

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-2019-0017

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 *Nuro, Inc. – Petition for Temporary Exemption for an 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 important role this proceeding will play in the long-term evolution of AV regulation and AV design. In Section III, we will

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.

argue that the 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 automated vehicles 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

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.

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. 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 resulting from 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.

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

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.

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.

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 of 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

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.

deploy accessible AVs on a shared platform where they can reach a greater number of people than privately owned vehicles.

This petition offers an example of an innovative vehicle design with positive energy contributions. Several companies have proposed replacing deliveries that are done today with cars or medium-duty trucks with small electric vehicles, including the Nuro R2X. 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.²⁸ 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.²⁹

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

²⁸ KPMG estimated several scenarios for incremental package delivery VMT ranging from a 30 to 50 percent decline in household vehicle 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.

²⁹ SAFE analysis

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 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.³⁰ 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.”³¹

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

³⁰ 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.

³¹ NHTSA, “Letter to Chris Urmson, Director, Self-Driving Car Project,” 2016.

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.

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.”³² 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.

³² 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.

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.

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.³³

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

Questions 2 and 3. *Is the basis for exemption (field evaluation of a low-emission vehicle (30113(b)(3)(B)(iii)) chosen by Nuro in its petition appropriate for the agency to use in determining whether to grant or deny an exemption for Nuro’s vehicle? In lieu of the low-emission basis, would it be more appropriate to consider Nuro’s petition under 49 U.S.C. 30113(b)(3)(B)(ii) (field evaluation of a new motor vehicle safety feature) or 30113(b)(3)(B)(iv) (authority to grant exemptions from FMVSS for vehicle with an overall safety level at least equal to the overall safety level of nonexempt vehicles)?*

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 the statutory requirements of any basis are met.

Nuro has applied under the low-emission basis (30113(b)(3)(B)(iii)), which appears to be appropriate. Automated vehicles such as the R2X have the potential to significantly decrease energy consumption and emissions. Per Nuro’s petition, the R2X “will emit no hydrocarbons, carbon monoxide, oxides of nitrogen, or particulate matter, which are four of the air pollutants regulated under the Clean Air Act.”³⁴ Thus, it qualifies as low-emission by the standards of the Clean Air Act.

The R2X would also promote innovative design features and specific applications for electric vehicles. The vehicle is a new design and allows for the potential to explore emissions reductions in delivery. As explored in Section III, reductions in energy consumption could be substantial, with the

³³ 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.

³⁴ Nuro, “Petition for Exemption from Certain Provisions of Federal Motor Vehicle Safety Standard, No. 500,” October 19, 2018.

potential to replace over 800 million gallons worth of delivery trips.³⁵ Increased adoption of electric vehicles in a delivery capacity could contribute to reducing American dependence on foreign oil, encouraging the use of fuel-efficient vehicles, and providing additional employment opportunities.

If considered under the safety feature basis (30113(b)(3)(B)(ii)), the case could be made on that front as well. According to Nuro, the R2X is equipped with “12 cameras providing high-definition, constant, and 360° views of the environment from various elevations and with overlapping vantages,” as well as “top-mounted LIDAR to provide precise representations of the surrounding area and movements.”³⁶ This allows the vehicle a much more comprehensive view of its surroundings than a human driver could achieve and may help prevent crashes that occur due to obstructed views and blind spots. Additionally, the ADS that drives the R2X cannot be drowsy, distracted, or drunk. Unlike humans, the system will always be focused on the road and the driving task.

SAFE recommends evaluating the exemption on the basis for which Nuro has applied. The Department has the discretion to consider all applicable bases for exemption and should grant an exemption under any basis for which Nuro meets the statutory requirements.

Question 4. *Independent of the agency’s disposition of this petition, NHTSA seeks comment on whether, and if so how, the agency should also consider creating a new vehicle classification category for light and/or low-speed passengerless ADS vehicles like the R2X to which a subset of the FMVSS requirements would apply.*

Our understanding is that the Department is not considering a *de novo* rulemaking on this topic but seeks to understand whether the safety implications for passengerless vehicles should be considered in a review and potential update of FMVSS. As the Department looks to update regulations to accommodate changes in vehicle design, SAFE believes that it would be beneficial for the Department to consider the safety design implications not just of “driverless” vehicles, but of passengerless vehicles as well.

Questions 5 and 6. *Nuro contends that an exemption is necessary to facilitate the development of a LEV because it has “exhausted the safety gains that can accrue” from its current testing. Does the petition provide sufficient information to enable the agency to determine whether exempting the vehicle would make the development or field evaluation of a low-emission motor vehicle easier? Does Nuro ADS’s reliance on “advanced machine learning” to improve driving performance justify public on-road testing to obtain additional ADS safety gains? Are there diminishing returns to continued testing with passenger cars retrofitted with ADS functionality?*

AVs can be developed in a variety of settings. These settings generally fall into one of two categories: artificial (i.e., simulation and closed courses) and public roads (with or without a safety

³⁵ SAFE analysis

³⁶ Nuro, “Petition for Exemption from Certain Provisions of Federal Motor Vehicle Safety Standard, No. 500,” October 19, 2018.

driver).³⁷ There are certainly advantages to testing in artificial settings, most notably the lack of risk to the public. However, there are also significant limitations to confining testing to these areas. Both simulation and closed courses suffer from concerns surrounding external validity.³⁸ That is, there is uncertainty as to whether the ADS would perform the same way in the real world as it does in the artificial setting. There is also limited unpredictability in these environments, which does not accurately reflect real-world operating conditions.³⁹

Testing AVs on public roads can alleviate some of these concerns. For example, there are fewer concerns about validity because these vehicles are ultimately intended for use on public roads.⁴⁰ Developers also have limited control over testing conditions on public roads, which more accurately reflects the situations that these vehicles would find themselves in during operation.⁴¹ Additionally, operation on public roads allows automated vehicle developers to discover new situations that may pose problems for their ADS and evaluate any upgrades to their software in real-world conditions.⁴² This information would help developers achieve a higher level of safety for their vehicles in a variety of conditions, which would not be possible if they were limited to artificial settings.

Furthermore, there is a business development benefit that can accrue from on-road testing that would not be possible in artificial settings. Namely, operation on public roads allows the petitioner to gain an idea of the market fit for the form factor that they are testing. Many AV developers are pioneering new business models that can be realized using the new technology. Given the innovative nature of these business models, developers would find value in information about what characteristics may make for a better market fit and what aspects of their model need to be adjusted to better accommodate the needs and desires of consumers and the public.

Therefore, SAFE believes that allowing a developer to test the technological and commercial viability of an AV that meets the statutory basis for an exemption is in the public interest and the current request should be fully considered.

Question 7. *In determining whether to grant the petition, how should NHTSA consider whether an exemption would “unreasonably lower the safety level”? Should this consideration be solely limited to safety level provided by the exempted standards or the safety of the vehicle more generally?*

³⁷ Laura Fraade-Blanar, Marjory S. Blumenthal, James M. Anderson, and Nidhi Kalra, *Measuring Automated Vehicle Safety: Forging a Framework*, RAND Corporation, 2018.

³⁸ Laura Fraade-Blanar, Marjory S. Blumenthal, James M. Anderson, and Nidhi Kalra, *Measuring Automated Vehicle Safety: Forging a Framework*, RAND Corporation, 2018.

³⁹ Laura Fraade-Blanar, Marjory S. Blumenthal, James M. Anderson, and Nidhi Kalra, *Measuring Automated Vehicle Safety: Forging a Framework*, RAND Corporation, 2018.

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

⁴¹ Laura Fraade-Blanar, Marjory S. Blumenthal, James M. Anderson, and Nidhi Kalra, *Measuring Automated Vehicle Safety: Forging a Framework*, RAND Corporation, 2018.

⁴² Laura Fraade-Blanar, Marjory S. Blumenthal, James M. Anderson, and Nidhi Kalra, *Measuring Automated Vehicle Safety: Forging a Framework*, RAND Corporation, 2018.

As explored in Section IV, SAFE believes that the exemption petition is not the appropriate venue for assessing the performance of an ADS or imposing performance requirements on an ADS. ADS behavior is regulated by the Department through its recall, enforcement, and rulemaking authorities, as well as through its policy guidance.

The plain reading of the statute, which we maintain is also in the public interest, asks whether the non-compliance with a particular standard or standards unreasonably degrades safety. To evaluate this, an AV with a non-compliant design should be compared to an AV with a compliant design. This strongly implies that the demonstration of the ADS proficiency should not be a burden on petitioners in exemption proceedings. The Department should consider whether the ADS can perform the functions of the components which the petitioner seeks to remove or whether the removal of these components impacts vehicle safety in the context of an AV.

Question 8. Is it appropriate for the agency to give any consideration to the quality of the performance of Nuro's ADS as part of its assessment whether granting Nuro's petition is in the public interest and consistent with the Safety Act?

As elaborated on in Section IV, the safety compliance of an ADS is currently and should continue to be addressed through NHTSA's defect and rulemaking authorities. Within the exemption process, it would be in the public interest for exemptions to be granted to petitioners who demonstrate that their ADS is capable of performing the functions of components that would be removed by design modifications.

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.

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

Question 9. How should safety considerations, including the performance of the ADS, be included in the "terms" of a granted exemption?

As discussed in previous questions and Section IV, the exemption process should not impose specific performance requirements on the ADS. ADS performance should be considered to the extent that the ADS adequately performs or mitigates the absence of the exempted safety feature.

ADS performance is best regulated through the Department's defect and rulemaking authorities, as well as through its enforcement bulletins and policy guidance. To this end, it may be useful for the

Department to offer guidance on what would be considered an unsafe ADS through one of those mechanisms.

Question 10. *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?*

As explored in prior questions and Section IV, unreasonable degradation of safety should be evaluated through consideration of whether the design modifications proposed by the petitioner would decrease safety. The petitioner should provide documentation to NHTSA demonstrating that its ADS can replace the functionality of components that would be removed or that the removal of these components would not reduce vehicle safety.

Question 13. *To what degree could the R2X's capabilities or ODD be changed through post-deployment software updates over the lifetime of the R2Xs for which Nuro is seeking an exemption? While Nuro states that it does not intend to "upgrade" the R2X's ADS to L5, are there ODD or other changes Nuro should be able to make to the R2X over the lifetime of the vehicles? How should NHTSA address the possibility of such changes in conducting its safety analysis?*

NHTSA should address the possibility of the evolution of the vehicle in the same way that it would for a compliant vehicle equipped with an ADS. Additional requirements should only be imposed if the expansion of the ODD or other changes would impact another aspect of the FMVSS that is not addressed by the current petition.

Question 18. *What communication protocols should the R2X follow when faced with unexpected human interactions, such as being pulled over by a police officer or being directed through a construction zone by a road worker?*

In SAFE's view, this question is best handled by local jurisdictions and law enforcement.

Question 23. *What additional situations and risk events (e.g., weather) should NHTSA consider when assessing the safe operation of the vehicle?*

As explored more in depth in prior questions and in Section IV, SAFE believes that the proper point of comparison in the exemption process for a noncompliant ADS-enabled vehicle is a compliant ADS-enabled vehicle. Therefore, the Department should place no additional limitations on the ODD of the exempted vehicle, unless it has reason to believe that the removal of certain components would affect the vehicle's ability to act in such situations.

Question 31. *We seek comment on whether the potential environmental and economic benefits described by Nuro in its petition are sufficient (or sufficiently likely to occur) to enable NHTSA to make a finding that an exemption is in the public interest and is consistent with the Safety Act, per 49 U.S.C. 30113(b)(3)(A).*

As explored above in the third section, automated vehicles have the potential to provide significant benefits for energy consumption and employment. Electric automated delivery vehicles, such as Nuro's, can help reduce energy consumption by shifting household shopping trips, food delivery, and last-mile package delivery from vehicles with internal combustion engines to low-emission vehicles. SAFE analysis has found that this could save over 800 million gallons of fuel annually.⁴³ Additionally, automated vehicles can improve job access and create a variety of new employment opportunities. These benefits would serve the public interest through decreasing American dependence on foreign oil (and thereby bolstering national security) and stimulating economic development.

Question 32. *In particular, we seek comment on whether a petitioner under the low-emission vehicle exemption basis must cite benefits that are directly related to the original purpose of 30113(b)(3)(B)(iii), which was to encourage the development of vehicles with low-emission propulsion technologies.*

SAFE urges the Department to take a broad view of what constitutes the development of a low-emission vehicle. Namely, the development of a vehicle is not only about developing technologies, but assessing and reacting to market and economic fit. The R2X is sufficiently different from current vehicles used for delivery functions – and those differences are key to reduced oil consumption – that the success of the technology will require significant on-road experimentation.

SAFE believes that the development and field evaluation of the R2X would further the development of a low-emission vehicle and serve the public interest, which would qualify the vehicle for consideration under the low-emission basis. The R2X is a low-emission vehicle, as Nuro outlines in its petition that the vehicle meets the standards of the Clean Air Act for being classified as such.⁴⁴ It would apply electrification in a small delivery vehicle, which would enhance the attractiveness of electric vehicles. Such an application would circumvent range concerns, often cited as a barrier to electric vehicle adoption, as delivery vehicles do not require a range of hundreds of miles. The R2X could also contribute to reduced dependence on foreign oil through transitioning delivery and shopping trips to low-emission vehicles. Furthermore, the vehicle could increase employment opportunities for those in the transportation and autonomous vehicle industries as well as food and retail.

Prior exemptions on the low-emission basis have been required to demonstrate that the vehicle would not unreasonably degrade safety, that it was a low-emission vehicle, and that it offered such benefits as reduced dependence on foreign oil, a greater selection of vehicles for consumers, encouragement of electric vehicle adoption, and additional employment opportunities.⁴⁵ They have also been required to substantiate that the exemption would allow for development or evaluation of the vehicle and that they intend to conform to the standard at the end of the period (or seek to

⁴³ SAFE analysis

⁴⁴ Nuro, "Petition for Exemption from Certain Provisions of Federal Motor Vehicle Safety Standard, No. 500," October 19, 2018.

⁴⁵ See, e.g., 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.

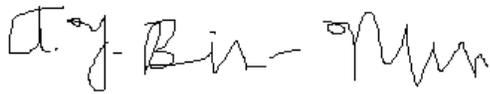
update existing standards).⁴⁶ Nuro's R2X should be held to the same standard as prior vehicles seeking exemption on the low-emission basis.

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 that reads "Amitai Bin-Nun". The signature is written in a cursive, slightly slanted style.

Amitai Bin-Nun, Ph.D.
Vice President, Securing America's Future Energy

Kristen Hernandez,
Policy Analyst, Securing America's Future Energy

⁴⁶ See, e.g., NHTSA, "Toyota Motor North America, Inc.; Grant of Petition for Temporary Exemption from an Electrical Safety Requirement of FMVSS No. 305," Docket No. NHTSA-2014-0068, January 2, 2015.