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RE: Notice of 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards

Docket ID No. EPA–HQ–OAR–2010–0799
Docket ID No. NHTSA–2010–0131

The American Clean Skies Foundation (ACSF) is a non-profit organization founded in 2007 to advance U.S. energy independence and a cleaner environment through the expanded use of natural gas, renewable energy, and energy efficiency. ACSF appreciates the opportunity to submit these comments on the proposed "2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards" (hereafter, the Proposed Rule).[1] The Proposed Rule was issued by the Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHTSA), to which these comments are jointly directed.

ACSF strongly supports the energy security and environmental goals underlying the Proposed Rule. However, the Foundation believes that these goals can best be met by adopting technology neutral incentives that enable natural gas vehicles (NGVs), as well as electric vehicles (EVs), to play a larger role. Both technologies can deliver similar well-to-wheel greenhouse gas (GHG) emission reductions. See Appendix 1. Accordingly, these comments propose several simple rule changes that EPA and NHTSA can make to establish a level regulatory playing field for advancing cleaner and more fuel-efficient vehicles, rather than arbitrarily providing incentives for selected vehicle powertrains, as the Proposed Rule now does. Consumers and the environment will benefit from competition across vehicle technologies.

Given the Administration's recognition of the major energy security and emission benefits that NGVs can provide (See Appendix 2), we believe it is essential that any new vehicle standards adopted by

[1] The Proposed Rule was published at 76 Fed. Reg. 74,854 (Dec. 1, 2011).

EPA and NHTSA are consistent with that vision and, at a minimum, do not discriminate against NGVs or dual-fuel (natural gas/gasoline) vehicles.

I. Executive summary

The Proposed Rule has two overarching goals: to reduce GHG emissions and improve our nation's security.[2] Encouraging the manufacture and use of more NGVs is one of the very best ways to achieve these goals because each new NGV will emit roughly 30% less GHG pollution than a gasoline vehicle and displace its lifetime consumption of imported petroleum.

The new rule will apply to vehicles manufactured in model years 2017 through 2025. This is a critical period for deploying alternative fuel vehicles, as it represents a key window of opportunity to make progress on environmental and security goals. Any new regulations that impact vehicle fuel choices and related infrastructure investments will also have far-reaching impacts on the country's transportation mix well before 2017 and after 2025. That is why it is so important that the proposed rule not handicap one category of oil-saving or lower carbon vehicle technologies versus another.

Unfortunately, however, in providing incentives for alternative fuel vehicles, the draft rule unduly favors EVs to the detriment of NGVs. ***This shortcoming can and must be addressed to create effective competition among alternative fuel vehicles and provide technology-neutral incentives***.

To that purpose, ACSF recommends the following rule changes:

1. ***A technology-neutral pool of alternative fuel vehicle incentives should be created***. All qualified alternative fuel vehicles, including EVs and NGVs, should qualify for these incentives which would use a multiplier to give extra credit for the emission reduction benefits of such vehicles in calculating each manufacturer's fleet averages. The incentive would be phased out when the annual sales of all qualified alternate fuel vehicles exceeds 10% of total vehicle sales, or roughly 1.5 million vehicles in 2017.

2. ***Because production volumes can be rapidly scaled-up, EPA should augment the near-term incentives for natural gas dual-fuel vehicles***. As with hybrid electric vehicles, the increased production of NGVs that can run on both gasoline and CNG as "dual-fuel vehicles" will significantly advance the objectives of the Proposed Rule.

3. ***Manufacturers producing NGVs and alternative fuel vehicles that use fuels having superior energy security benefits should be explicitly rewarded***. Promoting the goal of energy security requires explicit targeted incentives. This might be done by using a common metric (e.g., imported oil reduced) to rank vehicles and/or fleets and provide a proportionate compliance benefit.

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[2] *See e.g.*, 76 Fed. Reg. 74,862. *See also* White House Press Release at http://www.whitehouse.gov/the-press-office/2011/07/29/president-obama-announces-historic-545-mpg-fuel-efficiency-standard.

The rationale for these recommendations is discussed below. To provide context, we first provide an NGV "technology overview" and review certain risks regarding EV deployment. We also briefly summarize the Proposed Rule's regulatory structure as it applies to alternative fuel vehicles.

II. Technology overview

A. The benefits and worldwide market acceptance of NGVs.

Only last month, President Obama used his 2012 State of the Union speech to call attention to America's "nearly 100 year" supply of natural gas and the major role gas can play in enhancing our energy security and reducing GHG emissions.[3] Later he challenged a Nevada audience to:

> "*Think about an America where more cars and trucks are running on domestic natural gas than on foreign oil. Think about an America where our companies are leading the world in developing natural gas technology and creating a generation of new energy jobs . . . . [L]et's get more of these natural gas vehicles on the road.*"[4]

We agree. That is why it is so important that the Proposed Rule promote the President's policy and be technology neutral so that the rules encourage manufacturers to produce more NGVs and dual-fueled vehicles (as well as EVs) capable of delivering similar environmental and security benefits.

NGVs provide a means to achieve the Proposed Rule's emission reduction and energy security goals with proven, cost-effective technology[5] that has been widely deployed around the globe. More than 12 million NGVs were in use worldwide as of 2010,[6] far greater than EV deployment.[7] In fact, a

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[3] State of the Union Address 2012, http://www.whitehouse.gov/the-press-office/2012/01/24/remarks-president-state-union-address.

[4] Remarks of President Obama, delivered in Las Vegas, Nevada (Jan. 26, 2012).

[5] Based on the EPA's own data, from the consumer's standpoint, it is likely to be far cheaper—as measured in vehicle dollars spent to reduce a given amount of greenhouse gas per mile—for a driver to acquire a new NGV rather than an EV, given the substantially lower purchase cost of a CNG vehicle and the comparable full fuel cycle GHG reductions in emissions versus a gasoline powered vehicle. Small-sized EV sedans are expected to cost over $27,000 more in 2016; the additional cost for a CNG vehicle is likely to be under $2,500. *See* Draft Joint Technical Support Document, *Proposed Rulemaking: Model Year 2012-2016 Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards*, p. 3-91, available at www.epa.gov/otaq/climate/regulations/420d09901.pdf.

[6] International Natural Gas Vehicle Association, http://www.iangv.org/tools-resources/statistics.html. Companies that currently offer NGVs worldwide include Fiat, Chrysler, GM, Ford, Honda, and Mercedes.

[7] A report from Pike Research notes that the 2011 sales of plug-in EVs and battery EVs totaled "just under 114,000" worldwide. *See* http://www.pikeresearch.com/newsroom/cumulative-plug-in-electric-vehicle-sales-to-reach-5-2-million-worldwide-by-2017. By way of comparison, worldwide sales of NGVs in 2009 (the most recent worldwide data) were over 1.3 million vehicles. *See* http://www.iangv.org/tools-resources/statistics.html. *See also*, 76 Fed.

recent study by Harvard University noted that "highway-capable BEVs [Battery-Electric Vehicles] are not yet in widespread use anywhere in the world."[8]

In the United States, NGVs are widely recognized as providing "game changing" opportunities today for vehicle fleets, reducing both costs and emissions and the use of foreign petroleum. There are now over 70,000 CNG vans, light duty trucks and cars in service, including more than 3,000 NGVs in AT&T's fleet alone.[9] Moreover, states and local governments around the country are committed to expanded NGV roll outs. For instance, the governors of Colorado, Oklahoma, Pennsylvania, and Wyoming recently signed a memorandum of understanding to convert state fleets to CNG.[10]

Of particular relevance to this docket, which targets incentives for the 2017-2025 time period, is the prospective build-out of a national NGV infrastructure and the availability of low cost home refueling appliances for NGVs. Last year, for example, several companies announced new financing commitments totaling $450 million to establish a coast-to-coast highway refueling network that, by 2014, could be capable of supporting tens of thousands of LNG-fueled trucks and CNG-fueled vehicles.[11] By 2017, new "brand name" home refueling appliances are expected to come to market, providing an affordable garage-based CNG option for over 65 million homes already connected to natural gas pipelines.[12]

Beyond that, NGVs do not require the risky "technological leaps" remaining for EVs and various alternative fuel technologies. In fact, most existing vehicles can be modified to utilize natural gas, as use of this fuel involves similar internal combustion components. In addition, the technological

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Reg. 75,011 (noting that sales of the Nissan Leaf have been only approximately 8,000, and sales of the Tesla Roadster have been only approximately 1,500).

[8] Henry Lee & Grant Lovellette, "Will Electric Cars Transform the U.S. Vehicle Market? An Analysis of the Key Determinants," Discussion Paper 2011-08, Belfer Center for Science and International Affairs, July 2011, *available at* http://belfercenter.ksg.harvard.edu/files/Lee Lovellette Electric Vehicles DP 2011 web.pdf.

[9] *See* Energy Information Administration, Alternatives to Traditional Transportation Fuels 2008 (2010), http://www.eia.gov/cneaF/alternative/page/atftables/afv_atF2008.pdF; Department of Energy, Alternative Fuels and Advanced Fuels Data Center, press release, http://www.afdc.energy.gov/afdc/progs/fleet_exp_cat.php/LDV.

[10] *See e.g.*, http://www.cleanvehiclesolutions.com/blog/2011/12/29/governors-sign-memorandum-understanding-convert-state-fleets-natural-gas/.

[11] *See e.g.*, http://www.cleanenergyfuels.com/2011/7-11-11.html.

[12] These next-generation appliances will build upon existing home refueling stations manufactured by companies such as BRC Fuel Maker (see http://www.brcfuelmaker.it/eng/casa/chi_siamo.asp) and Gas Fill Limited (see http://www.gasfill.com).

advancements (and associated fuel efficiency gains) that EPA and NHTSA predict for petroleum and diesel fueled engines are likely also to benefit NGVs.[13]

NGVs offer significant energy security benefits. As the President has noted, natural gas is an abundant domestic energy resource.[14] The United States currently produces almost all of the natural gas that it uses and may actually be a net exporter of natural gas by 2021.[15] Over 65 million homes are already connected to the local natural gas distribution network and expanding the delivery infrastructure may be more economical than developing similar infrastructure for electricity. For instance, a joint study by the Bonneville Power Administration and the Northwest Gas Association found that "natural gas pipelines average between 50 and 60 percent of the cost of electric power transmission per unit of energy (or capacity) delivered."[16] Additionally, adding new interstate natural gas pipeline capacity averages just three years from announcement date to commercial start of operations.[17]

Finally, NGVs offer substantial GHG emission reduction benefits over conventional vehicles (those that use gasoline and diesel). Again, see Appendix 1. The natural gas-powered Honda Civic has regularly been recognized as among the "greenest cars" on the road.[18] While NGVs emit small amounts of methane, these emissions are more than offset by substantially reduced CO_2 emissions versus other vehicles.[19] And in the future, larger amounts of bio-methane (a renewable fuel with a very low GHG footprint) may become available, further enhancing the emission benefits of NGVs.[20]

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[13] *See* IEA-ETSAP Technology Brief, April 2010, *available at* http://www.iea-etsap.org/web/E-TechDS/PDF/T03_LPG-CH4_eng-GS-gct-AD.pdf

[14] *See* the President's 2012 State of the Union Address to Congress, *supra*.

[15] EIA Annual Energy Outlook 2012, *available at* http://www.eia.gov/forecasts/aeo/er/pdf/0383er(2012).pdf.

[16] Bonneville Power Administration & Northwest Gas Association, *Comparing Pipes and Wires*, March 2004. http://www.chpcenternw.org/NwChpDocs/Transmission_and_N_Gas_Comparing_Pipes_and_Wires_032304.pdf. Furthermore, EVs are expected to "have a significant impact on electrical grid strain." *See e.g.*, Nicholas DeForest, et al., "Impact of Widespread Electric Vehicle Adoption on the Electrical Utility Business – Threats and Opportunities," Technical Brief, University of California, Berkeley Center for Entrepreneurship & Technology.

[17] Implications of Greater Reliance on Natural Gas for Electricity Generation, American Public Power Ass'n, https://appanet.cms-plus.com/files/PDFs/ImplicationsOfGreaterRelianceOnNGforElectricityGeneration.pdf.

[18] *See* the annual ratings issued by the American Council for an Energy Efficient Economy (ACEEE) at http://www.greenercars.org/highlights_greenest.htm and http://www.honda.com/newsandviews/article.aspx?id=5904-en, noting that the CNG-powered Honda Civic GX was rated the "greenest car in America" for eight years in a row (from 2003 to 2011).

[19] The California Air Resources Board (CARB) has extensively analyzed this issue and found that CNG produces approximately 68 grams of CO_2 equivalent emissions per mega joule (MJ) burned. By comparison, gasoline and diesel produce approximately 94-95 grams of CO_2e/MJ. These comparisons are based on well-documented, well-

B. The Administration should not pick technology "winners" and "losers".

In a market economy, it is an axiom of regulatory design that the government should avoid trying to favor competing technologies (or companies) by picking winners. Such decisions are best left to the private sector.[21] This is especially true when the technology that may be favored faces large uncertainties in research or development for key components, materials supply risks in scaling-up production, billion dollar infrastructure hurdles and unproven consumer take up.

Qualified alternative fuel vehicles should all be given similar incentives so that they can compete on a level playing field in delivering the public benefits the Proposed Rule seeks. EVs may well have a very bright future. However, it is also possible that EVs may never be a widely-deployed technology. Unlike NGVs, EVs require technology advances in batteries and other components and have yet to be produced and deployed at scale.[22] By comparison, NGVs utilize existing engine technology but merely burn a different fuel. Similarly, auto mechanics accustomed to working on typical internal combustion engines face a learning curve when asked to repair electric engines, which use a substantially different motor technology.

In short, the Administration should not create inefficient regulatory structures that pick technology winners and losers. That would be unlawfully arbitrary and capricious.[23] Rather the Proposed Rule should be revised to establish a level playing field for alternative fuel vehicles. That is by far the most cost-effective and non-discriminatory way to achieve the rule's desired environmental and national security goals.

III. Regulatory structure of the Proposed Rule

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to-wheel analyses. Thus, natural gas can reduce GHG emissions by 20-29% compared with diesel and gasoline-fueled vehicles. *See* CARB Look Up Table, http://www.arb.ca.gov/fuels/lcfs/121409lcfs_lutables.pdf

[20] As detailed in Appendix 1, an NGV using even a 15% bio-methane blend would significantly reduce total GHG emissions. DOE's National Renewable Energy Lab has estimated future production of bio-methane will reach up to 16 billion gasoline gallons equivalent (GGEs). 74 Fed. Reg. 24,982. Bio-methane achieves approximately an 85 percent reduction in GHGs as compared to gasoline.

[21] The federal government's track record in selecting clean energy winners has been questionable, at best. Over the last year, in addition to the well-publicized bankruptcy of the solar manufacturer Solyndra (which received a DOE loan guarantee of more than $500 million), a manufacturer of lithium-ion batteries for EVs, EnerDel, also filed for bankruptcy after receiving a $118 million grant from DOE. In 1971, significant federal funding was authorized for the Clinch River Breeder Reactor Project, which was considered to be "revolutionary" at the time. Twelve years and $8 billion later, Congress pulled funding for the project, which was never finished. S*ee e.g.,* http://www.nader.org/template.php?/archives/926-That-Clinches-It-The-Breeder-Reactor-is-Dead.html.

[22] *See* Lee & Lovellette, Discussion Paper, note 9, *supra* (noting that "Batteries may become cheaper and lighter, and charging equipment can become more versatile; but these improvements are still developing").

[23] *See* North Carolina v. EPA, 531 F.3d 896 (D.C. Cir. 2008) (holding that EPA's NOx emissions trading program unduly favored coal-fired generation over natural-gas generation).

The Proposed Rule consists of parallel standards issued by EPA and the NHTSA, which seek to accomplish similar goals through different regulatory mechanisms. In particular, EPA would impose a limit on vehicle *GHG emissions* pursuant to the Clean Air Act. More specifically, EPA's proposed standards require, on an average industry fleet-wide basis, an emissions standard of 163 grams/mile of CO_2e, which equates to 54.5 mpg, by 2025. Pursuant to CAA § 202, EPA has broad discretion to set emissions levels that are "technology-based" and can be "technology forcing." Thus, EPA can use its standards to incentivize the deployment of advanced technologies such as EVs and NGVs. EPA proposes to include specific limits on three GHGs (CO_2, CH_4, N_2O), which can be met individually or through a combined CO_2-equivalent standard.

The NHTSA would increase the stringency of *traditional mile-per-gallon (mpg) Corporate Average Fuel Economy Standards (CAFE)*. NHTSA proposes to tighten these CAFE standards pursuant to the Energy Independence and Security Act of 2007 (EISA), which amended the Energy Policy and Conservation Act of 1975 (EPCA). NHTSA considers four statutory factors in setting CAFE standards: technological feasibility, economic practicability, the effect of other Government standards on fuel economy, and the nation's need to conserve energy. NHTSA's proposal would require, on an average fleet wide basis, 49.6 mpg by 2025.[24]

Because EPA and NHTSA both "address the closely intertwined challenges of energy security and climate change," they closely coordinated their GHG and CAFE standards development.[25] Accordingly, both these EPA GHG and NHTSA CAFE standards are issued pursuant to this joint Proposed Rule, similar to the joint proposed standards that these agencies previously issued for light-duty vehicles for model years 2012-2016.[26]

A. NHTSA alternative vehicle incentives.

Regarding EVs, NHTSA currently uses a statutorily-mandated petroleum equivalence factor (PEF) to convert the use of electricity into an equivalent "miles per gallon."[27] The PEF for electricity includes an *adjustment* – that is, a discount – so that the mileage for EVs is calculated based on only *15% of the actual energy consumed*. That adjustment provides a large benefit to EVs in calculating the average mileage for a manufacturer's fleet.[28] Because Congress established this PEF incentive, NHTSA believes

[24] NHTSA is expressly prohibited from considering the availability of statutorily-established credits (such as for alternative-fueled vehicles) in determining its standards. Thus, NHTSA may not raise CAFE standards because manufacturers have enough of those credits to meet higher standards. By comparison, EPA's CAA authority does not have such a restriction, which allows EPA to set higher standards. 76 Fed. Reg. 75,341.

[25] 76 Fed. Reg. 74,903.

[26] *See* 75 Fed. Reg. 25,324 (May 7, 2010).

[27] 49 U.S.C. § 32904(a)(2)(B).

[28] 76 Fed. Reg. 74,879.

that it may not create additional incentives for EVs.[29] EPA does not feel so bound, however, and proposes to create additional incentives for EVs in the Proposed Rule (as further described below).

Under the current CAFE standards set by NHTSA, NGVs also receive similar benefits because the miles per CNG gallon equivalent are discounted by applying a 0.15 "divisor." This incentive was created under the EISA, and the incentive is not scheduled for expiration. Under this incentive scheme, a 15 mpg dedicated alternative fuel vehicle is multiplied by 100/15 so that it would be rated as 100 mpg. The "divisor" consequently has an impact equivalent to the PEF mentioned above for EVs.[30]

B. EPA alternative vehicle incentives.

We come now to the nub of the discrimination and market inefficiencies that these comments are designed to rectify: Unlike the NHTSA rules, the EPA's new GHG standards contain additional EV-only incentives. These supplemental incentives arbitrarily and capriciously favor EVs over NGVs.[31] For instance, EPA would continue the practice of considering EVs to be *zero*-emitting (up to certain production caps), even though EPA recognizes that generating electricity upstream creates substantial GHG emissions (particularly due to the emissions from coal-fired power plants).[32]

EPA's proposal also includes a new incentive *multiplier* for EVs. Through this multiplier, EPA would allow a vehicle manufacturer to reduce its average fleet emissions by initially counting the lower emissions of each EV produced as two vehicles (i.e., using a 2 times multiplier).[33] In addition, in the Model Year 2012-2016 rule, EPA utilized the same 0.15 "divisor" available in the CAFE rules (discussed above) in calculating GHG emissions compliance for NGVs. But, under the Proposed Rule, this incentive would expire. As a result, EPA's new rules would abolish the benefits NGVs gain under the NHTSA standards from the 0.15 "divisor" incentive.

C. Dual-fuel vehicle incentives.

The Proposed Rule also contains additional provisions that specifically address dual-fuel vehicles, including hybrid-electric vehicles and those that run on both CNG and gasoline. The Proposed

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[29] 76 Fed. Reg. 74,878, n.56.

[30] 76 Fed. Reg. 74,879.

[31] The Proposed Rule separately identifies electric vehicles (EVs) and plug-in hybrid electric vehicles (PHEVs). However, the regulatory benefits for both of these electric vehicle types are generally the same under the Proposed Rule. Therefore, "EVs" in these comments should be understood to include both electric vehicles as well is plug-in hybrid electric vehicles, unless the context requires otherwise. Fuel cell vehicles also often share in comparable benefits, though because of the limited market deployment of these vehicles, they are not separately discussed herein.

[32] 76 Fed. Reg. 75,011.

[33] See 76 Fed. Reg. 75,013.

Rule would change the assumption in both CAFE and GHG emissions regulations that alternative fuels are used 50% of the time in dual-fueled vehicles. Instead, the agencies would sensibly replace this 50/50 assumed fuel split with a "utility factor"—i.e., an approach that takes into account the actual percentage of alternative fuel use by the average driver. Thus, the Proposed Rule recognizes that "CNG fuel is considerably cheaper than gasoline on a per mile basis," and that CNG is likely to be used in a dual-fueled vehicle significantly more than 50% of the time.[34]

Dual-fuel vehicles also face discrimination related to the proposed use of the 0.15 "divisor." Congress eliminated the 0.15 divisor incentive for non-electric, dual-fuel vehicles after 2019. The Proposed CAFE standards would continue the incentives for those dual-fueled vehicles after 2019.[35] Again, however, EPA and NHTSA send a mixed message regarding CNG vehicles. Under EPA's proposal, dual-fuel CNG vehicles would see the 0.15 "divisor" eliminated from the alternative-fuel portion of a vehicle's emissions. By not utilizing the same incentive under its emissions standards, EPA limits the usefulness of NHTSA's incentives.

Finally, the Proposed Rule includes a significant focus on energy security concerns. We discuss these concerns—and how they might be better translated with a more effective set of vehicle incentives—at greater length below.

IV. Suggested Revisions to the Proposed Rule to Promote Technology-Neutral Benefits

A. A technology-neutral pool of alternative fuel incentives should be created. Vehicles in this pool, including NGVs, should qualify for the same incentives that are now only available to EVs, in particular the incentive "multiplier."

Rather than provide incentives to specific vehicle types, EPA should strive to be technology neutral in its efforts to reduce GHG emissions. In particular, the Proposed Rule offers two main incentives that currently favor EVs: the ability of manufacturers to count EV emissions at 0 grams/mile in calculating fleet averages; and an "incentive multiplier" which begins by double-counting EVs in the overall fleet. This current incentive structure should be revised so that it is technology-neutral, and reflects life-cycle impacts, allowing NGVs—which provide comparable emission reductions and energy security benefits to EVs—to qualify for the same incentive available to EVs.

1. The incentive "multiplier" should apply to NGVs and EVs.

The Proposed Rule provides a new incentive "multiplier," but as drafted would only allow this incentive for EVs. More specifically, this "multiplier" allows manufacturers to multiply, by a determined

[34] 76 Fed. Reg. 75,018.

[35] 76 Fed. Reg. 75,341–43.

factor, the number of EVs when calculating its fleet emissions profile. EVs would start with a multiplier value of 2.0 in Model Year 2017, phasing down to a value of 1.5 in 2021.[36]

By providing this incentive to EVs, while failing to provide a similar incentive to NGVs, the EPA has inappropriately picked EVs as "the future" clean-car technology, thereby decreasing competition and incurring unnecessary program risks. This is unlawfully arbitrary and capricious. The GHG emission benefits on a life-cycle (well-to-wheel) basis are similar for EVs and NGVs. See Appendix 1. The EPA's current approach also harms consumers and cuts against the goals of the Proposed Rule because, as noted earlier, an NGV buyer likely can reduce her GHG vehicle emissions at a lower cost per unit than an EV buyer.

The GHG emissions of NGVs are approximately 20-30% lower than for vehicles using gasoline. Furthermore, current technology can capture and utilize natural gas from renewable sources (e.g., landfills, farm animals). Natural gas from these sources (i.e., biomethane) has a carbon intensity approximately 85% less than gasoline.[37]

All "qualified" alternative fuel vehicles with a similar potential to reduce GHG emissions (on a well-to-wheel basis) should be eligible for a multiplier that encourages the production of these vehicles until annual vehicle sales reach 10% of total sales for all fleets combined.[38] On this basis, the incentive would apply to approximately 1.5 million vehicles in 2017. The incentive could then be phased down by 2% annually so that it applies to a smaller number of qualified vehicles each year but affords a sufficient lead time for manufacturers to plan and begin deployment of these qualified vehicles.

Significantly, two other major federal programs for reducing the nation's GHG emissions treat the potential benefits of using NGVs and EVs in a similar way. The first provides for federal procurement for all qualified alternative fuel vehicles.[39] The second, under Executive Order 13514, requires each federal agency to measure and report reduction targets for direct (Scope 1) and indirect (Scope 2) greenhouse gas emissions.[40] Because the tailpipe emissions of the agency's vehicles are counted in

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[36] 76 Fed. Reg. 75,012.

[37] Again examining CARB's look up table provides an approximate value of 94-95 gCO_2e/MJ for gasoline and diesel, while renewable natural gas has an approximate value of 11-13 gCO_2e/MJ. *See* CARB Look Up Table, note 14, *supra*.

[38] "Qualified alternative fuel vehicles" should include only those vehicles that use an alternative fuel a minimum of 50% of the time (i.e., those vehicles that have a "utility factor" equal to or greater than 50%). ACSF believes this qualification criteria is necessary to encourage the development of technologies that are truly "alternative" with the potential to be "game changing." Thus, if forecast use of an alternative fuel is less than 50% (such as is the case with ethanol flex-fuel vehicles), then the vehicle class would not qualify for this incentive.

[39] *See* EPA, "Guidance for Implementing Section 141 of the Energy Independence and Security Act of 2007: Federal Vehicle Fleets and Low Greenhouse Gas-Emitting Vehicles" at 5 (Feb. 22, 2010).

[40] Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance" Section 2(a) (Oct. 5, 2009), available at http://www.whitehouse.gov/assets/documents/2009fedleader_eo_rel.pdf.

Scope 1 and emissions from electricity used by the agency (including recharging EVs) are counted in Scope 2, both NGVs and EVs have emissions reflected in the relevant accounts. In addition, both types of alternative fuel vehicles contribute, on a technology-neutral basis, to achieving the two-percent annual reduction in petroleum consumption required in Section 2(a)(iii) of this Executive Order, and both types of vehicles are covered by Section 12's guidance to develop strategies on alternative fuel vehicles.[41]

2. The 0 grams/mile incentive should be deleted.

In the Proposed Rule, EPA plans to allow a "0 grams per mile" incentive to EVs.[42] This incentive is subject to certain per-manufacturer and industry-wide production caps.[43] The decision to calculate the upstream emissions of EVs at 0 grams per mile (g/mi) is combined with the above multiplier incentive to create undue and discriminatory benefits for EVs. [44] For the reasons stated above, ACSF believes that the 0 g/mi incentive is inappropriate and it should be eliminated. The 0 g/mi is anti-competitive and unnecessarily favors one class of lower carbon vehicle platforms at the expense of others.

Indeed, EPA acknowledges that the upstream GHG emissions of EVs are a significant negative factor and may be worse than gasoline vehicles. EPA states that EVs in the 2017-2025 period "will *decrease* the overall GHG emissions reductions associated with the program as the upstream emissions

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[41] *See* Federal Energy Management Program, "Executive Order 13514: Federal Leadership in Environmental, Energy, and Economic Performance; Guidance for Federal Agencies on E.O. 13514 Section 12, Federal Fleet Management," at 2 (Apr. 2010), available at http://www.gsa.gov/graphics/fas/ExecutiveOrder13514.pdf.

[42] A manufacturer is allowed to use a value of 0 g/mi CO_2 to "represent the proportion of electric operation of a vehicle that is derived from electricity that is generated from sources that are not onboard the vehicle." 76 Fed. Reg. 75,372. EPA allows manufacturers to ignore the impact that electric power plant emissions have regarding the electricity that energizes EVs.

[43] For instance, EPA proposes to "place an industry-wide cumulative production cap of 2 million [EVs] eligible for the 0 grams per mile incentive in MYs 2022–2025." 76 Fed. Reg. 75013. Regarding per-manufacturer caps, for MY 2012-2016, manufacturers may only make use of this benefit up to a production cap of 200,000 vehicles (or 300,000 vehicles for larger manufacturers). Thereafter, the manufacturer would have its compliance values calculated according to a methodology that accounts in full for the net increase in upstream GHG emissions. 75 Fed. Reg. 25,436. The Proposed Rule would allow manufacturers to make use of this 0 g/mi benefit from 2017 through 2021 *without any production cap* under one scenario. For 2022 through 2025, a production cap would be reinstated at 200,000 vehicles, although for certain larger manufacturers the cap could reach 600,000 vehicles, before the manufacturer would have to fully account for the upstream GHG emissions. 76 Fed. Reg. 75,372.

[44] In the unlikely event that EVs are produced beyond the production cap, EPA has a methodology for calculating the upstream emissions associated with electricity used to power EVs. 76 Fed. Reg. 75,012.

associated with the generation and distribution of electricity are higher than the upstream emissions associated with production and distribution of gasoline."[45]

On the other hand, the superior emissions benefits of NGVs over gasoline vehicles are thoroughly documented. "The conclusion of recent studies such as those conducted by CARB and others is that, when used as transportation fuel, natural gas can reduce greenhouse gas emissions by 20 – 29 percent compared with diesel and gasoline fueled vehicles, respectively."[46] When compared to EVs, NGVs provide comparable emissions benefits (and NGVs can even provide superior emission reduction benefits to EVs depending on the extent to which coal-fired power is used to generate electricity for EVs). In addition, while EPA is counting on technological advancements to improve EVs, technology for NGVs will also advance if given the same opportunities.

The most effective and lawful incentive structure to promote vehicle emission reductions is a "multiplier" incentive for *all* alternative fuel vehicles. Such a program would more strongly encourage manufacturers to develop cleaner vehicles through competition between EV and NGV technologies, and would allow the market to decide the extent of each technology's success.

3. The 0.15 divisor should continue for NGVs.

As noted above in the regulatory overview, in EPA's MY 2012-2016 GHG rule for light-duty vehicles, EPA utilized the same 0.15 "divisor" available in the CAFE rules in calculating GHG emissions compliance for NGVs. However, EPA has currently scheduled this incentive to expire in model year 2016, and the Proposed Rule does not renew this incentive. By not recognizing the 0.15 "divisor" incentive under its GHG regulations, EPA appears to be undercutting a statutorily-mandated incentive (for the CAFE rules) through its proposed GHG rules. By proposing GHG rules that work against the CAFE regulatory scheme, EPA is acting in a counterproductive way and hindering the development of cleaner technologies.

For the joint NHTSA and EPA rulemaking process to be effective, the agencies must work together so that the incentives provided by one agency are not limited by the regulations proposed by the other.[47] Accordingly the 0.15 divisor for NGVs that exists under the CAFE rules should also be continued under EPA's GHG rules for light-duty vehicles.

B. **Because of their potential for rapid scale-up, EPA should incentivize the deployment of CNG dual-fuel vehicles to the maximum extent possible.**

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[45] 76 Fed. Reg. 75,010. In fact, EPA caps the EV incentive pool because it wants to "limit the maximum decrease in GHG emissions reductions to about 5 percent of total program GHG savings." 76. Fed. Reg. 75,013.

[46] NGVAmerica, "NGVs and the Environment," available at http://www.ngvc.org/about_ngv/ngv_environ.html. Blending renewable sources of natural gas with traditional natural gas can further lower NGV GHG emissions.

[47] Notably, the "PEF" for EVs, which provides an equivalent benefit to the 0.15 divisor for EVs under the CAFE rules, continues to be in effect and is not impacted by the Proposed Rule.

Many CNG vehicles worldwide are equipped to run as dual-fuel vehicles. These vehicles can facilitate consumer acceptance of alternative fuel vehicles through the use of a small gasoline tank, thus reducing the "range anxiety" that some consumers may have when choosing a vehicle that, as yet, has a limited fueling infrastructure.[48] Dual-fuel CNG vehicles have the potential to be a "game-changer" through rapid deployment. They also have a superior combination of reliability and the ability to use a domestic, clean-burning fuel, while reducing concerns about "range anxiety." Because CNG is "considerably cheaper than gasoline on a per mile basis," for dual-fueled vehicles the Proposed Rule includes a "utility factor" approach that would "result in a compliance assumption of about 95% operation on CNG and about 5 percent operation on gasoline" for CNG/gasoline dual-fueled vehicles.[49]

The deployment of dual-fuel CNG vehicles should be encouraged by the agencies through the maximum use of incentives. Specifically, EPA should use a standard "utility factor" that assumes these vehicles will run on CNG 95% of the time, as this reflects EPA's "real-world" projection of these vehicles. This 95% figure should be a default value and not require a case-by-case review that might otherwise be required to determine the utility factor.

Furthermore, the incentive multiplier outlined above should apply to dual-fuel CNG vehicles as well. A multiplier is already allowed for PHEVs, which are operationally similar to CNG dual-fuel vehicles (in the sense that two sources of energy may operate the vehicle, in the case of PHEVs this being either electricity or gasoline). If PHEV's qualify for a multiplier, then so too should CNG dual-fuel vehicles. Finally, the 0.15 divisor should be available under EPA's GHGs rules for the portion of the vehicle's operation on natural gas.

C. **The Proposed Rule should provide incentives for manufacturers producing NGVs and other vehicles that use fuels having superior energy security benefits**.

"Energy security" is a central focus of the Proposed Rule. However, The Proposed Rule does not provide explicit incentives for manufacturing vehicles *on the basis of energy security benefits*. Nothing in either the EPA or NHTSA calculations explicitly considers energy security. By providing incentives for vehicles that enhance our energy independence, the agencies could ensure that manufacturers consider this factor. These incentives would also spur development and advance technology in the area of alternative fuel vehicles.

Because the comparative energy security benefits of different fuels can be readily ascertained an objective basis can be established for providing incentives. For example, a "baseline" against which to assess energy security benefits could be tied to the current ratio of imported-to-domestic oil (which is used to make gasoline and diesel, the dominant fuels in light-duty vehicles). Thus, if the current ratio of imported-to-domestic gasoline/diesel used in fleets covered by the proposed rules is approximately 50-50,[50] then covered vehicles that use a fuel with a higher percentage that is sourced domestically would

[48] But, *see note* 12, *supra* regarding current home-fueling appliances.

[49] 76 Fed. Reg. 75,018.

[50] 76 Fed. Reg. 75,134.

be assigned a factor between 1 and 2.[51] A vehicle's multiplier could then be increased by this factor for the purpose of doing a fleet-wide compliance calculation.

Alternatively, each manufacturer could have a fleet wide "energy security" rating against which to measure the benefits/incentives it should receive. A manufacturer's ability to take advantage of its "energy security" incentives could be dependent on its fleetwide GHG emission average: should a manufacturer's fleet meet the requirements for an "energy security" benefit but not meet the applicable GHG standards, that manufacturer would be unable to utilize that benefit.[52]

Various forms of "revenue recycling" also could reward manufacturers who produce vehicles that enhance energy security. For instance, the revenue from fines collected under various motor vehicle regulations could be dedicated to enhance the use of fuels with energy security benefits. Since the implementation of CAFE standards, a total of nearly $795 million has been collected. In Model Year 2009, the last year data is available, the collected fines totaled approximately $9 million.[53] In 2007, the total of collected fines was more than $37 million.[54]

As noted above, NGVs offer significant energy security benefits. Utilizing natural gas as a fuel source is economical and wholly secure, as natural gas is an abundant domestic energy resource.[55] Although the electricity used to repower EVs is domestic, the batteries on which EVs rely may be

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[51] With 1 being the baseline and 2 being equivalent to fuel that is 100% domestically sourced.

[52] Another possible means of rewarding energy security is to make energy security benefits one of the "gating" criteria for the existing vehicle multiplier, discussed above in section IV.A. For instance, to qualify for this multiplier EPA would need to determine that a certain minimum percentage of a vehicle's fuel is domestically sourced (say 75%), and that the vehicle drive-train technology does not require foreign-sourced materials that constitute more than a certain percentage of the drive-train's costs.

[53] *See* Summary of CAFE Fines Collected, available at www.nhtsa.gov/staticfiles/rulemaking/pdf/cafe/CAFE_fines_collected_summary.pdf.

[54] As an example of statutory authority for revenue recycling, under 49 U.S.C. § 32912(e)(2), the Secretary of Transportation must use 50% of the fines collected "to carry out a program to make grants to manufacturers for retooling, reequipping, or expanding existing manufacturing facilities in the United States to produce advanced technology vehicles and components." Using the above "energy security" factor, the agency could provide funds to manufacturers based upon the highest fleet wide "energy security" factor to encourage development of vehicles that provide for a more secure energy future.

[55] *See* EIA, 2012 Energy Outlook Early Release, Table A13, which finds that the 2012 supply of natural gas is in excess of 25 trillion cubic feet. *Available at* http://www.eia.gov/oiaf/aeo/tablebrowser/#release=EARLY2012&subject=0-EARLY2012&table=13-EARLY2012&region=0-0&cases=full2011-d020911a,early2012-d121011b. *See also* Mass. Inst. of Tech., *The Future of Natural Gas* (noting that in the U.S., natural gas resources continue to grow, and the development of low-cost and abundant unconventional natural gas resources, particularly shale gas, has a material impact on future availability and price.), available at, www.cleanskies.org.

dependent on lithium and other scarce metals which must be imported from a limited range of nations.[56]

While EPA and NHTSA may take a variety of approaches in recognizing energy security benefits, what does seem clear is that these energy security benefits should be explicitly rewarded in order to further the stated energy security goals of the Proposed Rule.

V. Conclusion

Natural gas is an abundant domestic fuel that produces lower GHG emissions than gasoline and diesel on a lifecycle basis, and its use in vehicles involves widely-used, reliable engine technology. Encouraging the increased use of natural gas in vehicles will help to achieve EPA's goal of reducing GHG emissions from the nation's vehicle fleet. NGVs and dual-fuel CNG vehicles can also substantially improve our nation's energy security. Worldwide, millions of vehicles run on natural gas and the technology for NGVs is already available. Yet, despite the considerable benefits of NGVs, the Proposed Rule offers multiple incentives to EVs while overlooking the often superior benefits of NGVs.

The Proposed Rule must be revised so that its incentive structure for alternative fuel vehicles is technologically neutral and not anti-competitive. Failure of EPA and NHTSA to do so would be arbitrary and capricious. A technologically-neutral incentive scheme will unlock the full potential of our nation to utilize alternative fuels to meet both GHG reduction and energy security goals.

Sincerely,

Gregory C. Staple
Chief Executive Officer, ACSF

[56] *See* http://www.minerals.usgs.gov/minerals/pubs/commodity/lithium/mcs-2011-lithi.pdf.

Well-To-Wheel GHG Emissions For
Comparable Vehicles Powered By Various Fuel Types

The well-to-wheel greenhouse gas (GHG) emissions for several types of vehicles powered by different fuels are shown in the following table.

Fuel	Honda Civic	Ford Focus	Toyota Prius	Chevrolet Volt
Existing Vehicles				
Natural Gas	266 g/mile (31 mpg-e)			
Gasoline	375 g/mile (31 mpg)	375 g/mile (31 mpg)		
Gasoline/ Electric (hybrid)	264 g/mile (44 mpg)		237 g/mile (49 mpg)	314 g/mile (37 mpg, hybrid mode)
Electric		208 g/mile (100 mpg-e)	219 g/mile (95 mpg-e, electric mode)	223 g/mile (93 mpg-e, electric mode)
Hypothetical Vehicle Performance (based on above specs)				
Natural Gas w/ 15% Bio	234 g/mile (31 mpg-e)			
Natural Gas/Electric (hybrid)	187 g/mile (44 mpg-e)		168 g/mile (49 mpg-e)	223 g/mile (37 mpg-e, hybrid mode)

Sources: GHG intensities for each fuel are taken from the California Air Resources Board (ARB), 2009 (December), California Low Carbon Fuel Standard Carbon Intensity Lookup Table for Gasoline, at www.arb.ca.gov/fuels/lcfs/121409lcfs_lutables.pdf,[1] and supporting documentation. The carbon intensity of electricity generation is adjusted upward from the California fuel mix (447 gCO2e/kWh) to the national average (617 gCO2/kWh, from Federal Register, Vol. 76, No. 231, 1 December 2011, Proposed Rules, pp. 75014-75015, at http://www.gpo.gov/fdsys/pkg/FR-2011-12-01/pdf/2011-30358.pdf). Existing-vehicle mpg values are combined city and highway ratings from the company websites; some Civic and Focus gasoline models have higher mpg ratings; Prius electric mileage is based on initial estimates for the Prius plug-in hybrid (PHEV) running in electric-only mode; Volt PHEV gasoline mileage is based on hybrid mode, and electric mileage is based on electric-only mode. For natural gas and electricity, fuel economy assumptions are the EPA's "equivalent" mpg ratings, mpg-e (US EPA, 2010, EPA Fuel Economy Label, http://www.epa.gov/fueleconomy/label/420r10909.pdf). Hypothetical vehicle performance assumes the same mpg as the corresponding existing (natural gas or hybrid) vehicle, and GHG intensities from ARB.

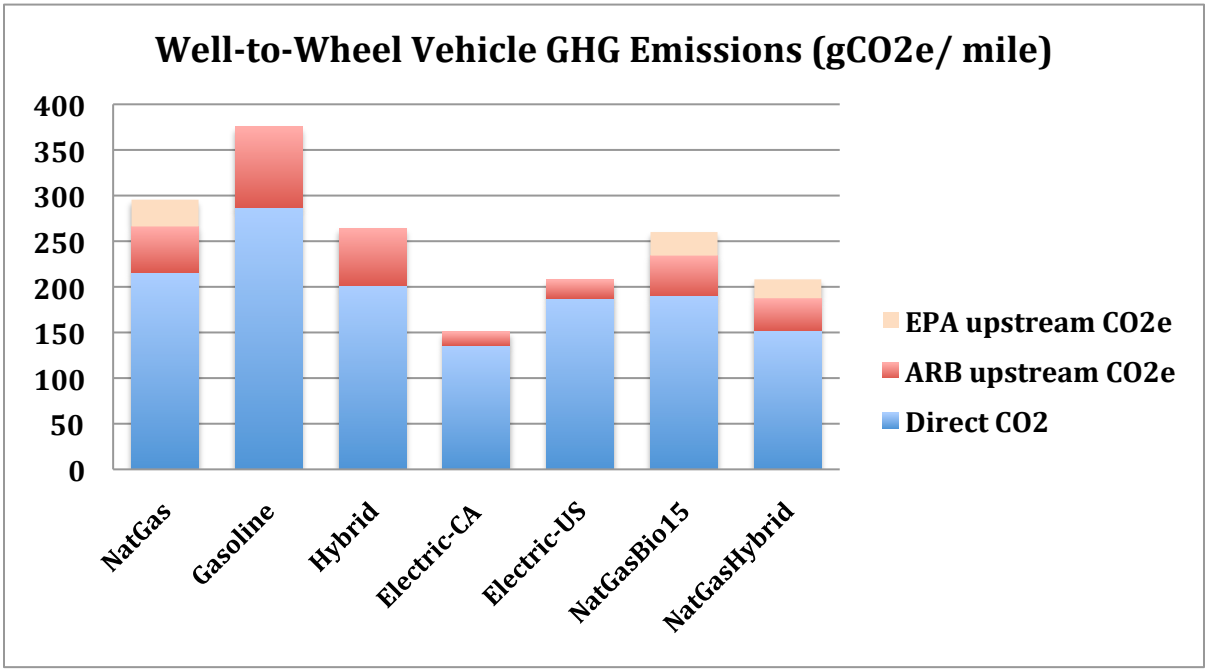
[1] The specific emission estimates are developed in a series of fuel-chain "pathways" for each fuel type, including gasoline (http://www.arb.ca.gov/fuels/lcfs/022709lcfs_carbob.pdf), compressed natural gas (http://www.arb.ca.gov/fuels/lcfs/022709lcfs_cng.pdf), compressed biogas (http://www.arb.ca.gov/fuels/lcfs/072009lcfs_biogas_cng.pdf), and electricity (http://www.arb.ca.gov/fuels/lcfs/022709lcfs_elec.pdf).

Each column in the table presents data from a specific vehicle now in production for different fuel sources and with corresponding changes to the vehicle powertrain. For each vehicle type, the differences in emissions result from variations in the GHG intensity of the fuel and in the inherent efficiency of a powertrain using that fuel. The GHG intensity of electricity, which varies depending on the generation source, is assumed to be equal to the national average reported by the EPA.

The table also shows hypothetical GHG emissions for certain vehicles, assuming natural gas is used either as a 85/15 blend with bio-methane in a conventional engine or unmixed in a hybrid powertrain. These calculations assume the same fuel economy as the corresponding existing (natural gas or hybrid) vehicle, and GHG intensities of the corresponding fuel.

Generally, natural gas fuel economy is similar to gasoline, resulting in about 25% lower emissions per mile; electric economy is about three times that of gasoline, resulting in 40% lower emissions. Hybrid fuel economy is more variable, due to the range of different hybrid drivetrain configurations in use, but fuel economy ranges between 1.3-1.6 times that of conventional gasoline, or about 0.4-0.55 that of electric vehicles, with emissions varying proportionately.

The figure below compares the well-to-wheel GHG emissions for the different fuel types based on a single vehicle model, namely the Honda Civic or Ford Focus, each of which are rated at about 31 mpg on gasoline with corresponding mpg-e values for the other fuel types as shown in the table above. Emissions include direct combustion CO2, as well as upstream and non-CO2 emissions, and are based on accounting methods and assumptions from the California Air Resources Board (ARB). Electric vehicle emissions are calculated using both the California and the U.S. average generation carbon intensity values.



Sources: GHG intensities of the fuels are taken from California Air Resources Board (ARB), 2009 (December), California Low Carbon Fuel Standard Carbon Intensity Lookup Table for Gasoline, at www.arb.ca.gov/fuels/lcfs/121409lcfs_lutables.pdf,[2] and supporting documentation. The carbon intensity of US average electricity generation (including losses) is adjusted upward from the California fuel mix (447 gCO2e/kWh) to the national average (617 gCO2/kWh, from Federal Register, Vol. 76, No. 231, 1 December 2011, Proposed Rules, pp. 75014-75015, at http://www.gpo.gov/fdsys/pkg/FR-2011-12-01/pdf/2011-30358.pdf). Hypothetical vehicle performance (for natural gas mixed with biogas and natural gas hybrid vehicles) assumes the same mpg as the corresponding existing (natural gas or hybrid) vehicle, and GHG intensities from ARB. Each emission pathway includes direct CO2 emissions from combustion as well as combustion emissions of N2O and methane (CH4) and upstream emissions of CO2 and methane, with the non-CO2 emissions converted to CO2 equivalent (CO2e) values using the 100-year global warming potential values from the Intergovernmental Panel on Climate Change (IPCC) fourth assessment report (2007). Natural gas vehicle emissions from the ARB tables assume 0.7% upstream methane leakage, while the "EPA upstream CO2e" estimates in the table assume higher methane emissions to raise the total leakage to the 2.2% rate indicated in the most recent EPA national emission inventory. We also apply a global warming potential ratio of 25, in place of the value of 21 used by the EPA.

Again, based on the well-to-wheel GHG emission estimates from the ARB, natural gas vehicle (NGV) emissions per mile are about 25% lower than those of comparable gasoline vehicles. When fueled with a 85/15 mix of natural gas and

[2] The specific emission estimates are developed in a series of fuel-chain "pathways" for each fuel type, including gasoline (http://www.arb.ca.gov/fuels/lcfs/022709lcfs_carbob.pdf), compressed natural gas (http://www.arb.ca.gov/fuels/lcfs/022709lcfs_cng.pdf), compressed biogas (http://www.arb.ca.gov/fuels/lcfs/072009lcfs_biogas_cng.pdf), and electricity (http://www.arb.ca.gov/fuels/lcfs/022709lcfs_elec.pdf).

biogas, NGV emissions are about 35% lower than for gasoline. Emissions of electric vehicles or plug-in hybrids (PHEVs) in electric-only mode are about 40% less than for gasoline if charged from the national-average generation mix, or about 60% less if charged from the California generation fleet. Emissions of hybrid vehicles similar to the Honda Civic are about 25% less than for conventional gasoline vehicles, and hybrid emissions would be about 45% less than conventional gasoline vehicles if fueled by natural gas.

The figure above includes an additional estimate of GHG emissions for natural gas powered vehicles based on recent EPA reports adjusting the upstream emissions of methane leaked in connection with the production of natural gas. These adjustments raise the natural gas fuel chain leakage rate from 0.7% (implied by the ARB data) to 2.2%, as indicated in the most recent EPA national GHG inventory.[3] We note, however that the revised US EPA inventory report appears to substantially overstate upstream emissions. The methane leakage rates implied by other government sources are 1.8% according to the National Energy Technology Laboratory[4] and 1.9% according to the Energy Information Administration.[5] Therefore, we consider the recent EPA methane leakage estimates a "worst-case" assumption for natural gas, and even these values show a 20% reduction compared to gasoline in a comparable vehicle.

We are aware that a few estimates of upstream methane leakage from natural gas production, particularly from shale gas fields, exceed the EPA's recent estimates.[6] However, while these high-end estimates (of up to 8% leakage) continue to attract media attention, they are not accepted by the majority of experts.[7] For example, IHS CERA, from which some of the high-end leakage data

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[3] *Ibid*. Our calculations of upstream methane emissions also apply a global warming potential ratio of 25, in place of the value of 21 used by the EPA, further increasing the upstream GHG footprint of natural gas.

[4] Skone, T., 2011. Life Cycle Greenhouse Gas Analysis of Natural Gas Extraction & Delivery in the United States, http://www.netl.doe.gov/energy-analyses/refshelf/PubDetails.aspx?Action=View&PubId=386

[5] U.S. Energy Information Administration (EIA). Emissions of Greenhouse Gas in the United States 2008 (2009), DOE/EIA-0573, at http://www.eia.doe.gov/oiaf/1605/ggrpt/pdf/0573(2008).pdf

[6] Howarth R, et al, 2011 Methane and the greenhouse gas footprint of natural gas from shale formations, Climatic Change, DOI 10.1007/s10584-011-0061-5. http://www.springerlink.com/content/e384226wr4160653/

[7] See, for example, Cathles, et al, 2012, A Commentary on "The Greenhouse-gas footprint of natural gas in shale formations', by R.W. Howarth, et al, DOI 10.1007/s10584-011-0333-0, http://www.geo.cornell.edu/eas/PeoplePlaces/Faculty/cathles/Natural%20Gas/2012%20Cathles%20et%20al%20Co

were sourced, observed that "IHS data for the Haynesville Shale was misused and severely distorted." [8]

Moreover, a recent analysis by URS Corp. of hundreds of shale gas wells from eight different producers found that EPA's recent inventory approach overestimates methane leakage by an average of a factor of about 12.[9] Thus, it appears that the most realistic estimates of upstream methane emissions from natural gas production are closer to the older EPA inventory estimates of 1% or below.

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mmentary%20on%20Howarth.pdf, and IHS CERA, 2011 (August), Mismeasuring Methane: Estimating Greenhouse Gas Emissions from Upstream Natural Gas Development, private report, available on CERA website, which directly rebut the Howarth article, and other studies that show contradictory results based on more consistent data and rigorous analysis, for example Mohan Jiang, W. Michael Griffin, Chris Hendrickson, Paulina Jaramillo, Jeanne VanBriesen and Aranya Venkatesh, Life cycle greenhouse gas emissions of Marcellus shale gas, (Carnegie Mellon Univ.), Environmental Research Letters, vol. 6, no. 3, July-Sept 2011, http://iopscience.iop.org/1748-9326/6/3/034014/fulltext, and Nathan Hultman, Dylan Rebois, Michael Scholten and Christopher Ramig, The greenhouse impact of unconventional gas for electricity generation, (Univ. of Maryland), Environmental Research Letters, vol. 6, no. 4, Oct 2011, http://iopscience.iop.org/1748-9326/6/4/044008.

[8] *Op. Cit*,. IHS CERA, previous note

[9] ANGA, 2012, Attachment 3: Gas Well Completion Emissions Data, to Comments of America's Natural Gas Alliance (ANGA) - Proposed Rule- Oil and Natural Gas Sector Consolidated Rulemaking, New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews. EPA Docket ID No. EPA-HQ-OAR-2010-0505. Comments prepared by Matthew Harrison, URS Corp., Austin TX.

Administration Statements Regarding Natural Gas Vehicles

President Obama:

"We have a supply of natural gas that can last America nearly a hundred years. Developing it could power our cars, our homes, and our factories in a cleaner and cheaper way. And experts believe it could support more than 600,000 jobs by the end of the decade. . . . Let's get more of these natural gas vehicles on the road. The federal fleet of cars is leading by example. We've got to help local governments upgrade their fleets, too. If more of these brown trucks are going green, more city buses should too."

- Remarks by President Obama delivered in Las Vegas, Nevada (Jan. 26, 2012), http://www.fox5vegas.com/story/16608373/full-text-president-barack-obama-speech-vegas-ups.

"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."

- Remarks by President Obama in his State of the Union address (Jan. 24, 2012) http://www.whitehouse.gov/the-press-office/2012/01/24/remarks-president-state-union-address.

"We are the Saudi Arabia of natural gas. We've just got to develop it, and if we do effectively, then we're going to create jobs and it's going to power trucks that are cleaner and cheaper and factories that are cleaner and cheaper. "

- Remarks by President Obama delivered in Aurora, Colorado (Jan. 26, 2012) http://www.whitehouse.gov/the-press-office/2012/01/26/remarks-president-american-energy-aurora-colorado.

"If we're serious about meeting our energy challenge we're going to have to do more than drill. And that's why the real solution is clean, homegrown energy. . . . It means that we've got to have natural gas vehicles. We've got a lot of natural gas that can be produced here in the United States of America."

- Remarks by President Obama delivered in Indianapolis, Indiana (May 6, 2011) http://www.whitehouse.gov/photos-and-video/video/2011/05/06/controlling-gas-prices-and-creating-new-jobs - transcript.

EPA Administrator Lisa Jackson:

President Obama "talked about the importance of natural gas, developing it safely and responsibly. There's jobs there but there's also real opportunity to cut our carbon footprint."

- Interview, Ashley Ahearn, KUOW, Seattle (Jan. 27, 2012) http://earthfix.kuow.org/communities/article/earthfix-conversation-5-minutes-with-epa-administr/.

"[W]hen you look at pricing and part of the economics, that ís going to move markets because natural gas is much more cost competitive. And that is a happy thing because its going to move us to lower emissions, if we can tap and make good use of that resource, or when you look at cleaner cars which are going to save, I think, the estimate is 12 billion barrels of oil with the life of a clean cars national program."

Remarks at Politico Energy Breakfast Briefing, Washington D.C. (Oct. 14, 2011)
http://www.politico.com/events/pro-energy-breakfast-briefing/

Secretary of Transportation Ray LaHood:

Announcing a grant for CNG buses in Los Angeles, Secretary LaHood said that "Investing in America's transit systems will generate tens of thousands of construction-related jobs and put more money in the pockets of working Americans."

- *United States continues to fund natural gas buses with federal stimulus programs*, NGV Journal (Oct. 21, 2011) http://www.ngvjournal.com/en/markets/item/7152-united-states-continues-to-fund-natural-gas-buses-with-federal-stimulus-programs.

Announcing a grant for CNG buses in Ohio, Secretary Lahood said that "These grants and others like them will put thousands of Americans back to work building sustainable, energy-efficient transit vehicles and facilities across the country."

- Scott Gerfen, *COTA will use grant to renovate McKinley Avenue fueling station*, ThisWeek Community Newspapers (Nov. 23, 2011) http://www.thisweeknews.com/content/stories/worthington

/news/2011/11/21/cota-will-use-grant-to-renovate-mckinley-avenue-fueling-station.html.

Secretary of Energy Steven Chu:

"As the President has said, natural gas will continue to play an important role in our nation's energy portfolio, helping create jobs, stimulate the economy, and reduce our dependence on imported oil."

- DOE, *Energy Secretary Steven Chu Statement on Final Report from Natural Gas Subcommittee* (Aug. 18, 2011), http://energy.gov/articles/energy-secretary-steven-chu-statement-final-report-natural-gas-subcommittee.

At the opening of a CNG station in Camden, NJ: "By expanding the use of alternative fuels such as natural gas, this project will increase our nation's energy security while reducing carbon pollution and lowering fuel costs for American businesses."

- DOE, Vehicle Technologies Program, *Secretary Steven Chu Highlights Grand Opening of Natural Gas Fueling Station in Camden* (June 8, 2011) http://www1.eere.energy.gov/vehiclesandfuels/news/news_detail.html?news_id=17438.

Deputy Secretary of Energy Daniel Poneman:

"Safe, responsible development of America's natural gas resources is a major priority for the country . . . today, I was able to see firsthand the full range of natural gas development – from drilling to producing to transporting – and the great potential it holds in helping America tap its own plentiful sources of energy and create an economy that's built to last."

- DOE, *Arkansas Natural Gas Company Hosts Tour With U.S. Deputy Secretary of Energy Poneman* (Feb. 3, 2012) http://energy.gov/articles/arkansas-natural-gas-company-hosts-tour-us-deputy-secretary-energy-poneman.