VNG

Comments of VNG.CO
On the
Draft Technical Assessment Report:
Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards for Model Years 2022-2025
EPA–HQ–OAR–2015–0827 / NHTSA–2016–0068

VNG.co is a developer of compressed natural gas (CNG) fuel dispensing infrastructure for medium- and light-duty natural gas vehicles (NGVs). We strongly support the goals of the joint light-duty vehicle program, but we believe the draft TAR arbitrarily and unreasonably fails to seriously consider the potential for NGVs to contribute to these goals in the near term and at reasonable costs. In particular, recent developments have made NGVs more relevant than ever to the agencies' goals, as they can provide unique and urgently needed benefits in four areas:

1. **NGVs are an ideal low-emission, non-petroleum alternative for light trucks and pickups.** Light trucks have steadily increased their market share in recent years to well over 50% of all light-duty sales, a strong indication of consumer preferences for larger vehicles that also threatens to undermine the overall benefits of the rule. While the TAR acknowledges that electrification will not be a commercial technology for pickups and other large light trucks for the foreseeable future, NGV models in these classes are already available, and natural gas could deliver ultra-low emissions of GHGs as well as NOx for this segment with adequate regulatory support.

2. **Renewable natural gas (RNG) provides game-changing emission reductions** – and now accounts for the majority of NGV fueling in California and a fast-rising share nationally. NGVs fueled on RNG provide emission reductions of 85% or more on a carbon-equivalent lifecycle basis, with even greater near-term impacts thanks to the capture of methane emissions. The draft TAR establishes estimates for the social cost of methane emissions for the first time, which provides a basis for valuing the enormous climate benefits of RNG-fueled NGVs.

3. **Synergies between NGVs and hydrogen fuel cell vehicles (FCVs) are more needed than ever.** FCVs are beginning to reach the market, and hydrogen demand threatens to outpace fueling development as early as 2019. Synergies between CNG infrastructure and hydrogen infrastructure development are numerous, and include developing the market for renewable fuels for each. Recognizing links between CNG and hydrogen market development can help to get in front of this issue of lagging demand and low-carbon fuel supply.

4. **NGVs also have a unique ability to reduce emissions for vehicles for the full life cycle of the vehicle through aftermarket upfits** – a major opportunity to expand the benefits of the rule beyond an exclusive focus on new OEM vehicles. Indeed, while some automakers have ventured into production line manufacturing of NGVs, most CNG capability is currently added via upfits, whether for new vehicles at the time of sale or after the vehicle is on the road. Considering emission reductions from CNG upfits through the full lifecycle of the vehicle (as a new, remarketed or used vehicle) in the TAR, and subsequently providing regulatory support in the MTE, is a major untapped opportunity to expand the reasonably achievable emission and petroleum reductions from light-duty transportation.

VNG welcomes this chance to remedy the shortcomings of this draft TAR and discuss the potential of NGV technologies to meet the agencies' goals. We hope to work with agency staffs to ensure that the final TAR and the Mid-Term Evaluation (MTE) truly capture the full range of opportunities to reduce transportation sector greenhouse emissions and petroleum dependence, as required by law.

Natural Gas Vehicles Are an Ideal Alternative for Light Trucks and Pickups

As the agencies acknowledge in the draft TAR, low gasoline prices have led U.S. consumers to gravitate towards the purchase of larger and less fuel-efficient vehicles – a development which, as the experience of the 1980s-2000s demonstrated, may become a long-term trend. And, even if gasoline prices rise again, these vehicles will still account for a sizable part of the market due to their unique ability to meet specific consumer needs. While the footprint-based structure of the rules ensures that automakers will have to increase the fuel economy of all vehicles in order to achieve compliance, the TAR shows this trend will nonetheless reduce the overall projected impacts of the rules on petroleum dependence and greenhouse gas emissions. There is also evidence that this is creating a perverse incentive for increasing the size of models across all vehicle segments in order to receive less stringent fuel economy targets.[1]

The size of light trucks limits the availability of cost-effective solutions to increasing fuel economy and reducing emissions – particularly for full-size pickups, which have added performance requirements. For example, the TAR estimates that the total cost of a 20% mass reduction for towing-capable pickups, which would improve fuel economy and emissions by only 10%, would be roughly $3,000. It is also particularly challenging to electrify light trucks and pickups due to the added cost and weight of the battery packs needed to move these larger vehicles, particularly those designed for carrying or pulling heavy loads. Indeed, there are very few electric light trucks on the market today and no pickups, and the TAR does not even bother to consider the possibility of electric towing-capable vehicles within the 2025 timeframe.

In contrast to electrification, natural gas is ideally suited to be a low-emission, non-petroleum alternative for light trucks and pickups especially. Larger vehicle envelopes provide ample room for the integration of compressed natural gas (CNG) storage tanks, and since natural gas offers far greater energy density than batteries it is much better suited for moving heavy vehicles. These characteristics are why natural gas has long been the clean fuel of choice for heavy-duty vehicles like transit buses and refuse trucks, and the same logic holds true for the heavier side of the light-duty vehicle spectrum.

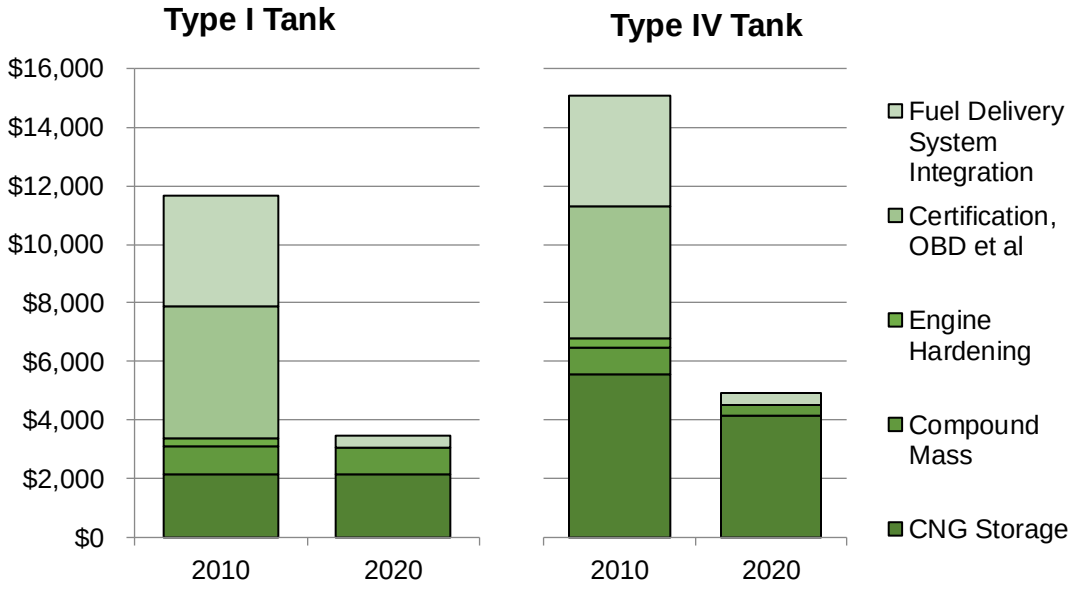
Indeed, automakers have already demonstrated that NGVs are already a viable commercial technology. All three U.S. OEMs have offered either CNG-equipped or CNG-ready versions of their flagship full-size pickups, including GM's Chevy Silverado[2], FCA's Dodge Ram[3], and Ford's F-150. In fact, in addition to being the best-selling vehicle of any model, the 2016 Ford F-150 was named Green Car Journal's "Green Car of the Year" in part due to the availability of a CNG prep package as an option.[4]

[1] http://cleantechnica.com/2016/08/17/us-cafe-standards-increase-emissions-decrease-fuel-economy/
[2] http://www.autoblog.com/2014/02/06/2015-chevrolet-silverado-hd-cng-official/
[3] http://www.autonews.com/article/20150304/OEM05/150309913/ram-will-expand-lineup-of-cng-powered-trucks
[4] https://media.ford.com/content/fordmedia/fna/us/en/news/2015/11/19/ford-f-150-earns-2016-green-truck-of-the-year-award.html

Furthermore, leading CNG conversion company Westport Innovations is investigating the potential for natural gas-fueled advanced powertrains that fully exploit the high-octane fuel properties of CNG.[5] These high-performance NGVs could offer superior efficiency compared to gasoline and diesel while delivering tank-to-wheels reductions in carbon emissions of greater than 30%. Such advancements would leverage turbocharged direct injection platforms, which, as the TAR recognizes, are rapidly increasing their market share for gasoline-fueled vehicles. Westport is initially looking to apply these advances to the pickup segment, with a vehicle concept they are calling the "SuperPickupTruck" after the Department of Energy's successful "SuperTruck" initiative for the heavy-duty sector.

While the current incremental prices of CNG pickups are typically $10,000 or more (including upfitting costs), these high costs are primarily due to the need to spread significant up-front design and certification costs over a small number of vehicle sales. Indeed, the comprehensive 2012 report "Advancing Technologies for America's Transportation Future" by the National Petroleum Council (NPC) estimates that about two thirds of the incremental cost of a NGV pickup comes from these areas, and that incremental costs could be reduced to as little as $3,500 per vehicle by 2020 simply by moving to high-volume production (defined as over 100,000 vehicles per year).[6] These projections are based in part on experiences in successful NGV markets in Europe like Italy and Germany, where volume production has driven incremental costs down to $3,000 or less.[7]

Projected NGV Pickup Incremental Costs



With potential incremental costs for NGV pickups comparable to the projected costs for 20% mass reduction, a record of OEM deployment in the U.S. and overseas at scale, and the ability to completely eliminate petroleum consumption and deliver emission improvements of over 30% with fossil natural gas (compared to just 10% for mass reduction), natural gas deserves to be included in the formulation of the targets for pickups and other light trucks just like other fuel efficiency technologies that have been

[5] Westport Innovations. "Methane – The Performance Fuel."
[6] http://www.npc.org/reports/trans.html
[7] https://www.bcgperspectives.com/content/articles/energy_environment_automotive_realistic_view_cng_vehicles_us/

proven to be cost-effective at scale. This would significantly increase the achievable fuel economy and emissions improvements for these segments within the timeframe of the rulemaking and thus provides a strong rationale for increasing the stringency of their targets – a step which would also serve to prevent backsliding on the aggregate benefits of the rules.

In the rulemaking process, we also believe that OEMs could be more directly incentivized to migrate their pickup truck platforms to natural gas by modifying the current advanced technology incentives for large pickups. Currently, the rules are technology-neutral, specifying only levels of CO2 reductions which NGVs could easily achieve. However, the requirements for technologies to be deployed in a substantial portion of the fleet in order to receive these incentives creates a barrier to their utilization – as evidenced by the agencies' projections that automakers will not be using these incentives. By modifying the incentive to be NGV-specific and lowering or removing the minimum deployment requirements, the agencies could help ensure that pickups – the most polluting and least-efficient vehicles subject to this rulemaking – are permanently transitioned to a lower-carbon, non-petroleum pathway.

Renewable Natural Gas Fuel Emerging as Emissions Game-Changer

Since the original rulemaking, there has also been a dramatic transformation of the lifecycle emissions profile of NGVs due to the rapid adoption of renewable natural gas (RNG) in the transportation sector. Indeed, this is likely the biggest change in the lifecycle emissions of any fuel or vehicle type since the 2011 rulemaking – yet it is completely absent in the draft TAR for reasons that are not clear.

RNG, also known as biogas, is a renewable, ultra-low GHG fuel that can be produced in a variety of ways, including the capture of landfill gas and the anaerobic digestion of organic feedstocks such as manure or wastewater sludge. Once processed to remove impurities, these RNG sources can be used as a perfect substitute for fossil natural gas, including distribution in the existing natural gas pipeline system and use in NGVs.

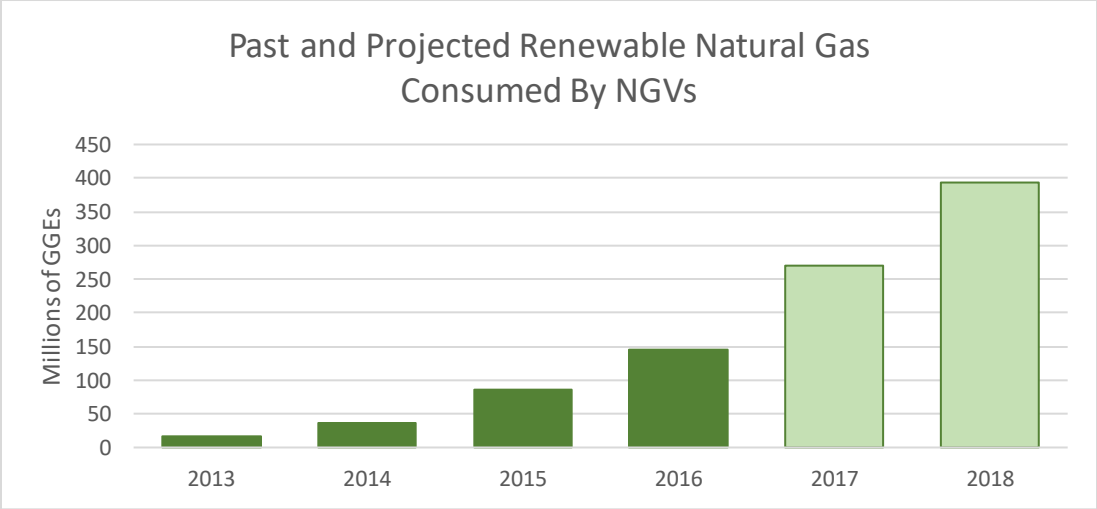
Since the capture of RNG removes methane that would otherwise escape into the atmosphere, it can achieve massive GHG emission reductions on a CO2-equivalent lifecycle basis when used for transportation. While lifecycle emissions can vary significantly depending on the pathway for RNG production, according to the most recent values for the Low Carbon Fuel Standard it can yield emission cuts of between 70% and *130%*[8] - in other words, NGVs powered by RNG can go *beyond* the "zero" emissions possible with an electric vehicle fueled entirely by solar or wind energy.

Moreover, because RNG eliminates emissions of methane – classified by CARB as a "Short-Lived Climate Pollutant," a category which the agency estimates is responsible for 40% of today's net climate forcing[9] – the climate change benefits of using this fuel will come much sooner than simply reducing carbon dioxide via increased gasoline fuel economy or electrification. The agencies have recognized the new importance of reducing methane emissions in numerous programs in recent years, including EPA regulations on methane emissions in the oil and gas sector[10] and CARB's first-of-its-kind overarching Short-Lived Climate Pollutant regulation.[11]

[8] http://www.arb.ca.gov/regact/2015/lcfs2015/lcfs15isor.pdf
[9] http://www.arb.ca.gov/cc/shortlived/meetings/04112016/proposedstrategy.pdf
[10] https://www.epa.gov/newsreleases/epa-releases-first-ever-standards-cut-methane-emissions-oil-and-gas-sector
[11] http://www.arb.ca.gov/cc/shortlived/shortlived.htm

RNG use in transportation is not a hypothetical scenario – in fact, it is increasingly the norm for NGVs, thanks to the federal Renewable Fuel Standard (RFS) and the California Low Carbon Fuel Standard (LCFS). While credit markets for these programs were in their infancy during the original rulemaking in 2011, they have since emerged as powerful economic drivers for RNG use in transportation, thanks to the reclassification of RNG as a cellulosic biofuel by EPA[12] as well as CARB's ranking of it as the lowest GHG transportation fuel on the market.[13] Thanks to the value of credits generated by these programs, RNG can be purchased from gas marketers at prices significantly below that of fossil natural gas.[14]

This economic driver has led to the very rapid increase in the sales of RNG fuel to the transportation sector – particularly in California, where retailers can benefit from sales of both LCFS and RFS credits and where there are the largest number of NGVs and natural gas fueling stations. According to the RNG Coalition, fully half of all NGV fuel in California in 2015 came from RNG, and 20-35% nationally. In terms of absolute volumes, RNG fuel use in transportation increased fivefold between 2013 and 2015, and the Coalition projects it will more than quadruple between 2015 and 2018.[15]



(Source: RNG Coalition)

While RNG can also be used as a substitute for fossil natural gas in heating or the generation of electricity, no end use sector can match the financial incentive provided by the direct use of RNG fuel in NGVs. Thus, according to the RNG Coalition virtually all new RNG production capacity is going towards NGV fuel sales, with the number of transportation-focused projects to double from 40 to 80 by the end of 2018. [16] This includes high profile projects like the recently-announced RNG production facility at a wastewater treatment plant operated by the City of Phoenix, which will sell RNG for use as a vehicle fuel and will be the largest wastewater-to-energy plant in the country when it opens in 2017.[17]

[12] https://www.epa.gov/renewable-fuel-standard-program/renewable-fuel-pathways-ii-final-rule-identify-additional-fuel
[13] http://www.arb.ca.gov/regact/2015/lcfs2015/lcfs15isor.pdf
[14] David Cox, RNG Coalition.
[15] David Cox, RNG Coalition.
[16] David Cox, RNG Coalition.
[17] http://www.businesswire.com/news/home/20160815005606/en/Ameresco-City-Phoenix-Announce-91st-Ave-Wastewater

Based on this rapid growth and attractive economics, the RNG Coalition estimates that RNG could be providing 100% of the fueling for NGVs in California by 2017, and nationally as early as 2018. [18] This presents a potential dilemma: unless the growth of the NGV market can be expanded beyond its current dependence on heavy-duty vehicles, there may be insufficient demand for natural gas fuel to support the continued development of these extremely important RNG capture projects. This impending saturation of the RNG transportation market makes it even more urgent for the agencies to fully consider the role of NGVs as part of a comprehensive climate agenda.

While the draft TAR does not consider the ramifications of this trend towards the use of RNG in NGVs, it does begin to establish a framework for evaluating what it could mean in the final TAR and subsequent MTE. First, it solicits input for the development of methodologies to account for the upstream emissions of electricity and hydrogen fuels; a similar framework should be developed for natural gas fuels that factors in the amount as well as the sources of RNG used in transportation. Indeed, unfairly excluding the emissions benefits of RNG from the analysis on the same basis as other alternatives will prevent the agencies from making reasonable and judicially sustainable decisions in the MTE.

Since virtually all RNG fuel sold commercially is used to generate credits under the RFS and LCFS programs, EPA and CARB are well-positioned to analyze and use this data in the light-duty GHG rules as well. Furthermore, the RNG Coalition has established strong credibility with the agencies in other contexts by providing very reliable data and projections on the industry's development, and could help establish estimates for the achievable emissions from widespread use of RNG in the pickup truck sector (for example).

Finally and perhaps most importantly, the draft TAR also includes the agencies' first attempts at calculating a social cost of methane emissions, which can provide the basis for valuing the potential contributions RNG-fueled NGVs can make in capturing these emissions. Since the global warming impacts of methane are much more potent in the near term than carbon dioxide, the draft TAR estimates much higher values for methane emission reductions over the life of the rule when compared to carbon dioxide emission reductions. For example, in 2025 the median value for a ton of methane reduced is $2,000, compared with $50 for a ton of carbon dioxide.

Because the transportation sector will offer the greatest financial driver for RNG capture and production projects for the foreseeable future, there are strong synergies between expanding the NGV market and achieving SLCP goals that the agencies should consider in this rulemaking. Expanding the consideration of the emission reductions that pickups and light trucks could achieve to include the potential benefits of using RNG could provide grounds for a significant tightening of the standards and a massive increase in the projected near-term social and environmental benefits of the rule.

In the rulemaking itself, it would be appropriate to provide incentives to NGVs on a similar basis as EVs. The 0 g/mi incentive for EVs essentially gives them credit for 100% renewable electricity use, even though there is actually a higher share of renewable gas used for NGV fueling than the share of renewable electricity in the grid mix used for EV fuel. Given that RNG can provide an average CO2-equivalent lifecycle emissions reduction of 85% compared to gasoline, combined with the fact that NGVs are already required by the Alternative Motor Fuels Act of 1988 to have their fuel use counted as 15% of a similar gasoline-fueled vehicle under the CAFE program (a calculation known as the Petroleum

[18] David Cox, RNG Coalition.

Equivalency Factor), it would be justifiable to assume that NGV emissions are 15% of the emissions of gasoline-fueled vehicles under the GHG program as well – essentially assuming 100% RNG use for the time being. As with EVs, this incentive could be phased out gradually and replaced with an accounting of upstream emissions based on actual RNG use levels.

Synergies With Hydrogen More Needed Than Ever

In awarding advanced technology multiplier incentives to NGVs, the original light-duty vehicle rulemaking in 2012 recognized that there are numerous technical synergies between the development and commercialization of NGVs and hydrogen fuel cell vehicles (FCVs) owing to the physical similarities between methane and hydrogen. The agencies wrote that "CNG investments have the potential to facilitate the introduction of hydrogen FCVs in several respects," including innovations in advanced storage materials and tube trailer designs, improved designs for compressors and fuel dispensers, and on-site production of hydrogen from natural gas feedstock. VNG helped to lay out this rationale in a white paper, "NGVs: An Essential Bridge to Hydrogen," commissioned from the consultancy Energy Futures.[19]

Since 2012, the FCV industry has taken its first steps towards commercialization, with Toyota, Honda, and Hyundai each offering models for the U.S. market. The TAR is cautiously optimistic about the uptake of these technologies, with an estimated 125,000 FCVs deployed in California by 2025 thanks to the Zero Emissions Vehicle (ZEV) mandate. However, this does not mean they are fully commercial technologies; indeed, it means that the need for NGV synergies to accelerate the development of this market has been elevated from the realm of the theoretical to the practical. The need is particularly urgent in the area of hydrogen infrastructure, as the TAR estimates that hydrogen fuel demand could begin to outpace infrastructure availability as early as 2019 and as late as 2026.

As noted in the original rulemaking, some of the strongest synergies between these fuels are in the area of infrastructure development. Both CNG and hydrogen fueling stations require the same types of equipment, including compressors, high-pressure storage tanks, and gaseous fuel dispensers. Shared standards, equipment designs, production and operational economies of scale, and technology innovations in this area could simultaneously drive down costs for both fuels. The September 2014 report "Transitioning the Transportation Sector: Exploring the Intersection of Hydrogen Fuel Cell and Natural Gas Vehicles" by the Sandia National Laboratory[20] goes further, with a concept design for a combined hydrogen and natural gas fueling station that "could improve operational expenditures and also take advantage of common supply chains."

The TAR also notes that "implementation of renewable hydrogen sourcing has posed a financial challenge" for stations developed to date, despite a minimum renewable content of 33% to receive grants from the California Energy Commission and greater incentives for 100% renewable hydrogen stations. RNG is an ideal feedstock for renewable hydrogen production via steam methane reforming (SMR) technology, but the market for FCVs is currently too small to drive widespread development of these resources. As discussed in the previous section, increasing the deployment of RNG-fueled NGVs is

[19] http://vng.co/wp-content/uploads/2012/05/Natural-Gas-An-Essential-Bridge-To-Hydrogen-Fuel-Cell-Vehicles.pdf
[20] http://energy.gov/sites/prod/files/2015/02/f19/2015-01_H2NG-Report-FINAL.pdf

key to building the market and growing demand for this ultra-low GHG fuel in the near term, ensuring sufficient supplies of RNG for renewable hydrogen production in the longer term.

Finally, these synergies may also yield benefits in the opposite direction, with advances in hydrogen improving the emissions profile of NGVs. The TAR recognizes the potential benefits of power-to-gas applications, in which large-scale wind and solar generation can be used to create hydrogen for blending into natural gas pipelines. While it is discussed in the context of reducing the lifecycle emissions of hydrogen production, this is also clearly relevant to reducing the lifecycle emissions of CNG. The 2013 report "Blending Hydrogen into Natural Gas Pipeline Networks" by the National Renewable Energy Laboratory[21] estimates that natural gas pipelines could accommodate blends of 5-20% hydrogen content with no technical changes by end users (e.g. NGVs), which would not only reduce the overall carbon content of natural gas but also reduce methane leakage from the pipeline system (since hydrogen, as a lighter molecule, would escape from leaks first and 'crowd out' methane).

The NREL report notes that "conceivably, a credit trading system could apply to natural gas with a specified blend content of renewable hydrogen, paralleling the renewable energy credit system used in the electricity sector." In fact, such programs already exist in the transportation sector: the LCFS and RFS programs both allow for the addition of new low-carbon and renewable fuel pathways, and renewable hydrogen-enriched natural gas sold as fuel for NGVs could readily fit within these schema. As with RNG, NGVs can play a crucial role in building this market in the near term to ensure the availability of renewable, low-GHG feedstocks for hydrogen fuel production in the long term.

In all these ways, NGVs could provide much-needed boosts to the development of the FCV industry. On the commercialization side, NGVs will help stimulate adoption of FCVs through lower costs and expanded infrastructure availability, and on the environmental side the expansion of availability of renewable gas feedstocks will maximize the climate benefits of these vehicles. Indeed, NGVs and FCVs should be considered part of the same gaseous fuel pathway and recognized as such in regulations that fully account for and promote the lifecycle benefits of ultra-low GHG gaseous fuel blends.

Incorporating Upfits Into The Rules

In Europe, most NGVs are manufactured on high-volume production lines. In contrast, most light-duty NGV sales in the U.S. are upfits, where a vehicle's natural gas components are installed by EPA- and CARB-certified aftermarket providers. This has significant drawbacks: costs are significantly higher due to the need to spread certification costs across low sales volumes, and the emissions benefits produced by upfitted vehicles are not directly incorporated into the current rules. This creates a vicious cycle: OEMs do not receive the regulatory benefits of producing vehicles that are converted to CNG, which results in underinvestment that keeps NGVs tied to a low-volume production model with high costs.

Greater OEM support for the upfit market could be facilitated by considering the benefits of upfit-ready NGVs. For instance, the previously-mentioned 2016 Ford F-150 pickup has a CNG "prep package" including hardened valves, valve seats, pistons and piston rings, which significantly reduces the cost of upfitting the vehicle for CNG operation.[22] Although this feature increases the likelihood that vehicles will be converted to a low-emission, non-petroleum fuel, it receives no regulatory benefit under the current

[21] http://www1.eere.energy.gov/hydrogenandfuelcells/pdfs/blending_h2_nat_gas_pipeline.pdf
[22] http://www.americancngenergy.com/ford-rolls-out-first-cng-ready-2016-f-150-pickup/

rules. The agencies should model the impacts of these CNG "prep packages" on the likelihood that vehicles will be converted to NGVs, which could facilitate their inclusion on the off-cycle credit menu.

This move towards considering the implications of the CNG upfit market could also unlock a unique opportunity to substantially reduce emissions and petroleum consumption via retrofits of remarketed and used vehicles – by definition, the most polluting vehicles on the road, since they receive no benefits from the current rulemaking. In contrast to EV and FCV technologies that are impractical to install on existing vehicles, the robust upfit ecosystem in place for NGVs is fully capable of addressing this market, and the updated certification requirements for remarketed and used vehicles established by EPA in 2012[23] could make serving this market very cost-effective.

While expanding the rules to include emission and petroleum reductions from vehicles that have already been sold – or of vehicles that have been prepped for future emission and petroleum reductions – will require a shift in thinking, the environmental and energy security benefits that would result are just as meaningful as those stemming from sales of cleaner new vehicles. We encourage the agencies to consider this possibility in the rulemaking as part of investigating the benefits of NGVs more broadly.

NGVs Key to Meeting Regulatory Goals More Flexibly, More Cheaply – and Sooner

The consultancy Energy + Environmental Economics (E3) published a report in 2014 titled "Decarbonizing Pipeline Gas to Help Meet California's 2050 Greenhouse Gas Reduction Goal."[24] The report asserts that leveraging existing natural gas infrastructure with the use of decarbonized gas – including biogas, renewable synthetic gas, and renewable hydrogen – can help meet the state's GHG goals with more flexibility, lower technology risk, and less infrastructure investments than relying on electrification strategies alone.

While this research pertained to all sectors of energy use, the ramifications may be most significant for transportation, where – as the agencies have acknowledged – electrification will be slow to be deployed overall, and may be an especially long time in coming for light trucks and pickups. But because it is exclusively and arbitrarily focused on electrification alternatives, the draft TAR paints a picture of a future in which drivers of pickup trucks and other larger vehicles are doomed to petroleum dependence and high emissions for the foreseeable future – and the agencies' goals are compromised as a result.

This gloomy picture fails to capture the ability of existing NGV technology and RNG fuel to benefit light truck drivers and the environment in the near term at competitive costs, as well as the even greater potential of next-generation NGVs fueled by both RNG and hydrogen-enriched gas to dramatically alter the trajectory of these vehicles for decades to come. Including such a thorough consideration of NGVs in the final TAR could provide a strong basis for increasing the stringency of the rules and accelerating – not slowing down – on the road towards energy independence and a more stable climate.

Respectfully submitted,
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[23] https://www3.epa.gov/otaq/consumer/fuels/altfuels/altfuels.htm
[24] http://origin-qps.onstreammedia.com/origin/multivu_archive/ENR/1241844-Decarbonizing-Pipeline-Gas.pdf