiveness of ESC systems. Rather, the relevant inquiry is whether an exemption would unreasonably lower the safety level of the vehicle in question.”³³ In this response, the agency affirmed that the exemption process is focused not on the safety level of individual vehicle components, but whether modifications to a specific standard unduly degrade the safety of the broader vehicle. Thus, exemption proceedings do not target the automated driving system, but rather the design decisions that were made in the context of the ADS.

The public interest is best served through a clear pathway towards the flexibility offered by exemptions; therefore, we urge the Department not to unduly burden petitioners with requests with respect to documentation of ADS that exceed requirements for AVs with conventional designs.

B. The Safety of the ADS is Appropriately Governed by the Department’s Recall, Enforcement, and Rulemaking Authorities

SAFE believes that the Department has an interest in assuring public safety as AVs continue to increase their presence on public roads. This interest is manifested through the Department’s recall authorities, enforcement bulletins, and rulemaking authorities, as well as its ability to set policies such as requesting Voluntary Safety Self Assessments (VSSAs).

We urge the Department to continue to develop these authorities, which may in time result in a rule on ADS safety. The exemption petition is a key step in the Department’s learning process on the workings of ADS and its interface with the regulatory system. As part of this proceeding, the petitioners have offered information on the safety of the ADS in their vehicles and the Department is considering requesting additional information on their safety.

Requiring petitioners to demonstrate ADS safety to a level considerably beyond that required by AV developers who are not requesting exemptions has the potential to harm the public interest. Denying an exemption petition for a vehicle will not remove its ADS from public roads – the same ADS could legally be used in FMVSS-compliant vehicles.

Our recommendation is that the Department continue to consider avenues other than exemption petitions as the primary means by which to regulate the safety of the ADS.

³³ NHTSA, “Tesla Motors, Inc.; Grant of Petition for Temporary Exemption From the Electronic Stability Control Requirements of FMVSS No. 126,” Docket No. NHTSA-2011-0110, September 28, 2011. NHTSA, “Wheego Electric Cars, Inc.; Grant of Petition for Temporary Exemption From the Electronic Stability Control Requirements of FMVSS No. 126,” Docket No. NHTSA-2012-0013, August 10, 2012.

C. The Department Should Balance Required Level of Detail Regarding ADS Safety With the Public Interest Served By Granting Exemptions Which Meet the Statutory Basis

As outlined above, the granting of exemption petitions, if they meet the requirements of the statute, is in the public interest. At the same time, the public interest is also served by the Department's oversight of AV safety.

To some extent, these priorities can and should overlap. Exemption petitions represent important opportunities for the exchange of information and views between petitioners, the Department, other stakeholders, and the public. Precisely because it is in the public interest for these exchanges to continue, the Department should seek to maximize these exchanges without unduly burdening petitioners to provide documentation far beyond what is required by statute.

SAFE recommends balancing these values. The Department should continue to encourage petitioners to submit documentation demonstrating that, given the totality of considerations including ADS functionality, the granting of an exemption is in the public interest. At the same time, the Department should refrain from requiring specific ADS performance requirements as a precondition for an exemption. Such requirements would be better advanced through rulemakings or enforcement bulletins.

D. The Department's Requests for Additional, Publicly-Disclosed Information Should Be Limited to Information Required to Meet a Specific Regulatory Need

As AVs are a new and highly-anticipated technology, there is considerable demand to better understand the technology by capturing information through the regulatory process. SAFE believes companies should only be required to reveal sensitive information when doing so will feed directly into immediate regulatory enforcement or other compelling and clearly articulated need. Generally, we have found that requiring frequent reporting of sensitive data without a clear mechanism for their use imposes high compliance costs without proportionate public benefit.

We recommend that the Department carefully consider the costs and benefits of proprietary information that might be required as part of any ongoing or future exemption petition.

E. The Department Should Consider Exploring New Uses And Markets As A Legitimate Component Of Developing A Low-Emission Vehicle

The Department has asked a petitioner whether the development of a specific low-emission vehicle satisfies the general purpose of "encourage[ing] the development of vehicles with low-emission propulsion technologies."

Our view is that the question implies an overly narrow view of technological development. History is replete with examples of innovations that were perfectly technologically viable but did not achieve success because of poor market fit. There is more to innovation than developing technology; the

Department has previously recognized promoting consumer choice and technology dissemination as legitimate grounds in an exemption petition.³⁴

Petitioners may seek exemptions because a new vehicle design may foster better consumer engagement with AVs, improve the economic viability of specific business models, accommodate individuals with disabilities, or enable a ride with greater comfort. All of these are legitimate market functions and could be represented as a legitimate attempt to enable the market development of a low-emission vehicle. As such, AVs, and automation more broadly, would contribute significantly to the market viability and uptake of low-emission vehicle technology.

We recommend that the Department consider the public interest inherent in the *success* of low-emission transportation, rather than merely its technological development, when considering the public interest requirement for exemption petitions.

V. Responses to Specific Questions

Question 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?*

Given the public interest served by granting exemptions for which the statutory basis is met, SAFE recommends that the Department grant the relevant exemption if either basis is met.

Automated vehicles such as the zero-emission autonomous vehicle (ZEAV) have the potential to significantly increase traffic safety. According to GM, the ZEAV “has an array of sensors, including LiDAR, cameras, and radar, which provide the ADS with continuous 360-degree information on the environment outside the vehicle.”³⁵ GM argues that this allows the vehicle a much more comprehensive view of its surroundings than a human driver could achieve. Greater visibility could help prevent crashes that currently occur due to obstructed views and blind spots. Additionally, the ADS that drives the ZEAV cannot be drowsy, distracted, or drunk. Unlike humans, the system will always be focused on the road and the driving task.

The prospective impact of these features could be substantial. Human error is currently a significant factor in all crashes, and drinking, distraction, and speeding are the primary causes of

³⁴ NHTSA, “Wheego Electric Cars, Inc.; Grant of Petition for Temporary Exemption From the Electronic Stability Control Requirements of FMVSS No. 126,” Docket No. NHTSA-2012-0013, August 10, 2012.

³⁵ General Motors, “Petition Under 49 U.S.C. § 30113 and 49 C.F.R. Part 555 to Advance Safety and Zero-Emission Vehicles Through Technology That Achieves the Safety Purpose of the FMVSS,” January 11, 2018.

56 percent of crashes.³⁶ Allowing for the testing of vehicles equipped with an ADS removes the potential for human error and could save the lives of thousands of Americans every year.³⁷

In SAFE's view, this qualifies the ZEAV – or any vehicle with an ADS – for consideration under the basis of allowing “development or field evaluation of new motor vehicle safety features.”

In SAFE's view, the ZEAV should also be considered for exemption under the low-emission basis. GM specifies that the ZEAV “does not utilize any form of combustion or emit any of the pollutions covered by § 202 of the Clean Air Act.”³⁸

This vehicle provides an opportunity for research on low-emission vehicles. While GM states their ZEAV will share a platform with the Chevrolet Bolt, they also point out the opportunity to understand the effect of an ADS on the performance of the propulsion system.³⁹ There are numerous potential benefits from deploying new low-emission vehicles, including reducing American dependence on foreign oil, encouraging the use of fuel-efficient vehicles, and providing additional employment opportunities.

Therefore, SAFE recommends an evaluation on both bases and suggests that exemptions be granted if the petitioner can meet the statutory requirements of either (ii) development or field evaluation of new motor vehicle safety features or (iii) development or field evaluation of a low-emission motor vehicle are met.

Question 4. *In lieu of either of the two bases relied upon by GM, would it be more appropriate to consider GM's petition under 49 U.S.C. 30113(b)(3)(B)(iv) (authority to grant exemptions from FMVSS for vehicles with an overall safety level at least equal to the overall safety level of nonexempt vehicles)? If so, why?*

SAFE's view is that the public interest is served by granting of an exemption, and the Department should grant exemptions for which any appropriate legal basis is met. Since the petitioner has applied for exemptions under basis (ii) and (iii), it would not serve the public interest to disregard these potential bases and evaluate the application solely on an entirely different basis.

Question 5. *What studies, data, assumptions, scientific reasoning, and methodologies are needed for the agency to evaluate and compare the ZEAV and a FMVSS-compliant non-ADS vehicle?*

³⁶ NHTSA, *Critical Reasons for Crashes Investigated in the National Motor Vehicle Crash Causation Survey*, February 2015; SAFE, *America's Workforce and the Self-Driving Future: Realizing Productivity Gains and Spurring Economic Growth*, June 2018.

³⁷ See, e.g., Nidhi Kalra and David G. Groves, *The Enemy of Good: Estimating the Cost of Waiting for Nearly Perfect Automated Vehicles*, RAND Corporation, 2017.

³⁸ General Motors, “Petition Under 49 U.S.C. § 30113 and 49 C.F.R. Part 555 to Advance Safety and Zero-Emission Vehicles Through Technology That Achieves the Safety Purpose of the FMVSS,” January 11, 2018.

³⁹ General Motors, “Petition Under 49 U.S.C. § 30113 and 49 C.F.R. Part 555 to Advance Safety and Zero-Emission Vehicles Through Technology That Achieves the Safety Purpose of the FMVSS,” January 11, 2018.

As explored in Section IV, SAFE believes that the main burden of proof for petitioners seeking exemptions centers on demonstrating that there are no significant adverse safety impacts from the requested modification of vehicle design. Therefore, the appropriate comparison on safety is between the AV for which the exemption is being sought and a FMVSS-compliant AV with the same ADS. SAFE recommends that while the Department should encourage the exchange of information about ADS performance, the approval of exemptions should not be tied to specific performance requirements of the ADS.

SAFE would also like to recommend that, outside this proceeding, future research on AVs should explore metrics for comparing the safety of AVs and human-driven vehicles. This would set a reasonable benchmark for minimum safety criteria an AV should reach and is an accessible way to convey vehicle safety to the average consumer. We encourage NHTSA to engage in future study on a variety of safety metrics, but particularly on “roadmanship metrics.”⁴⁰ Roadmanship metrics would readily allow for comparison with human-driven vehicles and offer safety implications with fewer miles traveled than lagging metrics such as accident or injury. While much of the information in Appendix 3 of this Petition is redacted, it seems that this is the direction that the petitioner believes to be fruitful.

Question 7. What studies, data, assumptions, scientific reasoning, and methodologies should a petitioner submit to the agency to substantiate its record of research, development, and testing establishing the innovative nature of the safety feature?

As discussed in Section IV, SAFE encourages the petitioner to be as transparent as possible regarding the types of technology they are developing and the potential improvements to road safety that could be realized as a result of the new safety feature. In the case of an ADS meeting the Department’s definition of a highly automated vehicle (e.g. SAE Level 3, 4, and 5), these are pre-commercial technologies, and should *prima facie* be considered innovative safety features.

Question 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?

As elaborated on in Section IV, the statutory requirements for an exemption do not raise the question of ADS safety. The statute suggests that the petitioner must demonstrate that the modified, non-compliant AV is at the appropriate level of safety (as required by the statute) when compared to an AV with a FMVSS-compliant design. SAFE believes that ADS safety is currently addressed in all AVs through NHTSA’s recall, enforcement, and rulemaking authorities. If the petitioner can demonstrate that ADS safety and the safety of the public is not affected by non-compliance with FMVSS, the ADS in a nonexempt vehicle has equivalent safety with the ADS of a compliant vehicle.

⁴⁰ Laura Fraade-Blonar, Marjory S. Blumenthal, James M. Anderson, and Nidhi Kalra, *Measuring Automated Vehicle Safety: Forging a Framework*, RAND Corporation, 2018.

While SAFE believes the petitioner should be transparent on the safety case for its ADS and seek to assure the Department and the public of the safety of their technology, we do not believe that a specific performance requirement is required by either the statute or the public interest. Our recommendation is that the petitioner be required to demonstrate to the appropriate level of proof (as required by the relevant statute) that the proposed design modifications would not reduce safety.

Question 9. *What studies, data, assumptions, validation test results, scientific reasoning, methodologies, and analyses should a petitioner submit to the agency to validate that its ADS during its operation will have sufficient reliability to accomplish its designed intent, e.g., timely and sufficiently applying the service brakes when braking is needed for safety purposes?*

As explored more fully in Section IV, SAFE believes that the appropriate point of comparison for a noncompliant ADS-enabled vehicle is a compliant ADS-enabled vehicle. SAFE believes it is not in the public interest to apply different safety requirements to automated vehicles with and without certain FMVSS-compliant components, provided the petitioner can adequately demonstrate that the removal of these components will have no effect on safety. Thus, petitioners should only be required to establish that their proposed design changes do not reduce safety.

Additionally, SAFE believes that, removed from the exemption process, roadmanship and other metrics capable of comparing an ADS with a human driver could be a useful area of future study for evaluating ADS reliability.

Question 12. *It could be argued that some FMVSS may either not be needed for safety or at least less needed for safety in the case of a vehicle that can be driven by only an ADS. Examples of potentially unnecessary features include inside and outside mirrors as well as the display of images from the rearview camera. Should test results or data be required to justify such an argument? If yes, what would be the most appropriate types of test results or data, and why?*

SAFE believes that when documenting whether a specific type or format of information has been received, it should be sufficient for the petitioner to claim that the ADS receives the information. However, where the ADS is being substituted for a FMVSS-compliant component, the petitioner should submit documentation that the information that would have been conveyed to the driver would be conveyed to the ADS. For example, in the case of removing the display for a rearview camera, the petitioner should submit documentation demonstrating that the information conveyed to the ADS is the same as what would have been conveyed to a human driver had the rearview display not been removed.

Question 13. *GM asserts that a FMVSS that requires telltales to provide drivers with information is not applicable because the ADS would be receiving that information. The agency requests comment on whether and to what extent the telltales might serve a safety purpose for passengers in the vehicle, regardless of whether the information would be transmitted to the ZEAV's ADS and whether the ADS*

would act on that information in a timely and appropriate way. What weight should the agency give to the extent of the ADS' ability to respond in appropriate ways to the information it receives?

The material question is whether there is degradation (or unreasonable degradation in the case of an exemption on the low-emission basis) of safety that would arise from removing the redundant display of information. Any additional documentation requested by the agency should focus on determining whether relying solely on the ADS would result in sufficiently different maintenance actions. The agency may also wish to clarify whether the petitioner intends to include any form of passenger intervention in their vehicle and if the possibility of passenger intervention enhances or degrades safety. This may help to determine which, if any, telltales may be useful for passenger safety.

Question 14. *For a FMVSS whose benefits depend, in part, on the attentiveness, judgment, and responsiveness of a human driver (e.g., FMVSS No. 135, which requires that a foot control be provided to activate service brakes), how should the agency, in considering a petition for the exemption of a vehicle equipped with ADS and with no human driver controls, evaluate the safety effects of substituting an ADS for a human driver? What types of testing and data, and how much, would the agency need to evaluate these effects?*

As explored in Section IV, SAFE believes that for the purpose of evaluating an exemption petition, FMVSS-noncompliant AVs should be compared to compliant AVs. The safety of the ADS itself should be addressed through recall, enforcement, and rulemaking authorities in addition to ongoing policy guidance.

SAFE recommends that requirements for an exemption petition should center on demonstrating whether design modifications lead to degradation of safety; however, no additional performance requirements for an ADS should be required if a FMVSS-compliant vehicle could have the same ADS.

Question 15. *Would it be appropriate to use computer simulation as one of the methods to determine equivalent safety? If yes, why and how? If not, why not? Are there adequately validated simulation models that could be used for this purpose?*

SAFE recommends that no additional demonstration requirements specific to the ADS should be required. In that context, given the widespread use of simulation as a method of safety development in the AV industry, SAFE would encourage petitioners to discuss their use of simulation in safety assurance. However, SAFE does not recommend that the exemption petition be tied to any specific submission of information about simulation use or approaches.

Question 16. *If the ADS is responsible for decision-making aspects of driving that a human driver otherwise would control, is it appropriate for the agency to evaluate the responsiveness and driving skills of the ADS in relation to the component, system, test procedure, or performance requirement from which an FMVSS exemption is sought? If so, how should the agency evaluate the safety of the ADS in different scenarios, e.g., negotiating a path through oncoming traffic when making a left turn, stopping when a*

pedestrian crosses the vehicle's path, and yielding to emergency vehicles? What kind of data would be needed for the agency to evaluate the performance of the ADS in these and other scenarios? How should the performance of the ADS be compared to that of a human driver in a nonexempt vehicle?

As discussed in Section IV, the ADS of a noncompliant AV should be compared to the ADS of a compliant AV. Currently, the safety of the ADS in compliant vehicles is addressed through NHTSA's rulemaking, defect, and enforcement authorities, in addition to voluntary policies. The ADS of noncompliant vehicles should be subjected to minimal, if any, additional burden of proof. Safety evaluation of the noncompliant AVs should ensure that the ADS is capable of performing the functionality of the removed components.

This question does raise the important issue of comparing the performance of the ADS and a human driver. While this is outside the scope of the exemption process, this would be a useful topic of future study. SAFE recommends the study of "roadmanship metrics" as a window into comparing the performance of a human driver with an ADS.

Question 17. *To what extent and how should GM's contemplated limited deployment (e.g., in a petitioner-controlled rideshare program, with established ODD constraints and the ability to pull vehicles off the street to remedy, including through software updates, any potential safety issues that might arise) be considered when evaluating safety equivalence?*

Though the safety of the ADS is mostly out of scope of the exemption process, the public interest would be further served by fleet-based deployment of automated vehicles due to additional safety and energy benefits that accrue from such a business model. For one, the vehicles that would be deployed under such a model would be closely monitored by the petitioner. If any unsafe situation were to arise, the petitioner would be able to react in a timely manner to reduce any risk to passengers and other road users. As the petitioner is not dependent on the consumer to handle vehicle malfunction, greater safety is provided than if these vehicles were to be sold to the public.

Additionally, ridesharing may result in reduced energy consumption. Consumers who pool rides in a ridesharing platform can reduce the total number of vehicle trips. Ridesharing may also encourage the private purchase of electric vehicles, as it offers consumers who may otherwise have been wary of purchasing such a vehicle the opportunity to gain familiarity with the technology.

Petitioner control of automated vehicles may also help the petitioner acquire more robust data surrounding the operation, and, consequently, the potential benefits and vulnerabilities, of their technology. Companies that sell their vehicles to the public have more limited data about how their vehicles perform in the real world. In contrast, AV developers deploying their vehicles in a ridesharing program would have a much wider range of data about each of their vehicles.

Question 18. *If some of the constraints of the ZEAV's initial deployment would eventually be progressively relaxed by GM, what types of data should the agency use in evaluating the safety of the*

ZEAV over its lifetime and deciding whether to grant or deny the petition? If an exemption is granted, should the agency monitor and periodically validate these data throughout the ZEAV's service life?

If the petitioner were to seek to relax some of the constraints of the initial deployment, the agency should require the same data and process as they would in the event of a FMVSS-compliant AV expanding its operating domain or loosening constraints. Additional restrictions or an approval process should only be applied if the expansion of the ODD would impact another aspect of the FMVSS that is not addressed by the current petition.

Question 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.*

As explored above in the third section, AV technology has the potential to provide significant benefits for road safety, energy consumption, employment and mobility. By removing humans from the driver's seat, automated vehicles could significantly reduce the annual cost of traffic accidents and save thousands of lives. They can also facilitate the adoption of electric vehicles, thereby reducing American dependence on foreign oil. Additionally, automated vehicles can improve job access and create new employment opportunities, as well as allow increased mobility for individuals with disabilities. The total annual benefit from automated vehicle deployment could reach \$800 million by 2050.⁴¹

Question 20. *In the absence of real-world demonstration of quality of the decision-making by the ZEAV's ADS, if the petition were to be granted, what terms and conditions, if any, should the agency place on the exemption, and any similar future requests, to protect public safety, facilitate agency efforts to monitor the operations of exempted vehicles, and maximize the learning opportunities presented by the on-road experience of the exempted vehicles during the exemption period and thereafter?*

As explored more fully in Section IV, SAFE believes that the safety of the decision-making component of an ADS lies outside the scope of the exemption process. The ADS in a noncompliant vehicle has equivalent safety with the ADS in a compliant vehicle, which is currently addressed through NHTSA's recall, enforcement, and rulemaking authorities, as well as through ongoing policy guidance. Within the constraints of the exemption process, the petitioner should provide documentation substantiating their claims that the ADS can perform the functionality of the components which they seek to remove.

However, the agency may find it valuable to gather data that would serve the public interest. Data that may be useful for this purpose would be information that could directly feed into creating safety regulations around automated vehicles.

Question 21. *Should NHTSA consider how the ZEAV would respond if it needed to deal with an unusual situation, e.g., cross the yellow line to pass a stopped vehicle blocking the way forward for a prolonged period of time or obey a policeman giving instructions instead of obeying a traffic light?*

⁴¹ SAFE, *America's Workforce and the Self-Driving Future: Realizing Productivity Gains and Spurring Economic Growth*, June 2018.

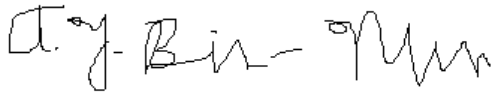
As elaborated on in Section IV, NHTSA should consider compliant vehicles equipped with an ADS as the point of comparison for noncompliant vehicles equipped with an ADS. Thus the agency should only consider how an ADS in a noncompliant vehicle would handle these situations if it would do the same for the ADS in a compliant vehicle. There should only be additional information required if the agency feels that the removal of FMVSS-compliant components would affect the vehicle's ability to act in such situations.

VI. Conclusion

SAFE looks forward to working with the Department on safety and other topics related to vehicle automation. We would welcome the opportunity for further discussion.

Thank you for considering SAFE's comments. Should you have any questions related to these comments, please direct them to Dr. Amitai Bin-Nun at abinnun@secureenergy.org.

Sincerely,

A handwritten signature in black ink, appearing to read "A. Bin-Nun". The signature is fluid and cursive, with the first name "Amitai" and last name "Bin-Nun" clearly distinguishable.

Amitai Bin-Nun, Ph.D.

Vice President, Securing America's Future Energy

Kristen Hernandez,

Policy Analyst, Securing America's Future Energy