



Consumer Federation of America

Automakers Are on the Road to Meeting Fuel Efficiency Standards

*An Analysis of Automaker Progress in Meeting 2025 Fuel Efficiency Requirements
and A Look At Consumer Attitudes Towards Fuel Efficiency*

Jack Gillis

Stephen Brobeck

Mark Cooper

Consumer Federation of America

April 25, 2016

INTRODUCTION

An analysis of current fuel economy across the U.S. fleet shows manufacturers are successfully complying with – and in some cases, exceeding – Corporate Average Fuel Economy (CAFE) and related emissions standards. As a result, American consumers now enjoy the widest-ever range of fuel-efficient options on the market, in every single vehicle class.

Further to this, new consumer polling shows that Americans continue to place high value on fuel efficiency when considering future vehicle purchases. They also support the federal government's fuel economy standards, which agencies are slated to revisit this year. According to a new national survey conducted by ORC International for the Consumer Federation of America, 81 percent of respondents support the federal standards, with 52 percent expressing strong support. And despite today's low gas prices, consumers expect a return to pre-glut, \$3.00 per gallon levels in coming years.

The following report includes: 1) a review of fuel economy performance among the major automakers, 2) a description of recent consumer polling and 3) an appendix of model-by-model new vehicle fuel economy performance over the past three years.

MANUFACTURERS KEEPING PACE WITH CAFE REQUIREMENTS

According to the Consumer Federation of America's latest analysis of 1,094 of this year's new vehicles, fuel efficiency continues to increase for 2016 on a model-by-model basis. The percentage of vehicles with an Environmental Protection Agency (EPA) fuel economy rating of at least 23 miles per gallon increased from 52 percent in 2015 to percent in 2016¹. At the same time, the percentage of vehicles with fuel economy at or below 16 mpg – i.e. the gas-guzzlers – declined from 6.1 percent in 2015 to 4 percent in 2016.²

¹ This report examined all vehicle models with an EPA label rating. As of February 2016, that included 1,094 cars. For 2015 there were 1,194 models and for 2014 the total was 1,091.

² The combined (city/highway) EPA rating was used for our analysis and percentages refer to the entire list of 1,094 vehicles with EPA fuel economy ratings for 2016. We did not include large passenger vans or exotic vehicles.

CFA REPORT: 2016 FUEL ECONOMY PROGRESS AND CONSUMER ATTITUDES

On the other hand, the 2016 improvement disguises significant variations in the fuel economy progress made by individual car companies. Some automakers have significantly increased the number of models that comply with the year's CAFE standard. Examples include Mazda, the first non-electric automaker to achieve 100 percent compliance (100 percent this year vs. 75 percent in 2015); Mitsubishi (70 percent vs. 39 percent in 2015)³ and Hyundai (59 percent vs. 28 percent in 2015). Other companies made little improvement over last year, such as Fiat Chrysler (21 percent in 2016 vs. 17 percent in 2015) and Toyota (35 percent in 2016 vs. 34 percent in 2015). Only one automaker, Ford, declined slightly (32 percent in 2016 vs. 34 percent in 2015).

The good news in 2016 is that 15 of the 16 major auto companies met or exceeded their 2015 fuel economy performance. And since the announcement of higher standards, many car companies have increased the percentage of their vehicles with higher fuel efficiency, providing strong evidence that automakers can meet the current standards agreed to in 2012.

When examining new vehicle models and automaker fuel economy performance, it's important to recall that fuel economy targets are foot-print based, meaning smaller cars must achieve higher fuel economy than larger SUVs and pickups. Additionally, automakers meet requirements on an average basis across their fleets, which mean that not every single model has to meet a given year's target for its vehicle class. Instead, automakers produce and sell a mix of vehicles that are both above and below a given year's set of standards. Over the past several years, rising standards have helped create a much more efficient U.S. auto fleet while preserving consumer choice on size, weight and performance. Indeed, the fact that the number of cars achieving more than 23 mpg has risen by 43 percent in the last ten years is strong evidence that reaching a goal of 40 mpg by 2025 is attainable.

³ Note: however, given the recent announcement of testing manipulation by Mitsubishi, those results have to be suspect until the investigation is complete.

CFA REPORT: 2016 FUEL ECONOMY PROGRESS AND CONSUMER ATTITUDES

We should note that throughout this report, we express miles per gallon in terms of on-road performance, which consumers see reflected in EPA window stickers and in automaker advertisements. Automakers are expected to meet a standard of 40 mpg in on-road performance by 2025, which is equivalent to 54.5 mpg under the CAFE testing and compliance system federal agencies use. (Please see the Appendix for more on this topic.)

Figure 1. On the Road to 40 mpg by 2025: Carmakers Demonstrate that Meeting the New Standard is Possible												
EPA Grade	Fuel Economy (mpg)	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
10	38+	0.4%	0.2%	0.2%	0.2%	0.6%	1.0%	1.1%	2.9%	3.1%	3.0%	4.0%
9	31-37	0.7%	0.4%	0.8%	1.1%	2.1%	3.2%	4.7%	6.4%	8.5%	8.7%	9.3%
Over 30 MPG		1.1%	0.6%	1.0%	1.3%	2.7%	4.2%	5.8%	9.3%	11.6%	11.7%	13.4%
8	27-30	2.4%	3.0%	3.5%	4.4%	7.3%	7.8%	9.2%	12.0%	14.8%	16.5%	17.3%
7	23-26	10.3%	10.2%	12.8%	12.4%	18.9%	18.3%	20.4%	25.0%	24.1%	23.8%	25.4%
Acceptable		12.7%	14.4%	18.3%	19.3%	31.6%	34.5%	41.2%	45.3%	50.5%	52.0%	56.1%
6	22	10.4%	10.4%	7.2%	11.7%	8.4%	8.0%	7.0%	7.7%	6.1%	8.0%	7.5%
5	19-21	28.2%	26.5%	28.5%	27.6%	29.2%	30.4%	26.9%	26.5%	24.3%	22.2%	21.8%
4	17-18	14.7%	13.7%	14.9%	12.5%	13.8%	12.5%	11.3%	9.4%	10.6%	11.7%	10.7%
3	15-16	24.4%	24.6%	16.6%	15.6%	11.4%	10.3%	9.8%	6.7%	6.1%	4.7%	3.7%
2	13-14	5.0%	5.9%	9.9%	8.2%	6.7%	6.8%	7.8%	3.0%	2.4%	1.4%	0.3%
1	0-12	3.5%	5.2%	5.7%	6.4%	1.7%	1.7%	1.8%	0.4%	0.0%	0.0%	0.0%
Poor		86.2%	86.3%	82.8%	82.0%	71.2%	69.7%	64.6%	53.7%	49.5%	48.0%	43.9%
# of Models		1076	1184	1198	1182	1101	1053	901	1057	1091	1194	1094

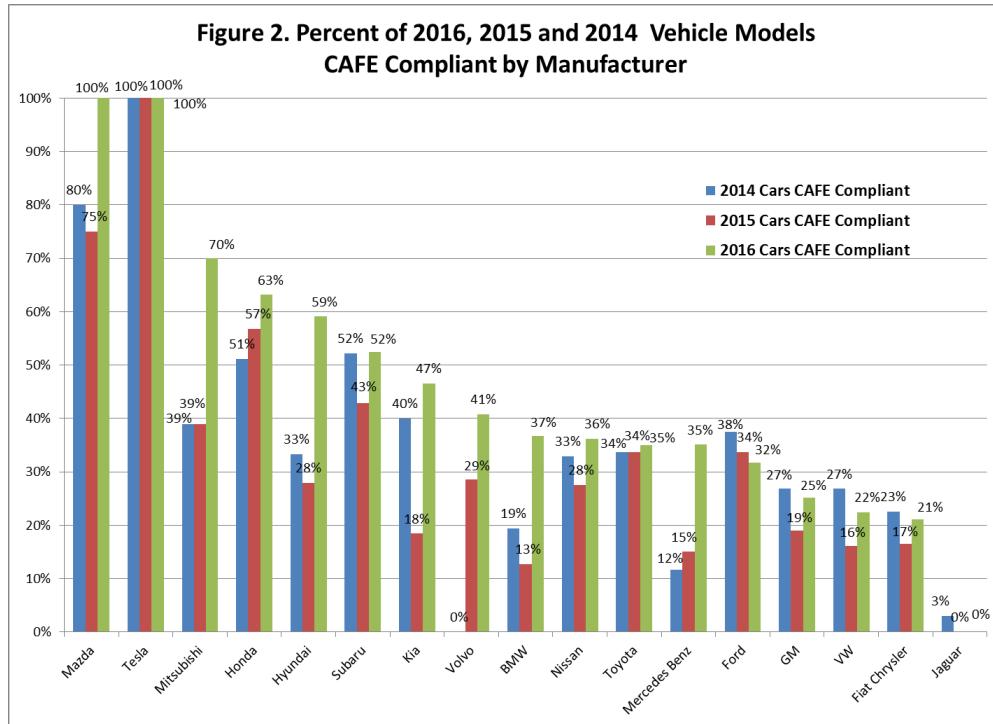
JUMP IN VEHICLE MODELS GETTING OVER 30 MPG

In looking at 2016 models, one of the biggest jumps in fuel efficiency was in the over-30-mpg category, which improved from 11.7 percent in 2015 to 13.4 percent in 2016 (see Figure 1). An example of an improved vehicle was the “all-new” Chevrolet Malibu. In 2015, the Malibu had a fuel economy range of 24 to 29 mpg, but that jumped to a range of 28 to 46 mpg in 2016. By adding new technologies such as engine stop/start and a hybrid engine to their lineup, Chevrolet made all Malibu models CAFE-compliant for 2016. Further, the most fuel-efficient Malibu model is already capable of meeting higher, future standards that automakers are not required to hit until 2022.

The following chart (Figure 2) compares the percentage of each company’s models that are CAFE-compliant in 2014, 2015 and 2016. In 2016, 15 companies

CFA REPORT: 2016 FUEL ECONOMY PROGRESS AND CONSUMER ATTITUDES

matched or improved the percentage of models complying with CAFE over 2015 (14 improved, while one, Tesla, matched last year's 100 percent). One company, Ford, backslid slightly.



“ALL-NEW” VEHICLES JUMP IN PERCENTAGE OF CAFE COMPLIANCE

The introduction of “all-new”⁴ vehicles is the best barometer of a manufacturer’s ability to comply with CAFE. Changing the fuel efficiency of existing models is difficult, as the vehicle is already designed and is being manufactured to its original specifications. With “all-new” vehicles, manufacturers can incorporate their latest fuel-saving technologies. In comparing the CAFE compliance of “all-new” models in 2015 and 2016, there was a significantly higher percentage of CAFE-compliant vehicles in 2016. In fact, 60 percent of the “all-new” 2016 vehicles were CAFE-compliant, compared to 41 percent of the “all-new” 2015 vehicles (see Figure 3).

⁴ Each year only about 10 percent of the fleet is “all-new”. Typically, when a new model is introduced, that vehicle essentially stays the same for 5-6 years. This is called a “model series” and while there may be some style and feature changes during a model’s series, the mechanics of the vehicle generally stay the same.

“ALL-NEW” CARS LEAD THE WAY

The percentage of “all-new” cars that were CAFE-compliant in 2016 increased significantly, to 80 percent in 2016 from 41 percent in 2015. However, the percentage of CAFE-compliant light trucks and SUVs stayed the same at 40 percent (Figure 3).

Figure 3. Percentage of CAFE Compliant Vehicles Among All-New Models 2014-2016			
	2014	2015	2016
Total All-New Vehicles	29	34	32
Total CAFE Compliant	19 (66%)	14 (41%)	19 (60%)
Percentage of CAFE Compliant Vehicles Among All-New Models 2014-2016			
	2014	2015	2016
Total All-New Cars	19	19	19
Total CAFE Compliant	11 (58%)	8 (42%)	15 (80%)
Percentage of CAFE Compliant Vehicles Among All-New Models 2014-2016			
	2014	2015	2016
Total All-New Trucks	10	15	13
Total CAFE Compliant	8 (80%)	6 (40%)	5 (40%)

From a consumer perspective, buyers realize immediate savings at the pump with a CAFE-compliant vehicle. Those purchasing these efficient models can rest assured they will receive a return on their investment for years to come.

TODAY’S VEHICLES ALREADY MEET FUTURE CAFE REQUIREMENTS

Finally, in reviewing the “all-new” models, we determined how many years into the future each model would comply with rising CAFE requirements for that vehicle class, since fuel economy targets increase every year. Current vehicles that meet CAFE requirements for future years help the manufacturer continue to comply with higher standards, which is good news for buyers.

CFA REPORT: 2016 FUEL ECONOMY PROGRESS AND CONSUMER ATTITUDES

There were 19 “all-new” vehicles for 2016 that had models which met, at the minimum, the 2016 CAFE standard. Figure 4 shows that many of these same 2016 vehicles will also meet the standard in future years. As indicated, almost all of them (95 percent) will remain CAFE-compliant for another 2 years, until 2018. Seventy-four percent will be CAFE-compliant until 2020, and 21 percent will remain in compliance until 2024.

Toyota’s 2016 Rav4 and the Chevrolet Malibu (Hybrid) and Chevrolet Cruze have models compliant until 2021. Honda’s new Civic, one of the most popular internal combustion engine cars in the United States, has models compliant until 2023, as does the Scion iA. A few other models would be compliant until 2024, including the Chevrolet Volt and Toyota Prius, while the Chevrolet Spark (EV), Smart ForTwo (EV) are compliant until 2025.⁵

The 2015 Ford 150, the most popular truck in the United States, has models compliant until 2021. Similarly, 2014’s Toyota Highlander is compliant until 2020.

Figure 4. Among the 2016 CAFE Compliant Vehicles – How Many Will Continue Their CAFE Compliance Until:

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
19	18 (95%)	18 (95%)	15 (79%)	14 (74%)	11 (58%)	7 (37%)	6 (32%)	4 (21%)	2 (11%)

SURVEY RESULTS: CONSUMERS WANT FUEL-EFFICIENT VEHICLES

A survey of American consumers conducted in March 2016 by ORC International for the Consumer Federation of America showed that consumers continue to see fuel economy as an important characteristic when considering the purchase of a new vehicle.⁶

- 81 percent said gas mileage would be important when buying a car

⁵ Previous version of this report indicated that the Chevrolet Spark (EV) and Smart ForTwo (EV) were compliant until 2024. A recalculation of their performance shows them actually going to 2025.

⁶ The survey analyzed in this paper was a national random sample survey of 1,001 adults conducted by telephone (wireline and cellular) from March 10 to March 13, 2016. For the full sample, the confidence interval is ± 3.1%, at the 95 percent level.

- 54 percent said mileage would be very important

Gas mileage is very important for women (60 percent), those under the age of 45 (59 percent), and people with moderate incomes of \$25k-\$50k (64 percent).

Consumers continue to express support for fuel economy standards.

- Overall, 81 percent support the federal standards, with
- 52 percent strongly supporting the federal standards

The most supportive groups (i.e. those who “support strongly”) are 35-44 year olds (63 percent), those with a college degree (60 percent), and those with incomes above \$100k (59 percent).

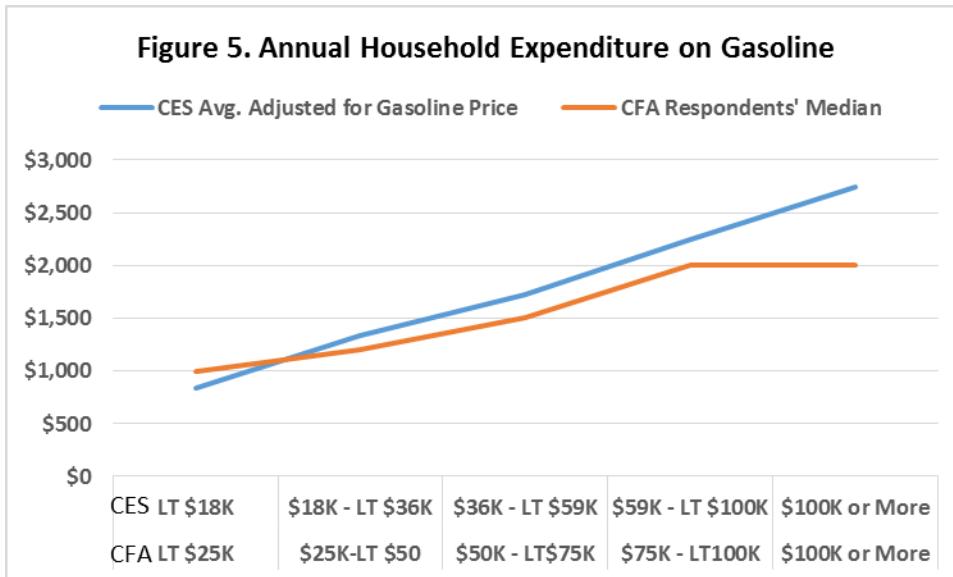
It is significant that consumers are indicating that fuel economy is an important purchase criterion, and that they expressed support for fuel economy standards at a time when gasoline prices were quite low. The survey shows consumers recognize the volatility of gasoline prices and expect them to rise. According to the survey, consumers project prices to be at or above \$3.00 per gallon in five years. In fact, the average response was \$3.50 per gallon, and one-third of respondents think gas prices will hit at least \$4.00 in five years.

When we compared these consumer projections for prices five years out to the latest published Energy Information Administration (EIA) projections for 2020, we found consumer expectations are in line with the expert EIA projections, which agencies use to formulate new fuel-economy goals. In this case, EIA projected a reference case price of \$3.20 in nominal dollars per gallon. However, the high price case (\$4.84) showed a much higher level than the low price case (\$2.72).

We believe respondents’ attitudes reflect not only expected increases in gas prices, but also their household expenditure experience. Even at \$2.00 a gallon, the average household spends about \$1,500 a year on gasoline, which is about as much as the average household spends on electricity or telephone services.⁷ While the estimates of the average household expenditure on gasoline had wide variations (i.e. the standard deviations were

⁷ Based on 2014 Consumer Expenditure Survey (Bureau of Labor Statistics) and annual gasoline prices (Energy Information Administration), and assuming no increase in consumption.

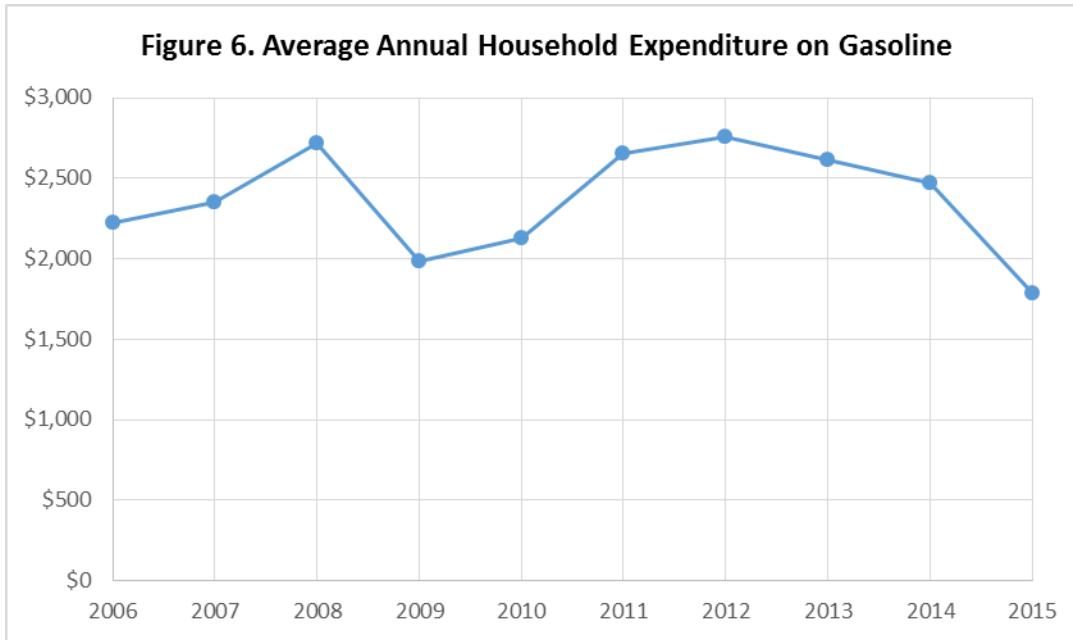
three times the mean), the medians were quite close to data on the average household expenditures as reported in the Consumer Expenditure Survey (as shown in Figure 5).



Source: Consumer Expenditure Survey, various years, CFA March Gasoline Survey⁸

Respondents' attitudes also likely reflect the volatility in gasoline expenditures experienced over the past decade. Figure 6 shows that consumers are spending nearly \$1,000 less on gasoline per year than they did in 2008, including adjustments for inflation.

⁸ Since the latest CES data is for 2014, we have adjusted it for the decline in gasoline prices. We show the income category limits for both the CES and the CFA survey. The categories are closely, but not perfectly, aligned.



Source: Consumer Expenditure Survey, various years

STAY THE COURSE: CONSUMER BENEFITS FOR FUEL ECONOMY REMAIN STRONG

Manufacturers' ability to produce CAFE-compliant vehicles will go a long way towards protecting consumers and our economy from volatile gasoline prices. Even with lower gas prices, buying for fuel efficiency is the consumer's best defense against gasoline price volatility. Gasoline remains a necessity of daily life and a very large household budget item, so consumer spending on fuel-efficient vehicles yields a direct, monetary benefit to consumers by lowering their expenditures on gasoline.

Based on CFA's economic analysis of the cost of complying with fuel economy standards, fuel-efficient technology remains an attractive investment for the typical consumer. In fact, if a consumer paid cash up front for a new car with efficiency technology, they would save money over the lifetime of a vehicle, even at \$1.30 a gallon.⁹ Put another way, if a consumer spends \$500 for a more fuel-efficient vehicle that uses about 385 fewer gallons of gasoline over its operating lifetime, then it costs them

⁹ Consumer Federation of America, et al., 2012, Comments on the Proposed Rule 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards, Docket Nos. EPA-HQ-OAR-2010-0799; FRL-9495-2, NHTSA-2010-0131, 2/13/12, Exhibit V-7 and accompanying text.

only \$1.30 per gallon saved ($\$500/385 = \1.30). While economists can and do offer complex modifications to these calculations, taking inflation, real increases in gasoline prices and the time value of money into account, the basic idea does not change. In fact, after all of these adjustments are made, the cost of saved gasoline in the economic analysis of the current fuel economy standards remains about \$1.30. Consumers who lease vehicles and trade them in after a few years of use can also consider the immediate value of reduced gasoline use and weigh that against any potential increases in monthly payments associated with a more fuel-efficient model.

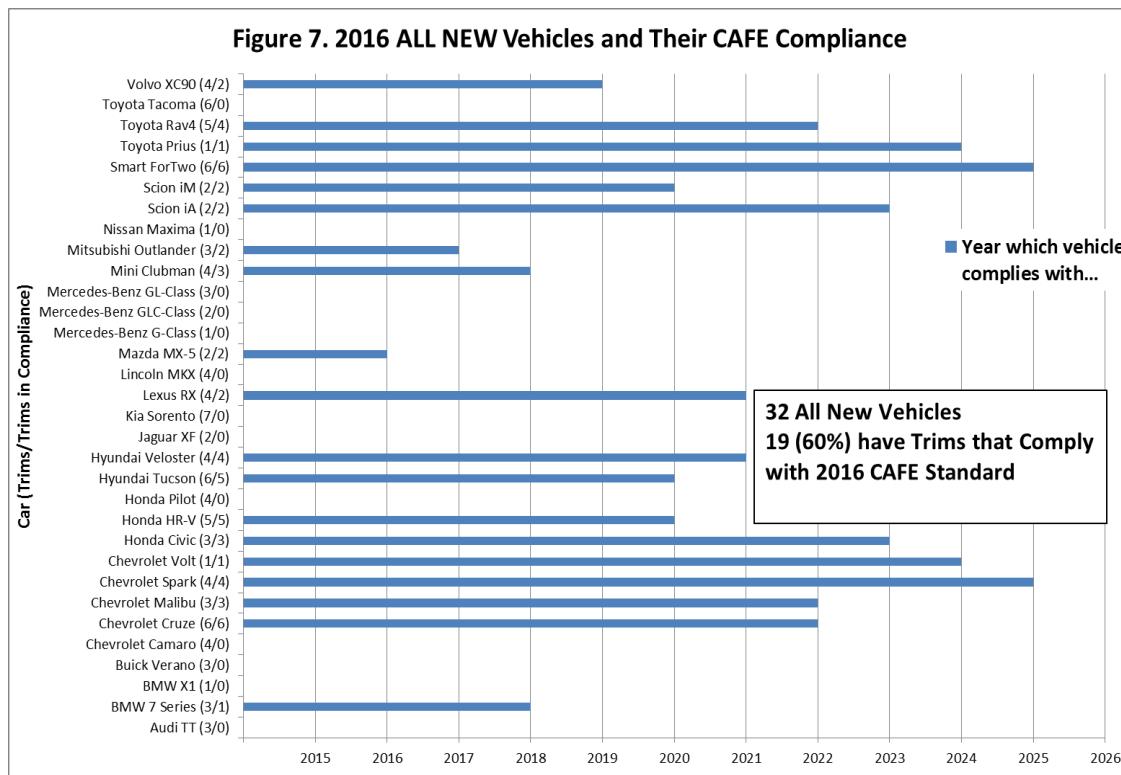
Fuel-efficient vehicles are not only critically important for consumer pocketbooks, they are also essential for manufacturer's financial viability and the health of the broader economy. Buying a fuel-inefficient vehicle during times of low gas prices can subject household finances to a huge burden when gas prices rise, causing consumers to reduce spending in other sectors. At the same time, high prices reduce the trade-in value of inefficient vehicles and make it harder for automakers to sell their least efficient models. Consider 2008, when gas prices spiked, leaving U.S. automakers stuck with millions of unsold gas-guzzlers. The U.S. government ended up stepping in to bail out the car manufacturers.

While there are very different compliance levels among the manufacturers, today's best-performing cars and trucks make it clear that averaging 40 mpg by 2025 is, indeed, achievable. Further, the 40 mpg fuel economy standards represent a historic agreement among automakers, labor unions, environmental groups and consumer organizations. Sticking to that agreement and continuing to increase fuel economy in coming years will benefit our economic security, the environment, and consumers, who will enjoy reduced fuel consumption and more vehicle choices. Finally, we should all take seriously the advice of military and national security leaders who emphasize the advantages of being less dependent on oil for our transportation needs.

When it comes to increasing fuel economy, staying the course will keep U.S. manufacturers competitive, benefit our national security, improve the environment, and save consumers money—a clear win-win-win-win.

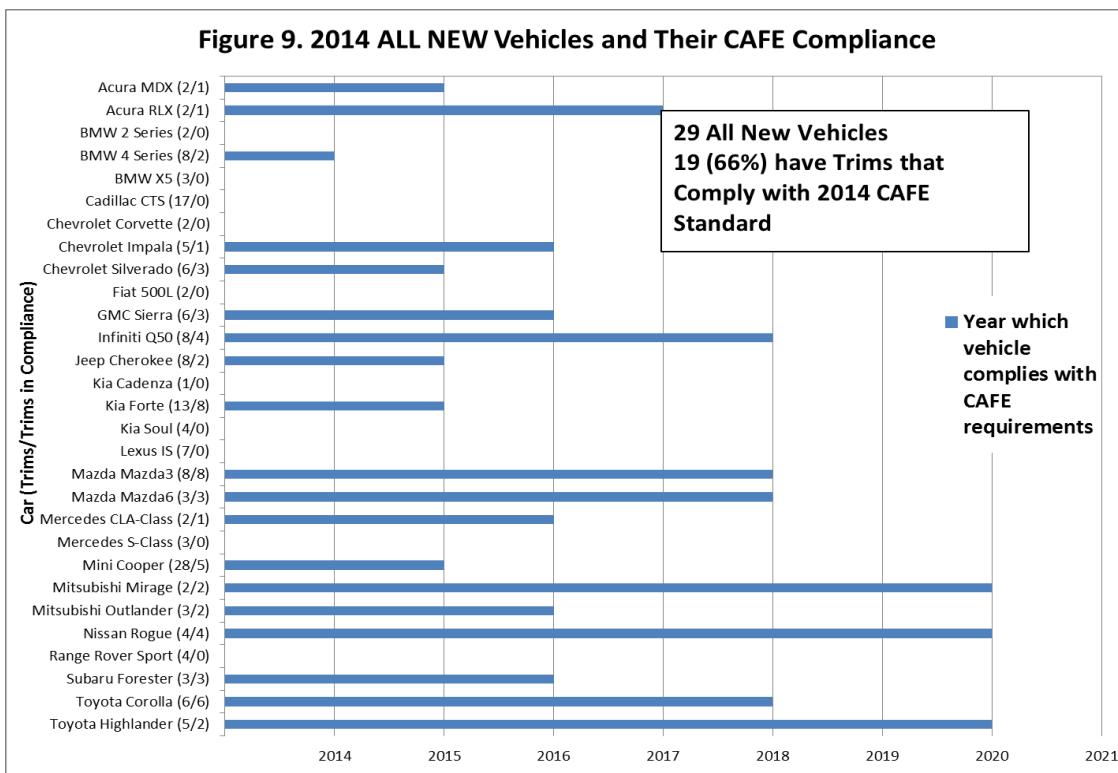
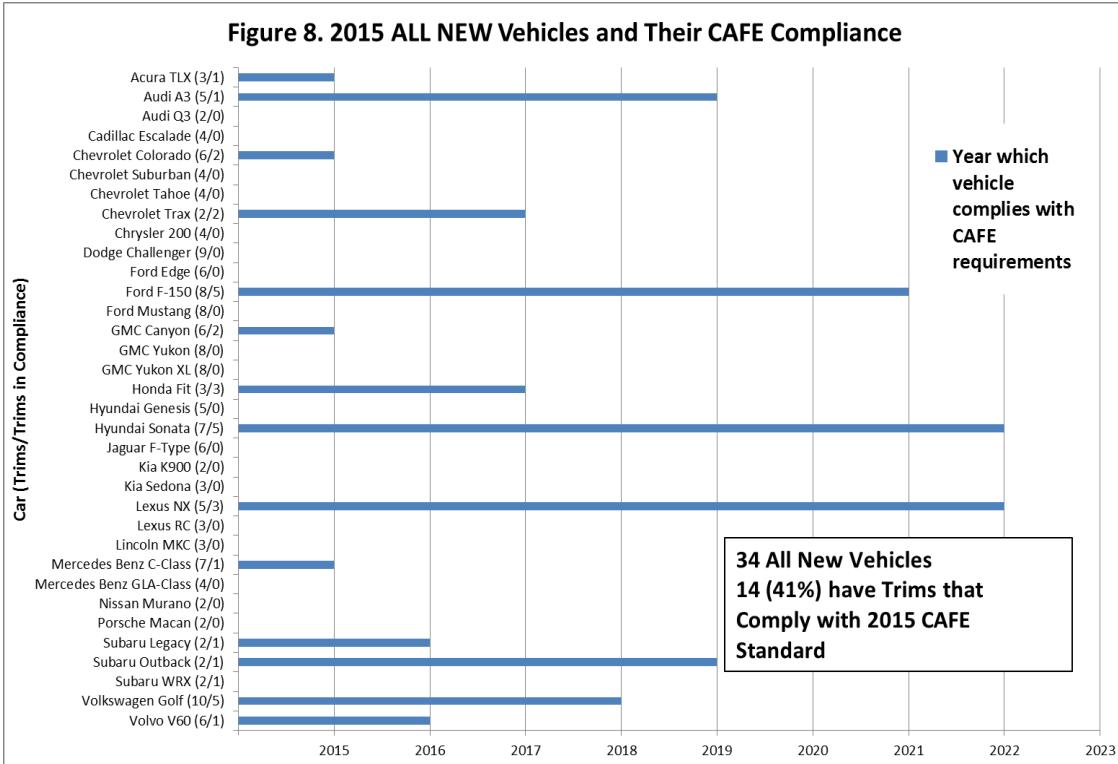
APPENDIX: MODEL-BY-MODEL NEW VEHICLE PERFORMANCE 2014 - 2016

Figures 7, 8 and 9 show the CAFE compliance of the “all-new” 2016, 2015, and 2014 vehicles.



Note: The numbers after the car names in figures 7, 8, & 9 represent the total number of “trims” for that model, followed by how many meet the CAFE standard. The blue line represents the year, which the most efficient trim of the model is CAFE-compliant until.

CFA REPORT: 2016 FUEL ECONOMY PROGRESS AND CONSUMER ATTITUDES



EPA LABEL VS. CAFE MPG RATINGS

Unfortunately, the mileage rating programs used for regulatory requirements under CAFE differ significantly from the more familiar EPA Consumer Label program, a situation that has already led to some confusion among consumers, policymakers, automakers and journalists.

CAFE test scores are based on automobile performance under laboratory conditions, including running vehicles on oversized treadmills, as well as a system of credits that cover everything from air conditioning to alternative fuels. These are the numbers the auto industry, policymakers and advocates tend to focus on.

By contrast, the EPA Consumer Label mpg ratings are based on track testing and other methods that do a much better job predicting a consumer's real-world mileage. These numbers can be appropriately used to compare vehicle-to-vehicle performance, and they are what consumers see on window stickers when they shop for a new car. They are also what automaker marketers and auto dealers use when they tout the fuel economy of vehicle models, and they are what automotive journalists use when reviewing and discussing new vehicle offerings from automakers.

Overall, we estimate that a CAFE test score of 54.5 mpg – a well-publicized policy goal of the program – would translate to about 40 mpg in EPA Consumer Label mpg.

First, the CAFE 54.5 mpg number includes a factor of 4.5 mpg to account for the environmental benefits of improved air conditioning systems by 2025. But using less polluting refrigerants and better performing AC systems does not significantly impact a vehicle's actual mpg. Thus, that brings the number down to 50 mpg.

To convert the laboratory number used by CAFE to the EPA Consumer Label number, the EPA uses a factor of 80 percent. As such, the goal set for 2025 vehicles entering the market, on average, will be approximately 40 mpg. As fuel economy increases, the difference between CAFE test scores and EPA window sticker numbers grows larger. In previous years, these differences were less significant, but as we look out to 2025, they are quite large. This tends to muddle policy conversations and confuse consumers, who ultimately bear the cost of fueling vehicles. In discussing fuel economy, it is of course important for policymakers to focus on achieving a program's goals. But we feel that it's also important to discuss those goals publicly in a way that the majority of consumers can understand and can relate to their everyday driving experience.