



CAFE: The Truth Behind The Testing



Executive Summary

Fuel efficiency standards for America's cars and trucks are moving into the 21st century after decades of inaction. After finalizing the first major increase of fuel efficiency standards in three decades and setting the first-ever global warming pollution standards for model year 2012-2016 vehicles, the Obama administration is poised to propose even greater progress with standards that will apply to new vehicles sold from 2017-2025.

Unfortunately, the testing process used to determine fuel efficiency standards is still stuck in the past, entrenched in the original 1975 law that set the first national fuel efficiency standards. Due to a set of arcane assumptions and requirements, the results of vehicle testing to measure fuel efficiency are divorced from reality.

When measuring fuel efficiency — and now greenhouse gas emissions — for regulatory purposes, the tests assume that you will average 48 miles per hour on the highway and that you'll never use the air conditioner, heater, or any other accessory. None of these assumptions capture the way consumers actually drive, but all affect the fuel efficiency that a vehicle achieves. As a result, the fuel efficiency values used for compliance with the Corporate Average Fuel Economy (CAFE) program are inflated on average 25% above the Environmental Protection Agency's own best estimates of actual on-road fuel efficiency that appear on new vehicle labels in dealerships. While these new vehicle window labels were recently overhauled to provide more information to consumers, no such update has been proposed or undertaken for fuel efficiency tests.

Though the National Highway and Traffic Safety Administration (NHTSA) and U.S. Environmental Protection Agency (EPA) finalized new fuel efficiency and greenhouse gas standards for vehicles produced in model years 2012-2016, both agencies passed on the chance to update vehicle testing procedures used for setting standards and continue to rely on outdated tests. As they propose fuel efficiency standards for vehicles sold from 2017-2025, EPA and NHTSA are likely to rely on the same old test procedures, resulting in a confusing array of numbers between labels and standards.

The Sierra Club is calling on EPA and NHTSA to set standards for vehicles sold from 2017-2025 that reduce global warming pollution by 6% per year — equivalent to a fuel efficiency standard of at least 60 mpg. The administration's initial analysis found that technology is available to cost effectively reduce tailpipe carbon pollution by 6% per year resulting in a fuel efficiency standard of 62 mpg.¹ The administration's analysis also recognizes that a new vehicle fleet meeting a 62 mpg standard in 2025 would be equivalent to a 50 mpg on-road average.² However, even this assessment is not accurate as it fails to account for improved air conditioners

and other factors accounted for in setting greenhouse gas standards. According to the Union of Concerned Scientists, the real-world average fuel efficiency of a 2025 fleet of vehicles that met a 62 mpg standard would be in the range of 40-44 mpg.³

At a time when new vehicle technologies are rapidly moving into the market and EPA is accounting for technologies that affect efficiency and emissions, such as air conditioners, it is imperative that we have an accurate way to calculate fuel efficiency and greenhouse gas emissions for both setting standards and measuring compliance. Applying accurate testing and using the results for both setting standards and new vehicle labeling would allow policymakers to use one set of numbers, give consumers a more accurate estimate of the mileage they will see on the road, and accurately inform the public about the stringency of new standards and how standards correspond to what they see in the marketplace.

We recommend that EPA and NHTSA use their existing authorities to update testing procedures in order to achieve truth in testing for setting standards as soon as possible. EPA should design new test procedures that reflect real-world conditions and behaviors. Updated test procedures should produce one set of numbers that EPA and NHTSA use for setting fuel efficiency and greenhouse gas standards, determining compliance and vehicle window labels. To avoid a sudden increase in the stringency of vehicle standards due to lower, more accurate test results, this updated testing system could be phased in gradually.

Even before new testing procedures can be devised and implemented, agencies working on proposed standards for model year 2017-2025 vehicles should emphasize estimated on-road fuel efficiency. This will begin the process of bringing more truth to the numbers and discussions about what automakers are being asked to do. It is time to recognize what the real numbers are.



Introduction

After decades of neglect, the fuel efficiency of America's cars and trucks is finally heading out of the 1970s and into the 21st century. Unfortunately, the testing process used for fuel efficiency standards is still stuck in the past, entrenched in the original 1975 law that set our first national Corporate Average Fuel Economy (CAFE) standards.

Believe it or not, when regulators measure fuel efficiency for fuel economy standards and now tailpipe greenhouse gas standards, the tests assume that you will average 48 miles per hour on the highway and that you will never use the air conditioner, heater, or any other accessory that might impact the vehicle's fuel efficiency. When it comes to how we set fuel efficiency standards, we are in a world of fantasy numbers that are divorced from reality. The fuel efficiency values used for compliance with the CAFE program are inflated on average 25% above the Environmental Protection Agency's own best estimates of actual on-road fuel efficiency as used for labeling purposes since model year (MY)⁴ 2008. Although both the National Highway and Traffic Safety Administration (NHTSA) and U.S. Environmental Protection Agency (EPA) have finalized new fuel efficiency and greenhouse gas standards for cars and light trucks produced in model years 2012-2016 and will propose standards for model years 2017-2025, vehicle testing remains stuck in the past.

EPA has twice revised the way the tests are used to calculate more accurate fuel efficiency estimates for vehicle window labels; these revisions will be discussed later in more detail. However, even window label numbers are estimates that rely on the old 1975 tests, overlaid with additional tests that were not designed for accurately reflecting real-world fuel efficiency. Moreover, there has been no effort to reconcile the fuel efficiency values for testing and compliance with national standards with the values displayed on window labels and seen on the road. Thus, the nation's fuel efficiency and greenhouse gas emissions rating system is both complex and inaccurate. The result is two different ways of keeping the books on fuel efficiency: the unadjusted test values used for compliance with CAFE and greenhouse gas standards (25% too high on average) and the approach used to piece together more accurate values for new vehicle labeling purposes, which are now used in the annual EPA Fuel Economy Trends report.

The problem has only become more complicated now that EPA has finalized the first national greenhouse gas standards for motor vehicles alongside new fuel efficiency standards. While EPA's landmark greenhouse

gas standards will significantly cut oil consumption and reduce carbon pollution, EPA passed on the chance to update testing procedures to align standards with the mileage that will appear on new vehicle labels.⁵

At a time when new vehicle technologies are rapidly moving into the market and EPA is accounting for improved air conditioning systems and other technologies that affect efficiency and emissions, it is imperative that we have a way to accurately calculate vehicle fuel efficiency and use the results to determine new vehicle standards. Accurate testing of new vehicles would allow policymakers to have coherent conversations based on one set of numbers, give consumers an accurate connection between standards and the mileage they will see on the road and accurately inform the public about the stringency of new standards.

This report will provide the history of how we got to this confusing soup of numbers, detail the current test procedures for both fuel efficiency and new greenhouse gas standards and labels, and offer recommendations for how to move toward an accurate system that connects fuel efficiency standards to the real world.



History of CAFE

EPCA – THE ORIGINAL FUEL ECONOMY LAW

After nearly a decade of declining new vehicle fuel efficiency, America was caught flat-footed by the Arab Oil Embargo of 1973. Across the country people waited in lines to fill up their cars as gas prices spiked to record levels. In an effort to reduce the nation's oil addiction and prevent further crises, Congress passed the Energy Policy and Conservation Act (EPCA) in 1975. Addressing the fuel inefficiency of U.S. automobiles, EPCA established Corporate Average Fuel Efficiency (CAFE) standards which mandated minimum fleet efficiency requirements beginning in model year (MY) 1978. In EPCA, Congress mandated that new fleet fuel efficiency of cars be roughly doubled to 27.5 mpg by MY 1985. Further, EPCA mandated test procedures for passenger car CAFE compliance, but did not require specific test procedures for light trucks. Instead, EPCA granted the Department of Transportation (DOT) the authority to set CAFE standards for other classes of vehicles, including light-duty trucks,⁶ which includes pickups and vans.⁷

When Congress passed EPCA, light-duty trucks comprised only 20 percent of the vehicle market and were used primarily as work vehicles.⁸ Using its authority to set separate fuel efficiency standards for light-duty vehicles, NHTSA (the agency within DOT charged with setting standards) set a weaker standard of 17.2 mpg for two-wheel drive vehicles in model year 1979, increasing slowly to 20.7 mpg in 1996 and remaining flat through 2004. Over that time period, sales of light-duty trucks soared with the emergence of the SUV and minivan, rising to 52% of sales in 2004. The light duty standards were moderately strengthened by NHTSA in 2003, establishing a standard of 22.2 mpg in MY 2007, and again for

model years 2008-2011. This round of rulemaking, finalized in April 2006, shifted the process of setting standards for light trucks to a vehicle-footprint-based system, rather than requiring each manufacturer's fleet of trucks to meet the same overall fuel efficiency. Put simply, longer and wider vehicles had to meet a less stringent standard than their smaller counterparts. Basing fuel efficiency standards on vehicle footprint was intended to ease compliance for U.S. manufacturers who produced larger, heavier gas guzzlers. The new footprint based standards did not have any impact on the testing used to measure a vehicle's emissions or fuel efficiency or to correct the numbers used for setting the standards.



ENERGY INDEPENDENCE AND SECURITY ACT OF 2007

In December 2007 Congress passed the Energy Independence and Security Act of 2007 (EISA), which included the first substantial changes to the CAFE program since its 1975 inception. EISA required new standards to be set at the “maximum feasible” level, including a new standard of at least 35 mpg by 2020 for the combined new passenger car and light truck fleet.⁹ As part of this historic increase in fuel efficiency, Congress directed NHTSA to use an attribute-based system, previously incorporated in the MY 2008-2011 Light Truck Rule, to set new standards rather than requiring each manufacturer to achieve one fuel efficiency average of cars and another for light trucks.

While EISA did not mandate which attribute should be used, NHTSA selected vehicle footprint as the attribute on which to base new vehicle standards. As discussed previously, footprint-based standards allow larger footprint vehicles to meet a lower standard than vehicles with smaller footprints. While EISA mandated higher standards, it did not address vehicle testing, instead keeping in place test procedures that had not been updated in more than 30 years.

Therefore the mandate in EISA to set a new vehicle fleet that meets a 35 mpg standard is equivalent to roughly a 29 mpg on-road standard.

PRESIDENT OBAMA ANNOUNCES CAFE INCREASES AND NEW GREENHOUSE GAS STANDARDS

Less than one week after taking office, President Obama signed memoranda directing EPA to re-evaluate its initial denial of California’s clean car waiver.¹⁰ California, which has unique authority under the Clean Air Act to set emissions standards, acted during the years of stagnating fuel efficiency standards. President Obama then ordered the Department of Transportation to issue fuel efficiency standards for the 2011 model year only,¹¹ rather than finalizing the standards the Bush administration had proposed for model years 2011-2015.

Following up on those directives, in May 2009 President Obama announced that his administration would raise fuel efficiency for cars and light trucks to a fleet average of 35.5 mpg by 2016 — achieving the goal of the 2007 energy bill four years early. This move also created new national greenhouse gas emissions standards of 250 grams of greenhouse gases per mile, the equivalent to nationalizing the California’s greenhouse gas emissions standards for cars and light trucks.

On April 1, 2010, EPA and NHTSA finalized rules that will carry out the President’s announcement, setting 2016 standards of 250 grams carbon dioxide equivalent per mile (gCO₂e/mi), which is equal to 35.5 mpg (or 34.1 mpg if the value of the air conditioning credits is accounted for).¹² In an attempt to make the two standards as similar as possible, neither EPA nor NHTSA attempted to change test procedures for the purposes of compliance, even though EPA has wide latitude to adopt new testing procedures for all vehicles and NHTSA has existing authority to change

testing procedures for light trucks. However, in the proposed rule, the agencies did note the inadequacy of the tests and their desire to update them, stating:

“Both EPA and NHTSA are interested in developing programs that employ test procedures that are more representative of real world driving conditions, to the extent authorized under their respective statutes. This is an important issue, and the agencies intend to address it in the context of a future rulemaking to address standards for model year 2017 and thereafter.”¹³

While it is encouraging that the agencies recognized the deficiencies of the current testing procedures, the agencies are already moving ahead with standards for vehicles sold in model years 2017-2025.

On September 30, 2010, EPA and NHTSA announced that they were beginning the rulemaking process to set new vehicle standards for model years 2017-2025 and would consider setting standards that reduced emissions between 3 and 6% annually, equivalent to a range of 47-62 mpg, as measured by outdated test procedures. The agencies recognize that the on-road fuel efficiency of a 62 mpg standard may only be 50 mpg; however, the actual real world number may be as low as 40 mpg once emissions reductions from air conditioning systems and other factors are accounted for.¹⁴ As the process to set standards through 2025 continues, it is critical that the agencies move away from tests designed in the 1970s and create tests that provide real world values for both standards and labels.



Fuel Economy Testing

HISTORY OF FUEL ECONOMY TESTING

At the core of CAFE standards (and now greenhouse gas vehicle standards) is a standardized method of testing vehicle fuel efficiency. Pursuant to EPCA, the EPA published fuel efficiency testing procedures in 1976, effective with MY 1977.¹⁵ Two testing procedures, the Federal Testing Procedure (FTP), or “city” test, and the Highway Fuel Economy Test (HFET), or “highway” test, were established as the basis for both CAFE and labeling purposes.¹⁶ While both city and highway values are displayed on new vehicle window labels, the two values are combined to determine CAFE compliance.

Originally developed for measuring tailpipe emissions and subsequently adopted to calculate city fuel efficiency, EPA developed the Federal Test Procedure (FTP) in the 1960s to simulate a drive in central Los Angeles. Covering 11 miles, a vehicle in the city test starts with a cold engine, averages 21.2 miles per hour and reaches a top speed of 56 mph. The FTP simulates stop-and-go traffic, with vehicles stopping 23 times, idling 18 percent of the time and accelerating at a maximum rate of 3.3 mph/second.¹⁷

EPA designed the Highway Fuel Economy Test (HFET) in 1974, to estimate highway fuel efficiency simulating a mix of rural and interstate highway driving. In the HFET, vehicles start with a warm engine and drive 10.3 miles, averaging 48.3 miles per hour and reaching a maximum speed of 60 mph. Vehicles do not idle or stop during the test and accelerate at a maximum of 3.2 mph/second.¹⁸

Both the FTP and HFET are conducted in laboratories kept at a temperature of approximately 75 degrees Fahrenheit. Vehicles are run without accessories operating, including air conditioners, lights, heaters, or defrosters. During each test, a professional driver runs the vehicle following a standardized speed versus time schedule while on a dynamometer, a machine used to simulate vehicle road loads. Throughout the test, a hose is connected to the tailpipe to continuously sample emissions in the exhaust. The amount of fuel consumed is calculated by measuring the amount of carbon in the collected exhaust and the amount of carbon in a gallon of gasoline.

While the EPA establishes test procedures, it does not test each vehicle or each model. Instead, manufacturers must test each model and submit results. When testing vehicles, manufacturers are allowed to use pre-production prototypes that may be specialized to achieve better results. The EPA then confirms the results for roughly 10-15 percent of models in its Ann Arbor, MI research facility.

EPA will not begin testing and assigning a fuel efficiency value for large SUVs and pickups – those that weigh more than 8,500 pounds, such as the Ford F-250 and F-350 pickup trucks, GMC 1/2 ton Yukon XL SUVs, and Chevrolet Express 2500 Passenger vans — until MY 2011. EPCA restricted NHTSA’s regulatory authority to vehicles that weigh no more than 10,000 pounds gross vehicle weight rating (GVWR)¹⁹; however, NHTSA chose to exempt vehicles weighing more than 8,500 pounds GVWR from fuel efficiency requirements. In MY 2011, new CAFE regulations will apply to trucks rated up to 10,000 GVWR. It is important to note that, as a result of pressure from agricultural interests, large pickup trucks will not be included in the new program. The EISA created a new class of “work trucks” for fuel efficiency purposes. Congress directed DOT to set fuel efficiency standards for these vehicles, which will include passenger vans and SUVs weighing more than 10,000 pounds and pickups and cargo vans that weigh more than 8,500 pounds, through a separate process that is currently underway.

Failing the Tests?

It is clear that the current tests used to determine fuel efficiency standards and compliance as well as new greenhouse gas emissions standards were behind the times when they were designed and have grown more outdated ever since. These tests fail to represent realistic driving conditions and are inadequate for accounting for new technologies, leading to inflated compliance estimates and allowing manufacturers to design technologies to perform on the test but not necessarily on the road. Both the city and highway test are filled with outdated assumptions that are geared to give the most favorable mpg rating for vehicles.

SPEED AND ACCELERATION

Both city and highway tests incorporate speeds, acceleration and braking that are significantly slower than today's driving patterns. Designed a quarter-century ago when the national speed limit was 55 mph,²⁰ the highway test sets a maximum speed of 60 mph. Since the inception of fuel efficiency testing, the national speed limit has been abolished and most states have adopted interstate speed limits of 65 or 70 mph. In its analysis, the EPA found that 28 percent of driving occurs at speeds greater than 60 mph.²¹ Driving at higher speeds greatly affects fuel efficiency. A Department of Transportation study shows that a vehicle traveling 70 mph achieves 17.1% lower fuel efficiency than a vehicle traveling 55 mph.²²

Similarly, the acceleration rates used in both tests are dramatically slower than those seen in on-road driving, further inflating fuel efficiency estimates. Instead of basing acceleration rates on real-world behavior, the tests assumed slower acceleration rates because dynamometers (basically treadmills used for vehicle testing) in the 1970s could not withstand real-world acceleration.²³ While the city and highway tests assume maximum acceleration rates of 3.3 and 3.2 mph/second, respectively, on-road driving studies have found maximum acceleration rates of roughly 11-12 mph/second.²⁴

In its analysis, EPA found that 33 percent of real-world driving does not fall within the speed and acceleration assumptions of the city and highway test procedures.²⁵

TEMPERATURE

EPA directs tests to be conducted at approximately 75 degrees Fahrenheit, simulating trips in southern California. At higher and lower temperatures, fuel efficiency declines. Indeed, according to the EPA, only

about 20 percent of driving occurs between 70 and 80 degrees Fahrenheit.²⁶ Roughly 15 percent of driving occurs above 80 degrees F, 65% of driving takes place below 70 degrees F. In tests, EPA found that vehicles driven at cold temperatures achieved significantly lower fuel efficiency than those driven in test conditions and that performance ranged widely from vehicle to vehicle. At 20 degrees F, vehicles averaged 12% lower fuel efficiency than those driven in the standard FTP test, with some vehicles showing fuel efficiency losses as much as 40 percent.²⁷

ACCESSORIES

Although not standard on many vehicles in the 1970s, 99 percent of new cars and light trucks are outfitted with air conditioning.²⁸ While fuel efficiency tests are not run with accessories operating, it is clear that accessories such as air conditioners substantially decrease fuel efficiency. A 2003 study by the National Renewable Energy Laboratory found that mobile air conditioning operation consumes roughly 5.5 percent of fuel used annually by passenger vehicles.²⁹ EPA analysis shows that running a vehicle with air conditioners at 95 degrees F reduces fuel efficiency by an average of 21 percent. According to the Natural Resources Defense Council, this accounts for roughly one-quarter of the gap between test fuel efficiency and the Energy Information Administration's on-road fuel efficiency estimate.³⁰

OTHER

Many other factors that can affect fuel efficiency are either considered inadequately or not at all in the test procedures. These factors include trip length, the amount of weight carried in the vehicle, lower energy content in alternative fuels, such as ethanol, and aftermarket tires.

A Tale of Two Numbers: CAFE Compliance vs. EPA Labels

Historically, responsibilities for different aspects of the CAFE program have been split between EPA, the Department of Transportation (DOT), and the Department of Energy (DOE). EPA is responsible for determining fuel efficiency test procedures, estimating fuel efficiency to be placed on window stickers and in an annual fuel efficiency booklet and calculating each manufacturer's corporate average fuel economy.³¹ DOT administers the CAFE compliance program, including establishing standards for passenger and non-passenger vehicles if necessary and determining manufacturer compliance with CAFE standards and assessing penalties as needed.³² DOE is responsible for publishing and distributing the annual fuel efficiency information booklet.³³ And, finally, EPA issues the annual Fuel Economy Trends Report.

Under the new National Program, which consists of EPA's greenhouse gas standards and DOT's CAFE standards, both agencies will administer separate compliance programs; however, EPA will still be responsible for vehicle testing.

EPA AND NHTSA ROLES AND RESPONSIBILITIES

EPA	NHTSA
Sets tailpipe greenhouse gas emission standards under the Clean Air Act (measured in grams of carbon dioxide equivalent per mile).	Sets Corporate Average Fuel Economy Standards under the Energy Policy and Conservation Act (measured in miles per gallon).
Conducts fuel economy and emissions tests at the National Vehicles and Fuel Emissions Laboratory to confirm manufacturer's measurements.	Administers the CAFE program and determines automaker compliance.
Calculates each manufacturer's average fuel economy.	
Using the "5-cycle" test, measures fuel economy and emissions for the Fuel Economy window labels placed on new vehicles.	
Publishes annual "Fuel Economy Trends Report"	

REVISED WINDOW LABELS

While NHTSA implements the CAFE program, EPA is responsible for the information provided to consumers on new vehicle window stickers. Implementation of the CAFE program in the 1970s also provided consumers with fuel efficiency information on the stickers; however, it did not take long for consumers to notice that they were not getting the mileage promised on the window stickers of new cars. With consumer complaints hitting, Congress took action. In 1978 Congress mandated a study on EPA fuel efficiency estimates and actual fuel efficiency.

Following recommendations resulting from Congressional hearings, in 1980 the EPA began a rulemaking to revise its fuel efficiency labeling procedure. Released in 1984 and applicable for MY 1985, the revised labeling method consisted of adjusting city and highway values downwards by a set percentage, based on data from on-road experience. In this “one-size-fits-all” adjustment, city values were adjusted downward 10 percent and highway values were reduced by 22 percent.³⁴

Although the downward adjustments in 1984 closed the gap between label value and actual fuel efficiency, they became increasingly out-of-date as due to changes in both technology and driving behavior. As a result, by the early 1990s some posited that labels did not accurately estimate the fuel efficiency that



Window label prior to 2008



Window Label after 2011

most drivers would achieve.³⁵ Again recognizing the discrepancy, Congress included a provision in the Energy Policy Act of 2005 requiring the EPA to revise its fuel efficiency estimates yet again.³⁶

REVISED “5-CYCLE” METHODOLOGY

Responding to directives in the Energy Policy Act of 2005, EPA issued new fuel efficiency test methods the following year to provide more accurate window label values beginning with 2008 models. Unlike the previous “one-size-fits-all” adjustment, the 2006 adjustment specifies three additional testing procedures that reflect a broad range of real-world driving conditions including cold weather, higher driving speeds, faster acceleration, and the use of air conditioning.

To update its testing procedures, EPA pulled from existing tests developed as a result of the Clean Air Act Amendments of 1990 to more accurately measure emissions from light-duty vehicles. The US06 test simulates high-speed, rapid acceleration driving and assumes an average speed of 48 mph, with maximum speed of 80 mph and accelerations of up to 8.5 mph/second. The SC03 test is designed to assess the use of air conditioning units and is run in conditions of 95 degrees Fahrenheit with 40% relative humidity and maximum solar heat load. This test assumes an average speed of 22 mph, a maximum speed of 55 mph and accelerations of up to 5.5 mph/second. The third test, the Cold FTP, measures performance at 20 degrees Fahrenheit and assumes an average speed of 21 mph, a maximum speed of 48 mph and accelera-

tions of 3.3 mph/second. While these three testing procedures had been used by EPA since the mid-1990s for emissions regulations, they were not required to measure fuel efficiency.

To arrive at an updated label value, EPA derives a “composite” value based on all five tests, weighted based on how often the conditions of each test occur in city driving and highway driving. Additionally, EPA includes a downward adjustment of 9.5% to account for rough road conditions, road grade, tire pressure, heavier loads, and differences in fuels. The composite value derived from these tests is still based on an assumption of 55% city driving and 45% highway driving, even though EPA has determined that the mix is closer to 43% and 57%, respectively.

Fuel efficiency values derived from this “5-cycle” test are significantly lower than previous estimates. Indeed, EPA estimates that most vehicles will receive city values of 8-15% lower than the earlier label values and highway values of 5-15% lower. EPA deserves credit for updating window labels in an attempt to more accurately reflect on-road fuel efficiency. However, the 5-cycle test remains built on a foundation of 1970s testing procedures.

Implications of Inaccurate CAFE Values

The wide discrepancy between the fuel efficiency ratings that automakers receive credit for, the value posted on new car labels and the fuel efficiency a consumer actually sees has several implications.

First, the disconnect between compliance and label values makes it virtually impossible to have a rational conversation about fuel efficiency — both for policy-makers and consumers. This discrepancy creates the impression that automakers are being asked to do more than they actually are. While automakers are required to create a fleet of vehicles that averages the equivalent of 35.5 mpg in 2016, the actual fleet average will be approximately 20% less than that — closer to 29 mpg. As the administration prepares to propose 2017-2025 standards, the industry is claiming that a 62 mpg standard is much too high — but the fact is that if the standard setting process focused on the on-road impacts of moving forward with a 6% annual decrease in greenhouse gas pollution between 2017-2025 — automakers are being asked to deliver something closer to a 44 mpg new vehicle fleetwide average.

Second, the confusion of numbers only grows with new greenhouse gas standards that are also based on the out-dated CAFE testing procedures. The methodology of the 1970s will carry forward to greenhouse gas standards to ensure that compliance is consistent across the programs that NHTSA and EPA administer. As standard setting jurisdictions overlap, the need for one set of correct numbers becomes increasingly clear.

Finally, the out-dated test procedures do not account for new technologies such as plug-in hybrid electric vehicles, as EPA recognizes in the proposed standards for my 2012-2016. A new testing program must account for new types of vehicles as well as new accessories and designs.

CAFE AVERAGES vs. ACTUAL AVERAGES

TOYOTA PRIUS
CAFE AVERAGE: 71 MPG



ACTUAL AVERAGE: 50 MPG

2016 VEHICLE FLEETS
CAFE AVERAGE: 35.5 MPG



ACTUAL AVERAGE: 29 MPG

Looking Forward: Policy Recommendations

Fuel efficiency and tailpipe emissions testing procedures are inaccurate and in need of a long overdue change that will bring them into the 21st century.

While NHTSA is statutorily constrained by EPCA when setting test procedures for CAFE standards for cars, it does have the authority to establish new test procedures for light trucks. Additionally, under the Clean Air Act, EPA has wide latitude to institute test procedures that accurately represent on-road greenhouse gas emissions. It is vital that both EPA and NHTSA use their respective authorities to develop and implement accurate testing procedures as soon as possible.

Accurate testing of new vehicles and use of these new procedures to guide new vehicle standards would allow policymakers to have coherent conversations based on one set of numbers for both compliance with the law and new vehicle window labels. Accurate testing will also give consumers a better sense of the average mileage they will see on the road and allow automakers to showcase gains in fuel efficiency without having to qualify them. To achieve this, we recommend the following:

Design new tests to reflect real-world conditions and behavior

Although EPA's updated window label testing procedures are more accurate, they remain an ad hoc approach. Instead of collecting real-world data and testing sample vehicles to inform new tests, EPA has continued to rely on existing tests with a simple adjustment to glue them together. Instead of upgrading existing tests, EPA, in consultation with DOT

and DOE, should develop new testing procedures that incorporate road and weather conditions, use of accessories and more aggressive driving habits.

While NHTSA is statutorily constrained, EPA can and should implement new test procedures for passenger vehicle greenhouse gas standards. Similarly, NHTSA should use its authority to use new vehicle test procedures for light trucks. These changes will begin the process of reforming testing and standards.

One set of numbers, phased in

EPA and DOT should use one set of numbers, to the extent possible, based on updated testing procedures that reflect real world conditions and behavior for both compliance and labeling. Using accurate fuel efficiency and greenhouse gas values for compliance with standards will ensure that the technologies implemented by manufacturers yield the most cost-effective reductions in the real world, instead of on unrepresentative test cycles.

Because accurate tests will yield lower fuel efficiency values, making existing standards (set based on inflated testing values) harder to meet, accurate values could be phased in. A phase-in period of five years would avoid a sudden requirement for automakers to produce more efficient vehicles, instead allowing them to plan ahead for a steady increase in standards that will yield significant reductions in oil consumption and greenhouse gas emissions.

CONCLUSION

As our fuel efficiency and greenhouse gas standards come out of the 1970s and into the 21st century, it is critical that testing procedures not remain mired in outdated and flawed assumptions. As EPA and NHTSA develop new standards for vehicles sold from 2017-2025, Sierra Club is calling on the Administration to decrease emissions by 6% per year and set a fuel efficiency standard of at least 60 mpg by

2025. Due to outdated tests, the truth is that the on-road fuel efficiency of hitting 60 mpg could be closer to a 44 mpg. As the EPA and the DOT proceed with standards that will make our cars and trucks cleaner and more efficient, they must embrace "truth in testing" in order to ensure that standards are grounded in real values and that automakers are measured by the performance that consumers see on the road.

Endnotes

- 1 Environmental Protection Agency and National Highway Traffic Safety Administration. 2017 and Later Model Year Light Duty Vehicle GHG Emissions and CAFE Standards; Notice of Intent. Oct. 2010. <http://www.regulations.gov/#!documentDetail;D=NHTSA-2010-0131-0001>
- 2 Ibid.
- 3 Union of Concerned Scientists. *Translating New Auto Standards into On-Road Fuel Efficiency*. May 2011. http://www.ucsusa.org/assets/documents/clean_vehicles/Translating-Standards-into-On-Road.pdf
- 4 Vehicle sales are classified and regulated in “model years,” which do not necessarily correspond to calendar years. For the purposes of fuel economy and greenhouse gas standards, a model year is the annual production period for a vehicle manufacturer that includes January 1 of the calendar year.
- 5 Similarly, California will soon consider its second round of clean car standards, which will include compliance targets likely based on the same tests.
- 6 Sierra Club, et al., *Increasing America's Fuel Economy*. Feb. 2002.
- 7 The US Code defines a light-duty truck as any vehicle rated 8,500 lbs GVWR or less and a curb weight of 6,000 lbs or less that is used either for the transportation of property or more than 12 people or has off-street capability. This class covers many minivans, sport-utility vehicles, and smaller pickup trucks. (40 CFR 86.82-2)
- 8 Sierra Club, et al., *Increasing America's Fuel Economy*. Feb. 2002.
- 9 Congressional Research Service. *Automobile and Light Truck Fuel Economy: The CAFE Standards*. 2008. http://assets.opencrs.com/rpts/RL33413_20080507.pdf
- 10 Under the Clean Air Act, California is allowed to implement more stringent pollution standards for motor vehicles. However, before implementing more stringent regulations, California must receive a waiver from the US EPA. In December 2007, the Bush Administration denied California a waiver to implement its Pavley clean car standards. The denial marked the first time that EPA had denied California a Clean Air Act waiver.
- 11 The Bush Administration initiated the rulemaking process for MY 2011-2015, ramping up to a fleetwide 31.6 mpg in 2015. The Bush DOT did not issue the final rule, leaving it to the new Obama DOT to finalize the standards. President Obama's action directed DOT to issue the 2011 model year standard only, creating the room for a re-evaluating the longer term program.
- 12 If all emissions reductions used to meet the standard EPA's standard of 250 grams of Carbon Dioxide equivalent per mile were met through improvements in fuel economy, the equivalent fuel economy standard would be 35.5 miles per gallon. However, EPA's standards allow for improvements in air conditioner efficiency and changes in refrigerants, while NHTSA's CAFE standards do not. Therefore, the final fuel economy standards were set lower, at 34.1 mpg, to account for air conditioning improvements that could be made in EPA's standards, but not NHTSA's.
- 13 Proposed Rulemaking To Establish Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Proposed Rule. Federal Register Vol. 74, No. 186 (28 Sept. 2009) 49454-49502
- 14 Union of Concerned Scientists. *Translating New Auto Standards into On-Road Fuel Efficiency*. May 2011. http://www.ucsusa.org/assets/documents/clean_vehicles/Translating-Standards-into-On-Road.pdf
- 15 Fuel Economy Labeling of Motor Vehicles: Revisions To Improve Calculation of Fuel Economy Estimates; Proposed Rule. Federal Register Vol. 71, No. 21. (1 Feb. 2006) 5426-5513.
- 16 Ibid.
- 17 US Environmental Protection Agency and US Department of Energy. Detailed Test Information. Accessed June 8, 2010 from http://www.fueleconomy.gov/feg/fe_test_schedules.shtml
- 18 Ibid.
- 19 Gross Vehicle Weight Rating (GVWR), is the maximum allowable total mass of a vehicle when loaded. GVWR includes the weight of the vehicle, as well as the weight of fuel, passengers, cargo and trailer tongue weight.
- 20 As a result of the Emergency Highway Energy Conservation Act, national speed limits were capped at 55 miles per hour from 1974 through 1987.
- 21 Fuel Economy Labeling of Motor Vehicles: Revisions To Improve Calculation of Fuel Economy Estimates; Proposed Rule. Federal Register Vol. 71, No. 21. (1 Feb. 2006) 5426-5513.
- 22 Data shown in *Transportation Energy Data Book: Edition 23*; Stacy C. Davis and Susan W. Diegel; Oak Ridge National Laboratory; ORNL-6970; Prepared for the U.S. Department of Energy; October 2003.
- 23 Ibid.
- 24 Fuel Economy Labeling of Motor Vehicles: Revisions To Improve Calculation of Fuel Economy Estimates; Proposed Rule. Federal Register Vol. 71, No. 21. (1 Feb. 2006) 5426-5513.
- 25 Ibid.
- 26 Ibid.
- 27 Ibid.
- 28 Natural Resources Defense Council. Comments on the Petition to Amend Fuel Economy Testing and Calculation Procedures. EPA Docket No. OAR-2003-0214. July 2004.
- 29 Rugh, J. and V. Howland, *National and World Fuel Savings and CO2 Emission Reductions by Increasing Vehicle Air Conditioning COP*; presentation at the 2003 Alternate Refrigerant Systems Symposium, National Renewable Energy Laboratory, July 17, 2003.
- 30 Natural Resources Defense Council. Comments on the Petition to Amend Fuel Economy Testing and Calculation Procedures. EPA Docket No. OAR-2003-0214. July 2004.
- 31 Fuel Economy Labeling of Motor Vehicles: Revisions To Improve Calculation of Fuel Economy Estimates; Proposed Rule. Federal Register Vol. 71, No. 21. (1 Feb. 2006) 5426-5513.
- 32 Ibid. Automakers failing to comply with a given model year standards are required to pay a penalty (\$5 per x mpg below the standard). Automakers averages are, however, determined on a rolling basis with automakers able to apply credits earned from overcompliance or from borrowing from as many as three years in the future. None of the Detroit automakers have every failed to comply with standards, whereas some European luxury and sports car brands pay penalties annually.
- 33 Fuel Economy Labeling of Motor Vehicles: Revisions To Improve Calculation of Fuel Economy Estimates; Proposed Rule. Federal Register Vol. 71, No. 21. (1 Feb. 2006) 5426-5513.
- 34 Ibid.
- 35 Mintz, M.M., A.R.D. Vyas, and L.A. Conley. *Differences between EPA-Test and In-Use Fuel Economy: Are the Correction Factors Correct?* Paper No.931104, Transportation Research Board, Washington, DC, Jan. 1993.
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