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America's
Natural Gas
Alliance

AGA
American Gas Association

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RE: Notice of Proposed 2017 and Later Model Year Light Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards, Docket ID Nos. EPA-HQ-OAR-2010-0799 and NHTSA-2010-0131

The American Gas Association ("AGA") and America's Natural Gas Alliance ("ANGA") submit these comments on the December 1, 2011 notice of proposed rulemaking for 2017 and Later Model Year Light Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards, 76 FR 74854 (the "Light-Duty Rule").

The American Gas Association, founded in 1918, represents more than 200 local energy companies that deliver clean natural gas throughout the United States. There are more than 71 million residential, commercial and industrial natural gas customers in the U.S., of which 92 percent — more than 65 million customers — receive their gas from AGA members. AGA is an advocate for natural gas utility companies and their customers and provides a broad range of programs and services for member natural gas pipelines, marketers, gatherers, international natural gas companies and industry associates. Today, natural gas meets almost one-fourth of the United States' energy needs.

ANGA is an educational and advocacy organization dedicated to increasing appreciation for the environmental, economic, and national security benefits of North American natural gas. ANGA's members include the leading North American independent natural gas exploration and production companies. The collective natural

gas production of the ANGA member companies is approximately nine trillion cubic feet per year, which represents around 40 percent of the total annual U.S. natural gas supply.

I. NATURAL GAS VEHICLES FULFILL EACH OF THE GOALS OF THIS PROGRAM

The Presidential Memorandum calling for this program stated that its goals were "to improve fuel efficiency and to reduce greenhouse gas emissions of passenger cars and light-duty trucks of model years 2017–2025", and thus take advantage of an "opportunity to lead the world in the development of a new generation of clean cars and trucks through innovative technologies and manufacturing that will spur economic growth and create high-quality domestic jobs, enhance our energy security, and improve our environment." Presidential Memorandum Regarding Fuel Efficiency Standards, May 21, 2010, as cited in 76 FR 74862.

Cognizant of this opportunity, EPA and NHTSA throughout the Light Duty Rule emphasize the importance of the economic impact of these regulations, noting, *e.g.*, that they will "achieve important reductions in GHG emissions and fuel consumption from the light duty vehicle part of the transportation sector, based on technologies that either are commercially available or that the agencies project will be commercially available in the rulemaking timeframe and that can be incorporated at a reasonable cost." 76 FR 74858. *See also id.* at 74859-60 (same); *id.* at 74962 ("This proposal provides important benefits to society and consumers in the form of reduced emissions of greenhouse gases (GHGs), reduced consumption of oil, and fuel savings for consumers, all at reasonable costs.") Indeed, the agencies estimate that the benefits of this program outweigh the costs by hundreds of billions of dollars. *Id.* at 74890.

By requesting comment on incentives for natural gas vehicles ("NGVs") (discussed more fully in Section II, below), the agencies seem to acknowledge that NGVs can meet the goals of reducing both GHG emissions and increasing use of alternatives, in addition to reduced emissions of criteria pollutants, while also serving to "spur economic growth" and "create high-quality domestic jobs" as the President called for. In fact, in his January 24, 2012 State of the Union address, the President repeatedly invoked both the environmental and economic advantages of domestic natural gas, *e.g.*, "The development of natural gas will create jobs and power trucks and factories that are cleaner and cheaper, proving that we don't have to choose between our environment and our economy."

What the agencies may not have recognized is that NGVs are, in fact, both the single most cost-effective means of achieving these goals in the transportation sector and, if encouraged, will create more jobs and economic growth than any other proposed solution.

A. Natural Gas Vehicles Will Strengthen the U.S. Economy by Utilizing More Domestically Produced Resources and Creating Domestic Jobs

Increasing use of domestically produced natural gas is essential to help reduce U.S. dependence on foreign sources of energy from geopolitically unstable regions of the world. Despite 35 years of rising imports and the agencies' admission that "the need to reduce energy consumption is more crucial today than it was when the Energy Policy and Conservation Act was enacted in the mid-1970s" (Interim Joint Technical Assessment Report, "JTAR", p. 1-1), the Light Duty Rule continues to emphasize a policy of incremental improvements in fuel economy. Ignoring a domestically-produced transportation fuel in favor of marginal gains in petroleum fuel economy is a shortsighted energy security policy. As the U.S. Energy Information Agency points out, in 2035 the U.S. is still expected to import 16.71 QBtus of oil, down only 17% from the 20.14 QBtus imported in 2010. EIA, AEO 2012 Early Release Summary, Table AI, attached as Exhibit 1. Reducing imports by less than 1% a year is too little, too late.

These are the facts, and that means that fuel switching is the only realistic pathway to energy security. Each NGV totally displaces a gasoline vehicle's lifetime need for petroleum, and as the agencies acknowledge, "each gallon of fuel saved as a consequence of the GHG and fuel efficiency standards is anticipated to reduce total U.S. imports of petroleum by 0.95 gallon." 76 FR at 75135. And the most abundant, efficient and secure replacement fuel is natural gas. The U.S. and Canada supply 99% of U.S. natural gas demand, and U.S. gas reserves are growing.

U.S. Natural Gas Supplies

The U.S. has enormous natural gas supplies; as the President correctly pointed out in his State of the Union Address, "We have a supply of natural gas that can last America nearly 100 years." Indeed, multiple experts agree, the U.S. has enough natural gas to meet growing demand for generations to come.[1]

In its 2009 Report addressing the supply of technically recoverable natural gas in the United States, the Potential Gas Committee reported that the currently available total supply of natural gas was 1,836 trillion cubic feet ("Tcf"), which represented an increase of 39% (516 Tcf) over the Committee's year end estimate for 2006. Potential Gas Committee, *Potential Supply of Natural Gas in the United States (December 31, 2008)* (June, 2009).

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[1] Sources:
ICF: As reported in MIT Energy Initiative, 2010, *The Future of Natural Gas*, interim report; Table 2.1
EIA: See http://www.eia.gov/analysis/studies/worldshalegas/
PGC: Potential Gas Committee's *Advance Summary* and press release of its biennial assessment; see www.potentialgas.org
CERA: IHS CERA, 2010, *Fueling North America's Energy Future: The Unconventional Natural Gas Revolution and the Carbon Agenda*
MIT: MIT Energy Initiative, 2010, *The Future of Natural Gas*, interim report
NPC: Realizing the Potential of North America's Abundant Natural Gas and Oil Resources Johns Hopkins University ; *Prudent Development Study* 2011

The Potential Gas Committee is not alone in its estimates. MIT's *Future of Natural Gas* (Interim Report) also reviewed U.S. gas resource estimates from several sources, including the Potential Gas Committee, and assumed a mean remaining resource base of approximately 2,100 Tcf. *Id.*, p. 9. This means that at current levels of consumption the U.S. has more than enough domestic natural gas to fuel the light-duty fleet.

The Economic Advantages of Natural Gas as a Transportation Fuel

Increasing our reliance on domestically produced sources of energy such as natural gas helps increase more than US energy security – it benefits our economy as well. According to the Department of Commerce, the U.S. trade deficit for 2011 was $558 billion, during which time the U.S. imported $432 billion of foreign petroleum. U.S International Trade Statistics, attached as Exhibit 2.

In contrast, producing and distributing natural gas as a transportation fuel means keeping this money at home and creating American jobs. In 2008, U.S. production of 20 Tcf of natural gas created more than 1.3 million jobs, and even a modest increase in demand for natural gas as a transportation fuel could create tens of thousands of additional jobs. "The Contributions of The Natural Gas Industry to the U.S. National and State Economies", IHS Global Insight, 2009, p.1, attached as Exhibit 3. The rapid growth in shale gas alone supported 600,000 jobs in 2010, a number expected to grow to nearly 870,000 in 2015. IHS Global Insight 2011, p. 1, attached as Exhibit 4. A significant push to increase NGVs in the U.S. also would create thousands of additional jobs related to manufacturing natural gas vehicles and building the relevant infrastructure.

Finally, we note that natural gas vehicles are just as available as natural gas itself. There are more than 12 million NGVs on the road worldwide, and a recent report forecast 28 million NGVs by 2015 (Global Industry Analysts, Inc.). Outside the U.S., NGVs are made by, among others, Ford, GM, Toyota, Honda, Nissan, Hyundai, Fiat, Volkswagen and Mercedes. Demand for U.S. NGVs would thus give domestic manufacturers a base upon which to build an export market. And another economic opportunity exists in converting existing petroleum vehicles to run on natural gas, yet another well-established technology that can further job creation here at home.

In sum, the only way to fulfill the statutory mandate of reducing U.S. dependence on foreign sources of energy is by beginning to move the U.S. light-duty vehicle fleet to natural gas as a complement to other advanced technology and alternative fuel vehicles, a policy which will also significantly assist the U.S. economy.

B. NGVs are the Most Cost-Effective Means of Reducing Light-Duty GHG Emissions

Each NGV not only utilizes a domestic alternative fuel source, but also has inherently lower GHG emissions. On a lifecycle basis (accounting for upstream emissions), NGVs have 30% lower GHG emissions than their gasoline-powered counterparts. California

Energy Commission, Full Fuel Cycle Assessment, p. 30, attached as Exhibit 5. Apropos of lifecycle emissions, AGA and ANGA agree with EPA's position that full lifecycle accounting is necessary for determining both actual emissions reductions and vehicle compliance. 76 FR 75011.

Moreover, natural gas is getting even cleaner, as renewable natural gas (biomethane from landfills and other sources) comes on line. Biomethane achieves nearly a 90 percent reduction in GHGs compared to gasoline, and U.S. biomethane production is increasing, with DOE's National Renewable Energy Laboratory estimating future production of up to 16 billion gasoline gallons equivalent. 74 FR 24982.

Not only will natural gas continue to reduce its GHG emissions, but the efficiency of natural gas vehicles will also continue to improve as the result of technological advances. In fact, NGVs will benefit equally from the very same technological advances the agencies say are available for gasoline vehicles to meet the proposed standards. The vast majority of these improvements, whether "vehicle technology", "transmission technology", "engine technology" or "vehicle electrification" can be used on NGVs to further lower their GHG emissions. Mass and drag reduction, low-friction lubricants, cylinder deactivation, variable valve timing, continuous variable transmissions, hybridization, etc., will have the exact same effect of reducing fuel consumption for NGVs as they do for petroleum ones.

Moreover, NGVs are not subject to the trade-off between greater fuel economy and lower safety considerations imposed by light-weighting or down-sizing vehicles. Of note, the JTAR presents mass reduction as the single largest component for increasing petroleum fuel economy and reducing GHG emissions (J-TAR Chapter 6, *passim.*) but at the same time admits that "the agencies believe that the effects of vehicle mass reduction on safety should be evaluated from a societal perspective (including an analysis of fatalities and casualties.)" JTAR 3-8. NGVs weigh somewhat more than comparable gasoline vehicles due to the weight of the CNG tanks, yet even with this weight penalty NGVs continue to reduce GHG emissions while utilizing an alternative fuel source. (Compare Honda CNG curb weight of 2,848 lbs with Honda Civic LX curb weight of 2721 lbs.)

C. The Agencies' Analysis of the Benefits of this Rule Should Include More Complete Energy Security Costs

Energy Security Costs

In response to the agencies' request for comment on whether to include costs of the relevant U.S. overseas military presence in the energy security benefits analysis (76 FR 75136), AGA and ANGA strongly support doing so. To include only "the macroeconomic disruption and adjustment costs portion of the energy security benefits to estimate the monetary value of the total energy security benefits of this program" (*id.* at 74932) ignores enormous costs that are directly attributable to U.S. dependence on

overseas oil supplies. A single example should suffice: the express purpose of the Navy's Fifth Fleet – reestablished in 1995 and based in Bahrain -- is to secure the Persian Gulf sea-lanes, and the annual cost of maintaining this force is in the billions of dollars.

II. INCENTIVES FOR NGVS

EPA has proposed not only extending the current incentives for electric vehicles ("EVs"), under which the agency deems them to have zero GHG emissions, but to add a second category of incentives for MY 2017-2021 under which each EV (and fuel cell vehicle) sold would be deemed to be equal to between 2.0 such vehicles (MY 2017-2019) 1.75 vehicles (MY 2020), and 1.5 vehicles (MY 2021). Plug-in hybrid electric vehicles ("PHEVs") would get similar, but smaller, multipliers: 1.6 for MY 2017-2019, 1.6 for MY 2020, and 1.3 for MY 2021. 76 FR 75013. EPA's rationale for these incentives is that "it is appropriate to encourage the initial commercialization of EV/PHEV/FCVs as well, in order to retain the potential for game-changing GHG emissions and oil savings in the long term." *Id.* at 75011.

EPA then asks for "comments on the merits of providing similar multiplier incentives to dedicated and/or dual fuel compressed natural gas vehicles". *Id.* at 75013.

While EPA proposes generous incentives for EVs and PHEVs because they represent "potential for game-changing GHG emissions and oil savings in the long term", both dedicated and dual-fuel NGVs represent actual "game changing GHG emissions and oil savings" right now that justify comparable incentives. Moreover, considering NGVs superior cost-benefit performance in reducing GHGs compared to EVs, EPA should consider an even larger multiplier incentive, perhaps equal to the incentive Congress mandated for NGVs based on their oil-displacement performance.

According to EPA, the 2012 Nissan Leaf EV has upstream GHG emissions of 161 grams per mile. *Id.* at 75011. If the Leaf were gasoline-powered, the proposed 2017 GHG standard for it would be 210 g/mi.[2] Assuming, as EPA does (*id.* at 75011), a 20% upstream GHG value for gasoline vehicles (42 g/mi), this "gasoline Leaf" would have total GHG emissions of 252 g/mi. Thus the actual GHG emissions difference between the EV Leaf and the gasoline Leaf is 252-161, or 91 g/mi. Using EPA's figures, simple math shows that the cost of this 91 g/mi advantage is a staggering $304 for each g/mi improvement over the comparable gasoline vehicle.

EPA expects that in 2016, the marginal cost of EV technology for a small size car (such as the Leaf) to be $27,628. Draft Joint Technical Support Document, Proposed

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[2] The GHG standard applicable to a vehicle is determined by its "footprint", which is "the vehicle's wheelbase multiplied by its track width". 76 FR 74870. Multiplying the Leaf's wheelbase of 106.3 inches by its track width of 60.6 inches (http://www.vehix.com/car-reviews/2011/nissan/leaf/vehicle-specification) equals 6441.78 sq in, or 44.73 sq ft, and thus a GHG footprint of 210g/mi. *Id.* at 74873.

Rulemaking to Establish Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, September 2009, p. 3-91. Conservatively assuming that the cost of EV technology in the 2012 Leaf is no more than EPA's estimate for 2016, $27,628 divided by 91 equals a cost of approximately $304 per g/mi of GHG reductions.

In contrast, a 2011 Honda Civic NGV vehicle has tailpipe CO2 emissions of 252 g/mi, and the comparable 2011 Honda Civic gasoline vehicle has tailpipe emissions of 306 g/mi. www.fueleconomy.gov. Even without including the NGV's smaller upstream GHG emissions, the NGV has 54 g/mi less GHG emissions than its gasoline counterpart, and costs $6,935 more. Thus the cost of achieving GHG reductions via an NGV is only $128 per g/mi. In other words, compared to electric vehicles, NGVs are close to three times more cost efficient in reducing GHG emissions.

Given this, AGA and ANGA believe that it would be reasonable for EPA to not only include incentives for NGVs, but to make them significantly larger than the ones proposed for EVs. Because the Light Duty Rule is a joint regulatory program designed to reduce both GHGs and oil dependency, the most logical basis for an incentive is the one Congress has already mandated for NGVs based on their displacement of oil imports.

In the Alternative Motor Fuels Act of 1988 ("AMFA"), Congress wrote a specific compliance metric favoring natural gas and other alternative fuels into the light-duty fuel economy statute. The Conference Report for AMFA could not have been clearer: "[t]he objective of both the House and Senate bills is to facilitate the development and use of alternative fuels in the United States for purposes of energy security" (House Report 100-929, 134 Cong Rec H 7732, September 16, 1988, p. 7736), and the first two legislative findings in the statute itself were "the achievement of long-term energy security for the United States is essential to the health of the national economy, the well-being of our citizens, and the maintenance of national security" and "the displacement of energy derived from imported oil with alternative fuels will help to achieve energy security and improve air quality." P.L. 100-494, Section 2.

Recognizing that every NGV increases utilization of a domestically produced alternative fuel, in AMFA Congress encouraged the production of natural gas vehicles by multiplying the fuel economy of an NGV relative to that of an equivalent gasoline-powered one. (AMFA Section 6(a), codified at 49 U.S.C. 32905(c), providing that in fuel-consumption calculations, "[a] gallon equivalent of gaseous fuel is deemed to have a fuel content of .15 gallon of fuel"; by multiplying natural gas volume by .15, the effect of this is to discount NGV fuel consumption by 85%.)

Based on the fact that NGVs are more cost-efficient than EVs in delivering GHG reductions, and that Congress mandated an incentive multiplier for NGVs of approximately 7 for their fuel-economy benefits, AGA and ANGA believe that an incentive multiplier that provides parity with electric and plug-in hybrid vehicles is justified for NGVs.

Using the equivalent multiplier for GHGs allows for full recognition of NGV fuel-economy benefits. However, any GHG multiplier that is less than the fuel economy one essentially negates the Congressional mandate in AMFA to the extent of that difference, a result at odds with the very purpose of this joint rulemaking. We strongly encourage EPA to take into account the fuel economy goals of this joint program in crafting their GHG standards, and the fact that NGVs are more cost-effective than EVs in reducing GHGs should allow for EPA to establish a GHG multiplier incentive equivalent to the Congressionally-mandated fuel economy incentive.

"Game-Changing Pickup Technologies"

EPA has also also proposed to "incentivize the penetration into the marketplace of 'game changing' technologies for full size pickups . . . [and] for that reason, EPA is proposing credits for manufacturers that hybridize a significant quantity of their full size pickup trucks, or use other technologies that significantly reduce CO2 emissions and fuel consumption." 76 FR 75016. If the agencies do not provide a multiplier incentive for NGVs as requested above, we ask that EPA clarify that natural gas-powered pickups would be able to qualify as a technology eligible for the proposed credits.

Assuming that NGVs are eligible for those credits, we note that for non-hybrid pickups to receive the proposed credits, they must achieve a "15 percent or 20 percent, respectively, better CO2-reduction than their footprint based target in a given model year." *Id.* at 75017. However, hybrid pickups do not have to meet any CO2-reduction performance target in order to receive comparable credits, and we believe it would be appropriate and consistent to either apply identical performance targets to hybrids or, alternatively, eliminate the targets for "other technologies" that achieve equal or better GHG reductions. We also believe that the proposed thresholds (as a percentage of their full-size pickup production) that a manufacturer must meet before being able to receive these credits are way too high: starting at 15% in 2017, and ramping up to 40% in 2021 for the 15% CO2-reduction credit and 10% for all model years for the 20% CO2-reduction credit. *Id.* at 75017. If the goal of the incentive is to encourage deployment of these technologies, the initial levels should be far more modest.

III. NGV TECHNICAL ISSUES

CO2-Equivalent Option

AGA and ANGA support EPA's decision, first announced in the preamble to the Heavy Duty Rule (76 FR 57123) to include the CO2-Equivalent Option as part of the light-duty regulations through MY 2016, to allow for the Option to be used on a test-group basis instead of having to apply a manufacturer's entire fleet. EPA should now extend the Option through MY 2025, and continue the policy of allowing CO2-equivalent compliance on a test-group basis, which would enable manufacturers who offer NGVs to avoid requiring all of their vehicles to be subject to the CO2-Equivalent Option.

However, if the agency adopts its proposal to require that the Option be applied to a manufacturer's entire fleet, we support EPA's additional proposal to include an offsetting

"equivalence option adjustment factor", so that "manufacturers do not have to offset the typical N2O and CH4 vehicle emissions, while holding manufacturers responsible for higher than average N2O and CH4 emissions levels."

Methane Global Warming Potential

Citing the IPCC Fourth Assessment Report, EPA's uses a Global Warming Potential ("GWP") factor of 25 for the Proposed LD Rule's methane emissions standards: "CH4 has a 100-year GWP of 25 according to the 2007 IPCC AR4." 76 FR 74993, n.236.

However, while EPA uses the 25 GWP for mobile sources, the rest of EPA's Office of Air and Radiation uses a GWP of 21 for stationary source methane emission standards. See, *e.g.*, the Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 FR 31519, 31522, June 3, 2010 ("CH4 has a GWP of 21"); PSD Permit Number PSD-TX-1244-GHG, issued November 10, 2011 by EPA Region VI for the Lower Colorado River Authority Thomas Ferguson Power Plant, p. 7 (mass-based methane emissions limits of 16.8 and 16.2 tons per year are each multiplied by 21 to establish CO2-equivalent emissions limits of 353.3 and 327.2 tpy; attached as Exhibit 6.)

In other words, the proposed LD Rule arbitrarily deems vehicle methane emissions as having 19% greater heat-trapping characteristics than the chemically identical molecules emitted from stationary sources. Unless EPA can explain the scientific basis for this, light duty vehicle methane emissions should be regulated with the same GWP as all other U.S. methane sources.

Dual-Fuel NGVs[3]

As described in detail below, AGA and ANGA support EPA's proposal to "directly extend" to dual fuel CNG vehicles the PHEV utility factor methodology described in SAE J2841 "Utility Factor Definitions for Plug-In Hybrid Electric Vehicles Using Travel Survey Data," September 2010. AGA and ANGA also support extending application of this utility factor methodology back to MY 2012-2016.

We agree with EPA's conclusion that "owners of dual fuel CNG vehicles will preferentially seek to refuel and operate on CNG fuel as much as possible" because, in part, "CNG fuel is considerably cheaper than gasoline on a per mile basis". 76 FR 75018. In fact, on a per-mile basis, CNG retails for approximately one-third to one-half the cost of gasoline. However, we note that another basis for EPA's conclusion ("because the owner paid a much higher price for the dual fuel capability", *id.*) is somewhat of a conjecture, as no manufacturer has yet to produce a duel fuel NGV.

[3] EPA defines "dual fuel" vehicles as ones that "operate on either compressed natural gas or gasoline, but not both at the same time, and have separate tanks for the two fuels." 76 FR 75018. Conversely, "EPA considers 'bi-fuel' CNG vehicles to be those vehicles that can operate on a mixture of CNG and gasoline." *Id.* at n. 306.

AGA and ANGA also agree with EPA's observation, which further supports use of the SAE utility factor, that "many dual fuel CNG vehicles will likely have smaller gasoline tanks given the expectation that gasoline will be used only as an 'emergency' fuel". However, we believe that this is precisely what the market will produce, and thus do not believe that there is need for any of the agency's suggested "additional constraints on the designs of dual fuel CNG vehicles to maximize the likelihood that consumers will routinely seek to use CNG fuel", such as "placing a minimum value on CNG tank size or CNG range, a maximum value on gasoline tank size or gasoline range, a minimum ratio of CNG-to-gasoline range, and requiring an onboard control system so that a dual fuel CNG vehicle is only able to access the gasoline fuel tank if the CNG tank is empty." *Id.* at 75019.

EPA notes that the same SAE utility factor it proposes to apply to dual fuel NGVs is the one first developed for PHEVs, and that there are two potential differences which "might weaken the case for using utility factors for dual fuel CNG vehicles." AGA and ANGA addressed the first (relating to a dual fuel NGV running on gasoline when both fuels are available on board), above. The second, that "it may be much more inconvenient for some private dual fuel CNG vehicle owners to fuel every day relative to PHEVs, and there are many fewer CNG refueling stations than electrical charging facilities" is not the relevant consideration. Unlike PHEVs, CNG vehicles are exactly like gasoline vehicles insofar as they do not need to refuel every day. Based on NHTSA's combined city-highway fuel economy figure (31 mpg) and vehicle tank size, the driving range for the 2012 Honda CNG is 248 miles, which means that, like gasoline vehicles, it would only have to be refueled once every few days.

Sincerely,

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