

Automotive News

CAFE guide: A map through the mpg maze

Quirky rules create mind-boggling math, high-stakes gamesmanship

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The federal government has a screaming deal for automakers that have struggled to find a market for electric vehicles: Two for the price of one.

In the 2017 through 2019 model years, regulators will count each EV produced as two when calculating whether automakers are meeting new fuel-economy standards for light vehicles.

The standards, finalized in August after a year of discussion, have a simple-sounding goal: cut fuel consumption and emissions. But the rules -- at 1,994 pages and more than half a million words, they are roughly the length of *War and Peace* -- are anything but straight-forward, filled with little-known peculiarities and fine print added to help get automakers on board.

Each automaker's vehicle fleet ultimately will have to average at least 54.5 mpg -- unless gasoline prices drastically change, new technologies emerge, consumers behave differently or any other assumptions that the government made while drafting the rules turn out to be way off. On top of that, the 54.5 mpg figure is based on strict federal testing criteria, with real-world fuel economy expected to be around 40 mpg.

And, five years from now, the government could decide that the standards are too difficult or costly and change the game again.

"This is a very confusing rule," says Sandy Stojkovski, president of Scenaria Inc., a consulting firm that is helping manufacturers prepare for the new standards. "There's a lot of complexity involved with this."

There also is a lot of expense involved -- about \$150 billion for the industry, according to the Obama administration. The National Highway Traffic Safety Administration says the average light vehicle will cost \$2,556 extra by 2025, not adjusted for inflation, though it believes the new rules would end up saving consumers as much as \$5,000 over a vehicle's lifetime by using less fuel. The National Automobile Dealers Association, which waged a last-ditch battle against the rules, argues that prices for new cars and light trucks will rise about \$3,000, with automakers spending billions exploring new powertrains and other ways of saving fuel.

"Throughout 2017-2025, substantial capital investments will be necessary to meet consumer demand for more fuel-efficient vehicles, to incorporate new technologies that consumers want, and to be competitive in the marketplace," Christin Baker, a Ford spokeswoman in Washington, wrote in an e-mail.

Automakers have myriad ways to earn credits, such as using certain air-conditioning technologies to reduce emissions and building large numbers of hybrid trucks. Credits accumulated for overachieving can be shuffled, traded or sold.

One key provision: A company that falls short one year can make up the difference with credits obtained as many

as five years earlier.

Analysts and consultants expect automakers to implement cheaper ways of improving fuel economy as quickly as possible to begin amassing credits so they can delay the need for more expensive technologies.

"We would have preferred that a number of the loopholes that the industry lobbied for be taken out, but this is what we got and we're happy," says Dan Becker, director of the Safe Climate Campaign in Washington. "It's the biggest single step any nation has taken to cut global warming."

Automakers have said they are committed to meeting the standards, but they are sure to use the rules to their advantage whenever possible.

"We clearly know that consumers want higher fuel efficiency, and we're going to give that to them. But it's a challenge, no question," says Heather Rosenker, a GM spokeswoman in Washington. "We look at everything, including where are we going to find credits."

Consumers expecting to find dealership lots filled with vehicles that all get 50-plus mpg likely will be disappointed, putting the burden on automakers to dispel any perceptions that they are falling short.

"That's a very challenging consumer-education issue," Rosenker says.

One way that automakers may give themselves a boost is by pushing the wheels of some vehicles farther toward the corners. The fuel-economy standards for each vehicle are determined by its footprint, or the area bounded by its track and its wheelbase.

By spacing the wheels an inch or two farther apart and extending a vehicle's wheelbase slightly -- something many designers have been doing to improve handling and create roomier interiors -- automakers can reduce a vehicle's fuel-economy target by several miles per gallon.

But that approach also can increase weight and consequently reduce fuel economy.

What the rules mean for some models

A vehicle's 2025 fuel economy target under the new CAFE rules depends on the size of its footprint. Real-world performance is typically about 20% less than the testing results.

Vehicle type	Example	Footprint	2025 target	Real-world estimate	2012 EPA combined
Compact car	Honda Fit	40 sq. ft.	61.1 mpg	48.9 mpg	30 mpg
Mid-sized car	Ford Fusion	46	54.9	43.9	25
Full-sized car	Chrysler 300	53	48	38.4	21
Small SUV	Ford Escape (4wd)	43	47.5	38	23
Mid-sized crossover	Nissan Murano	49	43.4	34.7	20
Minivan	Toyota Sienna	56	39.2	31.4	21
Large pickup	Chevrolet Silverado	67	33	26.4	17

Source: National Highway Traffic Safety Administration; EPA

"As long as those few inches don't cost them much more to do, of course they'll do it," says John O'Dell, senior editor of Edmunds.com. "Economically, most automakers are going to find it's better to keep plugging away at fuel-economy improvements than to turn your compacts into full-size cars and your full-size cars into luxury boats in order to get reductions."

Several vehicles redesigned for the 2013 model year have larger footprints than the outgoing versions. Ford

stretched the wheelbase of the Fusion by 4.8 inches, though the car gained only 1.1 inches in overall length. Its footprint grew by nearly 3 square feet, while the Ford Escape's footprint gained about 2 square feet. The Acura RDX, Volkswagen Golf and Nissan Altima grew considerably as well.

Among other loopholes that automakers might use to their benefit:

- Automakers that sell fewer than 50,000 vehicles annually in the United States, including Jaguar Land Rover and Suzuki, are granted two additional years to begin meeting the standards.
- Automakers with fewer than 1,000 employees, such as Fisker and Tesla, are exempt. But they can opt in and earn credits, which they can then sell for profit.
- Some versions of a particular nameplate will be held to a higher standard than others. The two-wheel-drive Escape, for example, qualifies as a passenger car. But the four-wheel-drive Escape is considered a light truck and therefore has a lower emissions and fuel-economy target.
- So-called off-cycle credits account for benefits that may not be fully measured in testing. Credit can be earned for features such as active grille shutters, engine stop-start and solar panels.
- EVs count double from the 2017 through 2019 model years, after which the multiplier declines annually. Plug-in hybrids, such as the Chevrolet Volt, count as 1.6 vehicles each at first.

Bigger footprints

Under new federal fuel economy standards, each vehicle's target is determined by its footprint, or the area of a rectangle with the wheels as its corners. Vehicles with smaller footprints must meet higher standards. The footprints of many vehicles increased from the 2012 to the 2013 model year.

VEHICLE	2012	2013	Change
Ford Fusion	45.87 sq. ft.	48.74 sq. ft.	6.30%
Dodge Caliber/Dart	43.06	45.55	5.80%
Acura RDX	44.33	46.43	4.70%
Ford Escape	43.32	45.26	4.50%
Volkswagen Golf	42.4	43.5	2.60%
Nissan Altima	46.3	47.36	2.30%
Chevrolet Malibu	46.64	46.49	-0.3%
Honda Accord	47.91	47.63	-0.6%

In anticipation of the standards, 43 new electric and hybrid vehicles are scheduled to go on sale by 2015, according to Edmunds.

Although automakers have incentives to build more EVs, analysts say EVs' much higher cost means gasoline-powered engines will remain dominant in the foreseeable future, in combination with turbochargers and eight- and nine-speed transmissions.

In addition, automakers will need to push further into traditional fuel-economy measures.

For instance, automakers have been exploring swapping more steel for lighter-weight aluminum in upcoming models, such as the Ford F-series pickup.

Jay Baron, CEO of the Center for Automotive Research, says he expects vehicles with aluminum doors to arrive next year.

"Aluminum is ready to pounce," says Baron, who this year helped create the Coalition for Automotive

Lightweighting Materials, which focuses on finding cost-effective ways of reducing mass.

Baron says automakers have studied numerous ways of increasing fuel efficiency, but the business case for many has been weak. Now, the need to meet the higher government standards acts as a much greater incentive.

"We are trying to push technologies onto the consumer that are not yet cost-justified," Baron says. "If they were cost-justified, consumers would be lining up to buy them."

Going up

Estimated light-vehicle average fuel economy required under the new federal standards, based on the government's market forecast using data from the 2010 model year

CARS			LIGHT TRUCKS		
Model year	2025 target	Real-world estimate	Model year	2025 target	Real-world estimate
2016	38.2 mpg	30.6 mpg	2016	28.9 mpg	23.1 mpg
2017	39.6	31.7	2017	29.1	23.3
2018	41.1	32.9	2018	29.6	23.7
2019	42.5	34	2019	30	24
2020	44.2	35.4	2020	30.6	24.5
2021	46.1	36.9	2021	32.6	26.1
2022	48.2	38.6	2022	34.2	27.4
2023	50.5	40.4	2023	35.8	28.6
2024	52.9	42.3	2024	37.5	30
2025	55.3	44.2	2025	39.3	31.4

Source: National Highway Traffic Safety Administration

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