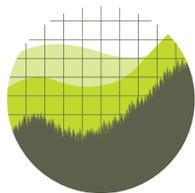




Regulatory Report

2011 Heavy-Duty Trucks Rule



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Executive Summary

The Environmental Protection Agency and the National Highway Transportation and Safety Administration have taken a crucial step in addressing our greenhouse gas emissions and oil dependency by regulating the fuel efficiency of heavy-duty trucks for the first time. That said, there is room for improvement:

- The agencies should increase the proposed scope and stringency of their regulations where it would maximize net benefits.
- The agencies should especially consider regulating the trailer components of combination tractors.
- The agencies should incorporate flexibility mechanisms into their proposed rules where they would lower costs without compromising regulatory objectives. For example, the agencies should broaden the use of credits, but should be careful to avoid awarding undeserved windfalls, such as by treating electric vehicles as producing zero emissions.

Though these improvements could enhance the net benefits of the regulations, the proposed program in its current form is still cost-benefit justified, as social benefits alone should likely be sufficient to outweigh technology costs. But the rules will also generate enormous private benefits, in the form of fuel savings, which suggests consumers might currently be under-investing in fuel-efficient technologies. Informational issues and the positional goods theory help explain that seemingly irrational under-investment, and those explanations suggest additional government actions, in the form of labels and demonstration projects, might be beneficial as complements to these regulations.

Introduction

In May 2010, President Obama ordered the Environmental Protection Agency (EPA) and the National Highway Transportation and Safety Administration (NHTSA) to act on their statutory authority to regulate heavy-duty trucks by July of the following year. To that end, in November 2010, the agencies issued a joint rulemaking, proposing for the first time to regulate the fuel efficiency and greenhouse gas emissions of large pickups and vans, vocational vehicles, combination tractors, and heavy-duty engines.¹

However, the agencies have not necessarily chosen the suite of policy options that will best maximize net benefits. This report explains how, following the instructions of executive orders, the agencies should analyze a wider range of alternatives, including the regulation of trailers, more stringent variations, and options for covering all air conditioning leaks.

Nevertheless, the currently proposed set of rules is cost-benefit justified. This report also details how social benefits alone likely outweigh technology costs, and offers theories for the seemingly paradoxical generation of significant private benefits in the form of fuel savings. Informational issues and the positional goods theory help explain that seemingly irrational under-investment, and those explanations suggest additional government actions, in the form of labels and demonstration projects, might be beneficial as complements to these regulations.

Finally, the report reviews some options for increasing the rules' flexibility, to save on compliance costs without sacrificing regulatory goals.

Analysis

Agencies Should Select a Policy That Maximizes Net Benefits

Where it would maximize net benefits, the agencies should increase the proposed scope and stringency of the regulations. In particular, the agencies should regulate trailers, reconsider the small business exemptions, explore more stringent alternatives, study options for reducing air conditioning leakage within the overbroad category of vocational vehicles, and respond to petitions for the regulation of currently uncovered sources.

Agencies Should Adopt a Cost-Benefit Framework for Analysis

Executive Orders 12,866 and 13,563 instruct agencies to “select, in choosing among alternative regulatory approaches, those approaches that maximize net benefits,”² to the extent permitted by law. Under the Energy Independence and Security Act of 2007, NHTSA must set “appropriate, cost-effective” fuel economy standards that achieve the “maximum feasible improvement” for commercial heavy-duty vehicles.³ Under the Clean Air Act, EPA must set standards for motor vehicle emissions that endanger public health and welfare, giving appropriate consideration to the costs of compliance.⁴ That kind of broad statutory language generally permits agencies to weigh regulatory costs and benefits.⁵ Given their broad statutory authority to regulate heavy-duty truck emissions, the agencies should follow the precepts of Executive Orders 12,866 and 13,563 by assessing the costs and benefits of all reasonable policy alternatives and selecting the approach that maximizes net benefits.⁶

Overview of Proposed Regulatory Coverage and Omissions

The agencies’ proposed regulations cover heavy-duty engines, pickup trucks and vans (weight classes 2b and 3), vocational vehicles (classes 2b through 8), and combination tractors (classes 7 and 8). This scope encompasses vehicles designed for myriad purposes and purchased by many different consumers, including: vehicles driven for personal transportation, such as some pickup trucks and vans, mobile homes, and recreational vehicles; vehicles owned and driven by individuals who work as independent contractors in the trucking industry; vehicles purchased by government entities, such as buses and fire trucks; and vehicles owned by businesses for carrying cargo or performing specialized work tasks. The agencies typically discuss regulatory impacts according to vehicle class, but it will sometimes also be helpful to think about effects for different consumer groups, which may cut across weight classes.

The proposed regulations exclude a number of vehicle types and components, including commercial trailers,⁷ vehicles and engines manufactured by small businesses,⁸ vocational vehicle

bodies⁹ and air conditioning systems,¹⁰ certain vehicles used primarily for off-road purposes (though their engines would still be covered),¹¹ and motorcycles.¹²

In issuing their proposed regulations, the agencies also discuss nine alternatives, only three of which are broader in scope or more stringent than their preferred choice.¹³ As discussed in the following sections, the agencies should explore a wider range of regulatory alternatives that might better maximize net benefits.

Agencies Should Regulate Trailers

Trailers play an important role in fuel consumption. Their size and shape affect the aerodynamic drag, rolling resistance, and overall weight of combination tractor-trailers, all of which impact fuel efficiency and greenhouse gas emissions. Regulation of trailer design therefore could offer substantial opportunities for increased fuel economy and greenhouse gas reductions. Indeed, the agencies recognize that current SmartWay technologies allow for reductions in fuel consumption and greenhouse gas emissions similar in magnitude to those available from truck design, and larger than those that can be accomplished through engine design. Refrigerated trailers offer a further opportunity to reduce greenhouse gas leaks from the air conditioning systems. “Not only do trailers represent a significant opportunity for reductions,” the agencies note, but there is “strong reason to believe that these reductions would not occur absent regulation,” due to split incentives and coordination problems between trailer owners versus truck owners.¹⁴

The agencies base their decision not to regulate on the diversity of trailer types and trailer manufacturers, who have not previously been subject to much regulation.¹⁵ The agencies instead propose to defer trailer regulation to a future rulemaking, given the lead time required and the President’s request to implement a final rule for heavy-duty trucks by July 30, 2011.¹⁶ However, the agencies do not explain what lead time is necessary, or why some lesser level of implementation could not be achieved within the proposed timeframe.¹⁷ Moreover, the agencies do not explain their failure to select the policy alternative that includes trailer regulation (Alternative #7), even though that alternative has the greatest quantified net benefits.¹⁸ More precisely, the agencies do not explain why any additional administrative costs or compliance difficulties (which would likely be temporary and dissipate as both government and industry build experience with this type of regulation) would outweigh the significant and ongoing benefits of regulation.

The agencies do note that, as of the 2010 model year, 5% of new trailers employ state-of-the-art technology under EPA’s voluntary SmartWay program.¹⁹ If this is evidence that the diversity of the trailer sector is an obstacle to wider adoption of available technology, and not instead evidence that such technology can be readily adopted by many manufacturers, the agencies do not adequately explain the basis for that conclusion.

Given the recommendation by the National Academy of Sciences to regulate trailers²⁰ and the agencies’ calculation of net benefits, trailers should be covered in the final rule. If including trailers in the final rule would significantly delay promulgation, or if the agencies are able to explain why additional administrative and compliance costs necessitate a temporary delay, the agencies should detail in the final rule a clear plan and schedule for moving forward. Though generally the agencies should at least reevaluate and probably drop the small business exemptions in the rule (see next subsection), the agencies could also consider whether trailers could be regulated more quickly if a small business exemption were applied.²¹ That alternative might still represent a substantial opportunity for increased fuel economy and greenhouse gas reductions, as three

trailers manufacturers account for over half of all production, and the top ten manufacturers by output account for nearly 90% of production.²²

Agencies Should Drop the Small Business Exemptions

The agencies exempt small businesses from compliance, based on the assumption that—given the small businesses’ low market share—an exemption will have only a “negligible impact” on emissions.²³ However, this is not the proper framework for analysis and justification. An exemption should only be created where special administrative and compliance burdens cause costs to exceed benefits. The agencies have not explained why small businesses would face special compliance burdens or create special administrative problems for the government. Given that the agencies are worried about corporations taking advantage of the small business exemption to circumvent regulation,²⁴ the agencies should at least rethink and should probably drop the small business exemptions.

Agencies Should Carefully Consider More Stringent Alternatives

Besides an option that includes trailer regulation (Alternative #7, which the agencies reject), the agencies only consider two policies more stringent than their preferred choice: a 20% increase in stringency (Alternative #6b), and a standard based on a hypothetical increase in the market penetration of hybrid technologies (Alternative #8). The agencies also reject both of those alternatives.

Agencies generally are required to assess the costs and benefits of all reasonable alternatives, including those suggested by the public,²⁵ as well as alternatives for all “key attributes or provisions.”²⁶ However, the choices made in defining and assessing the agencies’ two more stringent alternatives seem somewhat arbitrary. For example, the 20%-increase alternative assumes the addition of a heat recovery system to combination tractors, a 10% mass reduction in pickups and vans, and an 8% increase in hybrid powertrain application to vocational vehicles.²⁷ But the agencies do not consider any lesser increase in the latter two categories, or whether any greater increase might be possible for certain classes of vocational vehicles, a potentially overbroad category in this regard.²⁸

Similarly, in the hybrid-based alternative, the agencies imagine a hypothetical 13,000% increase in the annual sales of hybrid units (from under 5,000 units per year projected in 2010, to 650,000 units per year starting in 2017).²⁹ The agencies do not consider whether a more modest, but still ambitious rate of market penetration might be more feasible.³⁰ Additionally, when assessing the costs of such alternatives, the agencies calculate a \$30,000 premium based on one estimate for applying hybrid technology to a refuse truck.³¹ The agencies do not explain why technology costs would not decrease (due to economies of scale and learning) as market share increases from 5,000 units to 650,000 units.

The agencies must consider whether additional alternative policy arrangements and additional cost estimates might be appropriate. After assessing all feasible alternatives, the agencies must select the option that maximizes net benefits.

Agencies Should Reconsider Air Conditioning Regulations

The agencies do not propose to regulate air conditioning leakage from vocational vehicles, and do not discuss such regulation as an alternative rulemaking possibility. The agencies explain that since they have chosen to regulate the chassis manufacturer for this class of vehicles, and since other entities are potentially involved in designing the air conditioning system, regulating air

conditioning for this vehicle class is not practical.³²

However, the agencies do not specify the extent to which third parties are involved in vocational vehicle air conditioning system production and installation, or whether regulation at a level other than the chassis manufacturer may be appropriate for certain vocational vehicles. Notably, this broad vehicle category includes not only work trucks, but also recreational vehicles and transit buses. To the extent implementation of direct control standards is currently infeasible, the agencies should consider whether alternatives such as labeling (see below), credits (see below), or voluntary approaches would be beneficial, and the agencies should set a schedule for future regulatory actions to directly control leakage.

Agencies Should Respond to Petitions on Other Un-Regulated Mobile Sources

Several petitions are pending before EPA to regulate a variety of other mobile sources that produce significant greenhouse gas emissions,³³ including other non-road engines, ocean-going vehicles, and aircraft, as well as a petition from Policy Integrity that would cover all vehicle fuels (see below).³⁴ In order to fully comply with its mandates under the Clean Air Act, EPA must address all significant sources of greenhouse gas emissions and must respond to these petitions.³⁵ Addressing all these sources might not be appropriate in the context of the heavy-duty truck regulations; nevertheless, this rulemaking serves as an important reminder that heavy-duty trucks are just one component of a broader category of mobile sources, all tied together by the common use of vehicle fuel.

On the other hand, certain currently un-regulated sources could be appropriately addressed in the context of this rulemaking, in particular trailers and motorcycles—both part of the § 202(a) endangerment finding that underlies this rulemaking. To the extent the agencies choose not to address such sources, Policy Integrity plans to petition EPA to initiate a rulemaking procedure to control emissions of greenhouse gases from the use of trailers in combination tractors and from highway motorcycles.

The Proposed Rule, Though Imperfect, Is Cost-Benefit Justified

Even though other alternatives might better maximize net benefits (see above), the proposed regulation is still cost-benefit justified. In particular, under most scenarios, social benefits alone outweigh costs, and in all scenarios social benefits plus private fuel savings completely swamp the technology burdens. The large, unrealized private fuel savings do raise questions about whether and how a market failure might have generated this so-called “energy efficiency gap.” Potential informational issues may partly explain this paradox and may also partly justify additional labeling requirements. The positional goods theory may also help explain part of the energy efficiency paradox.

Social Benefits Alone Outweigh Costs in Most Scenarios

As demonstrated in Tables VIII-24 and -25, the net present value of total monetized social benefits (carbon dioxide reductions and energy security impacts, minus accidents, congestion, and noise) outweighs the net present value of total calculated technology costs for all but the lowest of four possible values measuring the “social cost of carbon.” Even at that lowest social cost of carbon, total monetized and qualitative social benefits may possibly outweigh total technology costs, depending on the magnitude of the unquantified benefits: climate benefits from non-carbon dioxide reductions (especially HFCs)³⁶ and other unquantified environmental, public health, and

welfare benefits.³⁷ Furthermore, it may be important that the costs per ton of carbon abated are significantly lower for certain vehicle classes (7 and 8) than for others (2b and 3),³⁸ suggesting that social benefits alone may more easily justify requirements for certain vehicle categories.

Crucially, the private benefits of fuel savings (plus refueling savings) are enough to outweigh costs, for all vehicle classes and regardless of which scenario is used to calculate social benefits. However, consumers arguably already have the option to generate these benefits for themselves, by voluntarily selecting the more fuel-efficient vehicle models currently on the market. The failure of consumers to make choices that should save them money in the long run is called the “energy efficiency paradox.” To the extent that private benefits are necessary to justify the regulatory costs, this paradox requires some explanation.

The agencies proffer a number of explanations for the failure of consumers in the heavy-duty vehicle sector to select more fuel-efficient models.³⁹ The correctness of such explanations will inform the question of what regulatory response is most appropriate. Based on the information currently before the agencies, the most compelling economic concepts that help explain the energy efficiency paradox are informational issues and the positional goods effect. The agencies should then tailor their proposed rule in light of such explanations.

Consumers’ Lack of Information Justifies Some Labeling Requirements

A number of informational issues may contribute to the energy efficiency paradox. Consumers may lack information about fuel-efficient technology, or may fail to consider available information or translate it into fuel savings when making vehicle purchase decisions. Consumers who might be interested in better fuel economy, moreover, may not have reliable information applicable to their vehicle or use. As the agencies suggest, informational issues may be an important explanation of consumers’ failure to select more fuel-efficient vehicles.⁴⁰

The agencies are currently in the process of revising separate labeling requirements for light-duty vehicles, where they note how important access to information on fuel efficiency and environmental impacts is to average consumers of passenger vehicles. That rulemaking does not cover heavy-duty trucks.⁴¹ While many consumers of heavy-duty trucks and engines are businesses that, compared to average individuals, might have better access to information and more time and resources to make informed choices,⁴² at least some heavy-duty vehicles are purchased by individuals (certain pickups, vans, mobile homes, and recreational vehicles). Moreover, there is no reason to assume that government entities and businesses might not also benefit from easier access to clearer information.

The agencies do not propose any major changes to current emission control information labels for heavy-duty engines and vehicles.⁴³ The agencies seem to view these labels mainly as tools to aid inspection and enforcement rather than as information disclosure tools,⁴⁴ but there is no reason they cannot serve both functions. EPA has the statutory authority under the Clean Air Act to require vehicle and engine labels that “contain such other information relating to control of motor vehicle emissions as the Administrator shall prescribe.”⁴⁵ NHTSA may also have some authority here, since Congress did not specify what it meant by “compliance and enforcement protocols” in the Energy Independence and Security Act of 2007.⁴⁶

Labels may be most appropriate and straightforward for heavy-duty pickups and vans. At least some consumers of this class variety are individuals, who are perhaps most in need of additional information on fuel efficiency and environmental effects. Labels are also beneficial not just for

intra-class comparisons, but also for cross-class comparisons. Though the agencies believe class switching may be unlikely, it is certainly possible between heavy-duty and light-duty pickups and vans.⁴⁷ Indeed, class 2b and 3 vehicles share much in common with light-duty trucks,⁴⁸ which is why the agencies were able to select a metric for fuel efficiency and emissions (gallons and grams per mile) analogous to the measure used in the light-duty context. Because of this common metric, the agencies may be able to adapt some features of the light-duty labels to the heavy-duty pickup and van context, allowing not only for administrative ease but also for cross-class comparisons by consumers.

For other vehicle categories, the different metrics (grams per unit of work), diversity of vehicle applications, and the chosen points of regulation (e.g., chassis manufacturers for vocational vehicles) may present new challenges for a labeling system. The labels developed for the light-duty context may not seamlessly apply. The agencies should consider whether clear, cost-effective labels can be developed for these other heavy-duty vehicle classes. The agencies might also consider whether a voluntary label or seal, analogous to the Energy Star program, can be developed, especially for those vehicles that the agencies have not regulated despite significant efficiency opportunities: for example, for aerodynamic improvements to vocational vehicle bodies.⁴⁹ This may be most important for vehicles marketed to individual consumers, like mobile homes.

Efficiency Tests are a Public Good, Justifying Current Regulation and Future Demonstration Projects

General evidence supports the efficacy of many new vehicle efficiency technologies, but much of the data has neither been duplicated by other researchers nor verified over a range of duty cycles, and the subset of data that has been peer-reviewed is applicable only to select technologies. Consumers may therefore remain skeptical of a technology's real-world performance, especially regarding the applicability to their particular vehicle model or use. The great diversity of vehicle types and operational purposes in the heavy-duty sector exacerbates this problem of the limited applicability and reliability of data. A consumer lacking reliable, applicable information may compare the known, irreversible, upfront purchase price of the new technology against an unknowable future stream of fuel savings, and choose to minimize the former by selecting a cheaper alternative instead of the one that promises more (but potentially illusory) efficiency.⁵⁰

Individual consumers, as well as certain local government purchasers and even some small-scale business operations, may have limited capacity to experiment on their own and test out new technologies. Coordination problems and the diversity of vehicle types and uses prevent the pooling of resources to evaluate technologies. But most commercial operations and larger government entities could theoretically take the risk of experimenting with various new fuel-efficient technologies. If the technology proved successful, an early adopter could achieve a short-term favorable competitive advantage by reaping fuel savings.

However, experimentation to determine the success of fuel-saving technology is costly and risky. If a single actor does move first and demonstrate the success (or failure) of the new fuel-efficient technology, that information may be hard to conceal, allowing others to learn of the benefits of the technology. In other words, the first mover generates a positive externality, because the information from the technology test is now free and available for anyone else in the market to act on as well. (Companies may try to keep tests secret, but the widespread adoption of a successful technology might be visible simply by observing the company's fleet, though it could be difficult to tease out the effects of multiple technologies.) Because private firms cannot prevent their competitors from benefiting, businesses typically under-invest in non-excludable goods. Instead

of a first-mover advantage, the first to investigate a new technology bears all the costs and risks of failure, and yet enjoys only a small portion of the benefits, since any comparative advantage from early adoption begins to evaporate as competitors follow suit for free. While firms could pool the costs of experimentation, such information sharing in highly competitive markets is improbable. This market failure undermines the incentive to investigate and invest in fuel-efficient, cost-efficient technologies. As is typically the case with public goods and externalities, it is up to government to step in. One option for a government response would simply be to help supply the missing information through additional research and demonstration programs. However, as with labeling, a demonstration program might be inadequate to correct informational issues if consumers do not trust the government's results or deem them inapplicable to their particular vehicle or use. Alternatively, even if consumers were persuaded by a demonstration program, they might wait to adopt such technology until they have first tested its adaptability to their own vehicle type or operation.⁵¹ This will cause delays in achieving fuel savings, may result in additional costs to consumers, and will slow down the generation of the important greenhouse gas reductions, energy security improvements, and other social benefits. Thus, demonstration programs alone would be an inappropriate response to the informational issues underlying the energy gap and preventing the achievement of environmental objectives.

The agencies propose to circumvent these informational issues by mandating adoption of new technology. In the event that the benefits of new technology prove illusory, the government-created condition establishes the even playing field necessary for consumers to avoid competitive losses. At this stage, the government has set minimum fuel efficiency standards based on cost-effective, widely applicable, and relatively proven technological improvements. However, the agencies should also consider how a pilot project or demonstration programs could be useful going forward to encourage the continued adoption of even more advanced technologies.

A Positional Goods Effect Predicted for Certain Consumers Justifies Some Regulation

A “positional good” is something whose value depends strongly on how it compares with the things owned by others.⁵² Smith might be relatively happy with her house's size if it matches the neighborhood's average size, but she might value the same house less if a mansion goes up next door: housing size is positional. By comparison, Smith might not care how many vacation days her neighbors have so long as she gets the amount she wants: vacation days are non-positional.

Positionality and status matter for reasons that go beyond psychology, biological hardwiring, or envy—although those factors should not be ignored.⁵³ Status can be “instrumental,” in that higher status itself can create better consumption opportunities and access to better employment opportunities.⁵⁴ “Conspicuous consumption” of positional goods thus becomes a signal for status:

When an individual's ability level cannot be observed directly, such observable components of his consumption bundle constitute a signal to others about his total income level, and on average, therefore, about his level of ability... [I]mperfect information about ability might create incentives for people to rearrange consumption patterns to favor observable goods.⁵⁵

In other words, theory predicts that more visible goods will be more positional, and that people will over-consume visible goods. Visibility depends not necessarily on physical visibility, but on whether “society has direct means to correctly assess the expenditure involved.”⁵⁶

According to a recent U.S. survey on the visibility of 31 expenditure categories (from food to mobile phones), new or used motor vehicle purchases were the second most visible expenditure;

related expenditures on gasoline/diesel, vehicle maintenance, and insurance were all substantially less visible.⁵⁷ Surveys also consistently confirm that vehicles are highly positional goods, that people prefer a relative increase in a vehicle's value to an absolute increase,⁵⁸ and that the more visible features of vehicles are more positional.⁵⁹

The more observable prestige features of vehicles include size, power, brand, and design. While all these traits have functional value (such as capacity, safety, and performance),⁶⁰ they also all have relative value: consumers value size, power, and load capacity not just for their functional benefits, but for the status signal.⁶¹ As Bob Lutz, Vice Chairman of General Motors, has stated, “aspirational aspects overwhelm the functional differences” when customers choose vehicles.⁶² Importantly, many vehicle prestige features—especially larger size and increased performance—reduce fuel efficiency. And given the low visibility of gasoline expenditures and financial savings, which are typically considered non-positional,⁶³ fuel efficiency is currently a relatively non-positional good.

In the heavy-duty truck context, the positional goods theory may have a limited but important application. Consumers may compete for prestigious traits on vehicles bought for personal transportation, including certain pickups, vans, mobile homes, and recreational vehicles. A similar effect may take place among some combination tractors owned by individual, independent contractors, who may not only compete for bragging rights among their peers, but may also compete for employment opportunities based on the relative size or power of their vehicle.⁶⁴ Finally, the relative size and power of heavy-duty vehicles may be important to the branding of a commercial business: the more powerful the fleet, the more solid the brand may appear.

The problem with positional goods is that an increase in aggregate consumption does not necessarily increase consumer welfare. If Smith invests in a positional good to move up the status hierarchy, Jones will feel relatively worse off and so will match that investment to catch up. As a result, both consumers spend resources without actually improving their relative status.⁶⁵

The conspicuous consumption status competition is wasteful because consumers invest more in positional goods than they would if they were motivated purely by the goods' functional value, as consumers try to capture a status advantage that never materializes. In the end, positional goods do not produce the welfare that consumers expect, due to a negative externality caused by positionality: as soon as the second consumer also buys the larger vehicles, it reduces the value to the first consumer of her vehicle.⁶⁶

Because consumption decisions are made non-cooperatively but in fact alter the spending behavior of others, consumers get stuck on a “positional treadmill” that does not increase welfare.⁶⁷ Yet if any individual opts out of this “expenditure arms race,” it would only move that consumer backwards on the status hierarchy, which for most consumers is unacceptable.⁶⁸ And given limited resources and limited market options, the over-consumption of positional goods results in under-consumption of non-positional goods (such as fuel efficiency).

In short, a market failure blocks optimal investment in fuel efficiency. It can be especially hard for consumers to move themselves down the status scale voluntarily on visible, positional features like vehicle size and horsepower.⁶⁹ Yet if consumers could maintain their relative economic and competitive position, they might be more willing to pay for non-positional goods.⁷⁰ The proposed regulation is a cooperative solution that allows consumers to achieve what they could not in the non-cooperative open market: namely, an increase in fuel efficiency without losing position in the status hierarchy.⁷¹ Regulations similarly help consumers select fuel efficiency without falling

behind in the size rankings, since with time the average fleet size will shift. Regulations also correct a supply-side problem, since theory predicts manufacturers will devote their research and development budget to status goods until government adjusts the incentives.⁷² Finally, with time and under new labeling requirements that could increase the visibility of fuel efficiency, it is possible fuel efficiency may emerge as an increasingly positional trait.⁷³ Someday businesses could even compete for status as having the greenest fleet—but regulation may be necessary to jumpstart that effect, to overcome the initial hesitation to sacrifice current prestige goods for fuel efficiency.

Agencies Should Utilize Flexibility Mechanisms If Consistent with Objectives

Where the agencies can lower compliance costs without sacrificing regulatory objectives, they should pursue those strategies.

Air Conditioning Credits

The agencies are not proposing air conditioning efficiency credits,⁷⁴ a credit system for the uncovered air conditioning emissions from vocational vehicles,⁷⁵ or credits for those who exceed the air conditioning leakage standards.⁷⁶ They should consider all these options.

Technology Credits

The agencies' proposed credits for early compliance and advanced vehicle technologies may help incentivize early, cost-effective reductions and long-term investment in new technologies. Unfortunately, in awarding these credits, the agencies propose to treat electric vehicles as if they had zero greenhouse gas emissions.⁷⁷ The agencies should reconsider this approach. Electric vehicles do not have a zero carbon emissions value: electric vehicles run on energy from an electric grid, and producing this electricity emits carbon. The proposed rule does not account for these upstream emissions, even though it easily could assign all electric vehicles an emissions figure based on the national average for electricity production, or require manufacturers to report the specific average amount of greenhouse gases emitted for each electric vehicle model.

The agencies also ask for comments on applying a 1.5 multiplier to early and advanced technology credits.⁷⁸ Generally, the agencies should give careful thought to whether the benefits of early action and investment in research justify that size of a multiplier. But the credit multiplier is perhaps most dangerous where credits are not based on real emissions reductions. Namely, if electric vehicles are treated as having zero emissions and then awarded 1.5 credits, that combination will allow manufacturers to avoid emissions cuts elsewhere and will undermine the regulatory goals.

Gas Equivalencies and Light-Duty Rule Change

Allowing compliance with nitrous oxide and methane standards through carbon dioxide-equivalent values, as proposed,⁷⁹ is appropriate, as long as it does not undermine stringency.

The proposed changes to the light-duty standards (allowing a carbon dioxide-equivalency approach for either nitrous oxide or methane, without requiring use of both, and also exploring a credit-based approach)⁸⁰ are also justified and consistent with Policy Integrity's comments on that rulemaking. However, burying a proposed change to a previously finalized rule in the notice for a different rule falls outside norms of administrative procedure. Notice of a proposed rulemaking, required by the Administrative Procedure Act,⁸¹ is basic to administrative law. To ensure adequate public participation, notice of a proposed rule must adequately inform the public of its intent.

This proposed rulemaking explicitly focuses on standards for medium- and heavy-duty vehicles. Yet, the agencies are also proposing changes to their rule covering light-duty vehicles. While the new proposed rulemaking will interest a good number of parties that commented on the light-duty rule, there may be a sizable number of other parties whose interests are not implicated by a medium- and heavy-duty rule. In future modifications of final rules, the agencies should make a separate proposal to revise their rules in order to maximize opportunities for public participation.

Cap-and-Trade

Although the proposed regulations fulfill EPA's legal duty under Section 202 of the Clean Air Act with respect to most heavy-duty vehicles, the program does not reach an efficient level of greenhouse gas reductions in the transportation sector. The proposal does not create a uniform regulatory framework applicable to all mobile sources and does not effectively maximize social welfare or minimize costs. In April 2009, Policy Integrity submitted a rulemaking petition to EPA requesting the creation of a comprehensive cap-and-trade system under Section 211 of the CAA for vehicle fuel used in all mobile sources.⁸² A cap-and-trade rulemaking would be more effective at addressing greenhouse gas emissions of all mobile sources, including sources such as off-road vehicles and marine vessels, which are not currently covered.⁸³ It would also allow EPA to regulate emissions at the source of fuel sale, manufacture, and import rather than requiring piecemeal command-and-control regulation of various vehicle sectors. The details and statutory authority for such a program are more clearly outlined in Policy Integrity's petition, available online.⁸⁴

Conclusion

By proposing these regulations, the agencies have tried to respond to legal obligations and to the growing risks associated with greenhouse gas emissions and energy dependence. The recommendations contained in this report will allow the agencies to more efficiently and effectively meet these goals.

Notes

- 1 Proposed Rulemaking to Establish Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles, 75 Fed. Reg. 74,152 (proposed Nov. 30, 2010) (to be codified at 40 C.F.R. pts. 85, 86, 1036, 1037, 1065, 1066, and 1068, and 49 C.F.R. pts. 523, 534, and 535) [hereinafter, Proposed Rulemaking].
- 2 Exec. Order No. 13,563, 76 Fed. Reg. 3821 (Jan. 21, 2011); see also Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (1993).
- 3 49 U.S.C. § 32902(k).
- 4 42 U.S.C. § 7402.
- 5 Cf. *Entergy v. Riverkeeper*, 129 S.Ct. 1498, 1509 (2009); see also Proposed Rulemaking at 74,171 (citing *Entergy*).
- 6 See Exec. Order No. 12866 § 1.
- 7 Proposed Rulemaking at 74,157.
- 8 E.g., *id.* at 74,167.
- 9 *Id.* at 74,165.
- 10 *Id.* at 74,167.
- 11 E.g., *id.* at 74,176.
- 12 *Id.* at 74,156.
- 13 See *id.* at 74,338-51.
- 14 *Id.* at 74,346.
- 15 *Id.* (explaining agencies have little experience administering and businesses have little experience complying with regulations in this segment of industry).
- 16 *Id.* at 74,350 (citing an executive order calling for the regulation of heavy-duty trucks).
- 17 In *Bluewater Network v. EPA*, the D.C. Circuit Court of Appeals rejected EPA's conclusion that otherwise available technology could not be applied to all models within the allotted lead time, because the agency failed to estimate what level of implementation was feasible within the time available. 37 F.3d 1, 22 (D.C. Cir. 2004). EPA had concluded that emissions reductions corresponding to 70% of new snowmobiles were the most that could be achieved within the timeframe of the proposed rulemaking. The agency did not, however, explain the evidence and analysis underlying its conclusion. The Court therefore held that, "[w]e can defer to the Agency's prediction of the feasible pace of implementation only if it has adequately explained the basis of that prediction." Here, the agencies have failed to do so.
- 18 Proposed Rulemaking at 74,344 (note that these calculations do not even seem to include some important benefit categories, like reduced HFC emissions from refrigerated trailers).
- 19 *Id.* at 74,216.
- 20 *Id.* at 74,354.
- 21 See WHITE HOUSE OFFICE OF MGMT. & BUDGET, CIRCULAR A-4 8 (2003) ("You should consider setting different requirements for large and small firms, basing the requirements on estimated differences in the expected costs of compliance or in the expected benefits."). The Small Business Administration considers nearly half of all trailer manufacturers to be small businesses. The agencies express concern that regulating small trailer manufacturers would require them to convene a Small Business Regulatory Enhancement Fairness Act panel to reach out to affected stakeholders. See Proposed Rulemaking at 74,347.
- 22 See Trailer-Body Builders.com, 2009 North American Truck Trailer Output, available at <http://trailer-bodybuilders.com/trailer-output/output/2009-trailer-output-table/> (cited in Proposed Rulemaking at 74,347).
- 23 E.g., Proposed Rulemaking at 74,189.
- 24 See *id.* at 74,167.
- 25 Exec. Order No. 12,866 § 6(a)(3)(C).
- 26 CIRCULAR A-4, *supra* note 21, at 16.
- 27 Proposed Rulemaking at 74,340.
- 28 The agencies indicate that the alternative "reflects the technologies [they] thought most likely to be applied by manufacturers if a more stringent standard were set." *Id.* at 74,341. However, they do not further explain or cite support for that conclusion.

29 See id. at 74,340.

30 In Bluewater Network, the Court rejected EPA's conclusion that industry could apply new technology to no more than 70% of new snowmobiles in part on the basis that the agency's limited explanation could equally have supported 30% or 100% application. See 37 F.3d at 21.

31 Proposed Rulemaking at 74,340-41.

32 Id. at 74,167.

33 See Proposed Rulemaking to Establish Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, 74 Fed. Reg. 49,453 (proposed Sep. 28, 2009) (listing some open petitions).

34 Institute for Policy Integrity, New York University School of Law, PETITION FOR RULEMAKING UNDER SECTIONS 211 AND 231 OF THE CLEAN AIR ACT TO INSTITUTE A CAP AND TRADE SYSTEM FOR GREENHOUSE GAS EMISSIONS FROM VEHICLE FUELS (Jul. 29, 2009) available at <http://policyintegrity.org/projects/documents/7.29.09IPIPetitiontoEPA.pdf>. See also Inimai M. Chettiar & Jason A Schwartz, The Road Ahead (Institute for Policy Integrity Report No. 3, Apr. 2009), available at <http://policyintegrity.org/files/publications/TheRoadAhead.pdf> (basis for petition).

35 See The Road Ahead, supra note 34, at 17-18, 20-32.

36 See Proposed Rulemaking at 74,332.

37 See id. at 74,324.

38 Annual cost per ton for pickups and vans range from \$70-\$270; for vocational vehicles, \$20-\$30; and for combination tractors, \$10-\$30. Id. at 74,312-13.

39 Id. at 74,303-07.

40 See id. at 74,304.

41 Proposed Rule on Revisions and Additions to Motor Vehicle Fuel Economy Label, 75 Fed. Reg. 58,078, (Sept. 23, 2010).

42 Businesses are not necessarily always rational economic actors. The agencies suggest that "split incentives" within trucking firms cause them not to purchase more fuel-efficient models, as the firms' vehicle buyers do not adequately communicate with their fuel purchasers or vehicle operators. See Proposed Rulemaking at 74,305. As the agencies concede, there is little empirical evidence for such an explanation, and they should consider whether there is an adequate basis for the proposition that such split incentives help explain the energy efficiency paradox.

43 The agencies call the current approach to labeling "sufficient." Id. at 74,263; see also id. at 74,268 ("we do not anticipate any major changes needing to be made to emission control information labels as a result of new GHG standards.").

44 See id. at 74,272, 74,277.

45 Clean Air Act § 207(c)(3)(C) ("In addition, the manufacturer shall indicate by means of a label or tag permanently affixed to such vehicle or engine that such vehicle or engine is covered by a certificate of conformity issued for the purpose of assuring achievement of emissions standards prescribed under section 202 of this Act. Such label or tag shall contain such other information relating to control of motor vehicle emissions as the Administrator shall prescribe by regulation.").

46 Proposed Rulemaking at 74,172 (citing 49 U.S.C. § 32902(k)).

47 See id. at 74,320.

48 Id. at 74,189.

49 See id. at 74,198.

50 The discounting of uncertain benefits may be magnified if businesses are risk-averse. Risk aversion may be particularly strong in the heavy-duty vehicle sector. See GreenBiz, "With Money on the Table, What's the Best Move for Green Trucking?" Jan. 19, 2010, available at <http://www.greenbiz.com/blog/2010/01/19/money-table-whats-best-move-green-trucking> (citing the Rocky Mountain Institute's Mobility and Vehicle Efficiency Practice for the proposition that industry risk aversion and low profit margins are the primary obstacles to the trucking industry's adoption of more efficient technologies).

51 Proposed Rulemaking at 74,306.

52 Robert H. Frank, The Demand for Unobservable and Other Nonpositional Goods, 75 AM. ECON. REV. 101, 101 (1985).

53 Envy certainly may be a factor, and status may be an end into itself. The case for biological and psychological hardwiring is also strong: natural selection rewards those who compete for higher status that carries better or more mating opportunities, as well as those who compete for status for their offspring, to ensure success of their progeny.

54 Ed Hopkins & Tatiana Kornienko, Running to Keep in the Same Place: Consumer Choice as a Game of Status, 94 AM. ECON. REV. 1085, 1087 (2004) (noting also that quality marriage opportunities might depend on status).

55 Frank, supra note 52, at 107. Consumption patterns might vary depending on the relevant population in the status competition. People might compete among friends, neighbors, and coworkers; within their socio-economic class; with higher classes; or on a society-wide basis. See Fredrik Carlsson et al., Do You Enjoy Having More than Others? Survey Evidence of Positional Goods, 74 ECONOMICA 586, 590 (2007). If a particular population has more reliable, independent information on abilities or income, consumption patterns for observable goods might shift. Frank, supra note 52, at 108.

56 Ori Heffetz, A Test of Conspicuous Consumption: Visibility and Income Elasticities 9 (2009), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1004543.

57 Id. at 13, 17, 34, 36 (vehicle purchase had a visibility index of 0.73, second only to tobacco products (0.76); gasoline/diesel had a visibility index of 0.39).

58 Specifically, a majority of people surveyed would prefer a world in which their vehicle is superior to other people's but less valuable overall, versus a world in which their vehicle has more absolute value but is inferior to the societal average. See, e.g., Fredrik Carlsson et al., Do You Enjoy Having More than Others? Survey Evidence of Positional Goods, 74 ECONOMICA 586, 588, 593 (2007) (reporting results of a Swedish survey); Francisco Alpizar et al., How Much Do

We Care About Absolute Versus Relative Income and Consumption?, 56 J. OF ECON. BEHAVIOR & ORG. 405, 412 (2005) (reporting results of Costa Rican survey). Though some such surveys were conducted in other countries, if anything positionality for vehicles could be stronger in the United States, given the American affinity for cars and the income distribution. See Reid R. Heffner et al., Effects of Vehicle Image in Gasoline-Hybrid Electric Vehicles 2 (U.C. Davis Inst. of Transportation Studies UCD-ITS-RR-05-08, 2005) (“In the words of automobile psychologist G. Clotaire Rapaille, Americans are in ‘a permanent search of an identity’ and ‘cars are very key... [they are] maybe the best way for Americans to express themselves.”); Hopkins & Kornienko, *supra* note 54 (noting that positional effects increase as society’s income increases, because the portion of income spent on conspicuous consumption increases).

59 Carlsson et al., *supra* note 58 at 588 and 593 (finding support for hypothesis that “visible goods and their characteristics, such as the value of cars, are more positional than less visible goods and their characteristics, such as car safety”).

60 Carlsson et al., *id.* at 595, could not provide a clear answer to the question of whether cars are completely positional. On average cars are highly positional, but that reflects a good deal of heterogeneity: cars may be completely positional for some people, but are possibly completely non-positional for others. *Id.* at 596.

61 See Jerry Garrett, “Monster Trucks, Monster Sales,” N.Y. TIMES, July 24, 2007 (“In today’s truck market, size sells. In fact ... the bigger a pickup is, the heavier it is, the more gas it guzzles, and the pricier it is, the better it seems to be selling.”).

62 George Will, Americans and Their Cars, TOWNHALL DAILY, Apr. 18, 2002, available at http://townhall.com/columnists/GeorgeWill/2002/04/18/americans_and_their_cars/page/full/.

63 See, e.g. Omer Moav & Zvika Neeman, Savings Rates and Poverty: The Role of Conspicuous Consumption and Human Capital (2009), available at http://www.hecer.fi/Seminars/Papers/moav_paper.pdf.

64 It is conceivable that employers may choose the contractor with the relatively more powerful truck, even if both trucks possessed the absolute torque necessary to perform the job.

65 See Frank, *supra* note 52 at 104, 108 (“One individual’s ‘offensive’ signal is cancelled by another’s ‘defensive’ signal, and in the end too many resources are devoted to the consumption of observable goods.”).

66 See Hopkins & Kornienko, *supra* (“[E]ach individual consumer in turn marginally affects the utility from consumption enjoyed by others, but does not take these effects into account when deciding on the particular variant and quantity to be consumed.”); Erik Verhoef & Bert van Wee, Car Ownership and Status: Implications for Fuel Efficiency Policies from the Viewpoint of Theories of Happiness and Welfare Economics 4, at 5-6 (Tinbergen Institute Discussion Paper TI 2000-076/3, 2000) (“However, most cars in most Western countries have engines with much more power than needed, given the characteristics of infrastructure, speed limits, and travel distances.”).

67 Robert H. Frank, Positional Externalities Cause Large and Preventable Welfare Losses, 95 AM. ECON. REV. 137, 137 (2005).

68 Frank, *supra* note 52, at 105-06.

69 See Sara J. Solnick & David Hemenway, Is More Always Better?: A Survey On Positional Concerns, 37 J. ECON. BEHAVIOR & ORG. 373, 379 (1998) (“[S] subjects were more likely to select the positional situation when it was presented first (the ‘gain’ context) rather than second”); Yew-Kwang Ng & Jianguo Wang, Relative Income, Aspiration, Environmental Quality, Individual and Political Myopia: Why May the Rat-Race for Material Growth be Welfare-Reducing?, 26 MATHEMATICAL SOCIAL SCI. 3, 6-7 (1993) (noting that personal attitudes and aspirations for future consumption depend on current and past personal consumption, which in turn are influenced by other people’s consumption behavior).

70 Robert H. Frank & Cass R. Sunstein, Cost-Benefit Analysis and Relative Position, 68 UNIV. OF CHICAGO LAW REV. 323, 326 (2001) (“If people could maintain their relative economic position, they would be willing to pay more, and possibly a great deal more, to purchase many of the goods that regulation attempts to deliver... [W]hen an individual buys additional safety in isolation, he experiences not only an absolute decline in the amounts of other goods and services he can buy, but also a decline in his relative living standards. In contrast, when a regulation requires all workers to purchase additional safety, each worker gives up the same amount of other goods, so no worker experiences a decline in relative living standards. If relative living standards matter, then an individual will value an across-the-board increase in safety more highly than an increase in safety that he alone purchases.”).

71 Correcting for negative externalities and collective action problems is a classic case for regulation. “Analytically, positional externalities are no different from ordinary environmental pollutants.” *Id.* at 364. Such regulation is not about taking public action just because one consumer’s increased consumption makes another consumer unhappy or envious; rather, regulation is justified to address a market failure. *Id.* at 365. Even if not everyone wants to solve this particular collective action problem, “we do not require unanimity as a precondition for unquestionably legitimate collective action in other spheres.” *Id.* at 366. See also Verhoef & van Wee, *supra*, at 13-14. (“On the free market, consumers would inefficiently strongly stimulate each other to purchase more luxurious variants. Corrective taxes [or a CAFE standard with tradable permits] may protect consumers against such treadmills.”).

72 Ben Cooper et al., Status Effects and Negative Utility Growth, 111 ECON. J. 642 (2001).

73 See Carlsson et al., *supra*, at 596 (“[W]e found that the mean degree of positionality for car safety is significantly larger than zero. This may in part be due to the fact that car safety has become more visible recently, when safety has become an important sales argument and various safety tests are frequently discussed in advertisement and in media more generally.”); Heffner et al., *supra*, at 5 (“All participants recognized some symbolic benefits rooted in their HEVs’ reputation as ‘green’ environmental vehicles, an image which is reinforced by automakers, the media, and a growing list of vocal celebrity owners. This image is distinct from the vehicles’ function, but related to it.”).

74 Proposed Rulemaking at 74,164, 74,213.

75 *Id.* at 74,211.

76 *Id.* at 74,212.

77 *Id.* at 74,255-56.

78 *Id.* at 74,255.

79 *Id.* at 74,207-08.

- 80 *Id.* at 74,211.
- 81 5 U.S.C. § 553(b)(3).
- 82 Institute for Policy Integrity, New York University School of Law, PETITION FOR RULEMAKING UNDER SECTIONS 211 AND 231 OF THE CLEAN AIR ACT TO INSTITUTE A CAP AND TRADE SYSTEM FOR GREENHOUSE GAS EMISSIONS FROM VEHICLE FUELS (Jul. 29, 2009) available at <http://policyintegrity.org/projects/documents/7.29.09IP1.pdf>.
- 83 See *The Road Ahead*, *supra*, at 94–101 (providing basis for Policy Integrity's petition for rulemaking on vehicle fuel emissions).
- 84 See also *id.* at 20–33.



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