Press release

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As Trump Administration signals potential rollback in U.S. fuel economy standards, evidence quietly mounts that automakers can readily meet or exceed targets in 2025

Studies show again that the speed and scale at which manufacturers have deployed innovative powertrain and vehicle designs, as well as "off-cycle" technologies, outstripped regulators' conservative forecasts.

As federal efficiency and pollution standards for cars and light trucks are being reopened, two new studies from the International Council on Clean Transportation add to the body of evidence on automotive technology trends and costs.

One is a case study of how accurately the EPA's vehicle simulation models projected efficiency benefits from new technologies and represented synergies among those technologies. The study uses the Toyota Camry, one of the best-selling vehicles in the U.S. market. The 2018 Camry incorporates eight technology upgrades specifically modeled in the EPA's forecast, making it a sort of naturally occurring experiment.

The second study, released today, is the first in-depth analysis of automakers' use of so-called off-cycle technologies: design features or equipment that improve fuel efficiency but whose effects can't be simulated by running a vehicle in a laboratory test cell over the certification drive cycles, or whose benefits may not be fully captured during that certification procedure. Examples of the former include, for instance, low-e glass coatings, which keep the vehicle cabin cooler and reduce the need for air-conditioning. Examples of the latter could include stop-start systems that shut the engine off rather than idling it when a vehicle is not moving.

The Camry case study defines and adjusts for all differences between the 2015 and 2018 Camry and all differences between the EPA's technology assumptions and technology on the 2018 Camry. The results show that the actual CO_2 reductions achieved in the 2018 Camry exceed those predicted by EPA models, 18.6% to 17.7%. That confirms the accuracy of those models and contradicts industry-funded studies that question the EPA modeling outcomes.

"The weight of evidence right along has been that the agencies' forecasts were good—not only good but conservative, as shown by real cars on the street or in a production cycle now," said the ICCT's John German, who authored the Camry study. "What we see on the 2018 Camry is the latest and clearest example."

Because the fuel-economy benefits of innovative off-cycle technologies can't be directly measured through the laboratory-based test procedures used to certify new vehicles against fuel-economy and greenhouse-gas emission requirements (and other limits on exhaust pollutants), the regulations define a system of credits based on estimates of those benefits, expressed in terms of grams of CO2 reduced per mile traveled. The intent was both to encourage engineering and design innovation over and above improvements to power train, aerodynamics, and the like, and to reflect the real efficiency gains represented by these technologies. In the 2012 rulemaking and later 2016 regulatory assessment for the 2017–2025 standards, EPA estimated that, overall, off-cycle credits in the industry would amount to less than 3 g CO2/mi in 2025.

In fact, according to the new ICCT study, credits granted to automakers exceeded that forecast by 2016, ten years early, and some individual automakers have doubled or tripled it. Based on the value of credits already granted, the proliferation of automaker petitions for more credits, and the trend of automakers following each other's paths for approved credits, the study estimates that off-cycle credits could amount to between 10 g and 25 g CO2/mi overall in 2025. That would be the equivalent of 11% to 26% of the entire fuel-efficiency improvement required in the U.S. passenger vehicle fleet under the regulation. In 2022–2025 alone—the years at issue in the EPA's current reevaluation—off-cycle credits could amount to more than half of the required improvement in fleet fuel efficiency.

The problem, the study points out, is that the efficiency gains from off-cycle technologies may be illusory. "If you have a suite of technologies that suddenly could account for a quarter of the expected fuel-efficiency benefit of this regulation, you should be pretty sure they're delivering real-world benefits," said Aaron Isenstadt, one of the paper's authors. "But we don't know. We can't even figure out which vehicle models are getting all these credits. And what little data we do have suggests that the energy benefits of off-cycle technologies are significantly overestimated."

"Nobody saw this coming," said Nic Lutsey, the study's lead author. "The effect of letting off-cycle credits make up so much of the efficiency improvement in the passenger vehicle fleet is the equivalent of cutting the CAFE standard for 2025 by up to 4 mpg. Put another way, it would have a similar effect to delaying implementation of the standards by a couple of years. Our work continues to show the standards are feasible, and there are really too many flexibilities already."

The study identifies improvements that could be made to the off-cycle credit program to address the problem. These could include: incorporating off-cycle technologies in the agency

compliance scenarios in the mid-term evaluation; providing greater transparency on which off-cycle technologies are deployed on which vehicle models; establishing clearer principles and constraints for the use of the program; collecting comprehensive real-world data to improve the credit approval process; and tracking the program results along with overall real-world fuel economy and emissions trends in the fleet.

"These studies confirm, again, that in the auto industry there's more innovative design and engineering going into production faster than anybody anticipated, for both on-cycle and off-cycle technologies, and that pattern looks to continue over the next several years," said Drew Kodjak, ICCT's executive director. "The agencies were conservative in their technology projections. It's clear industry is going to significantly exceed forecasts, and could meet the fuel economy targets at significantly lower costs than projected. One thing is certain: the evidence just doesn't support any argument that the automakers are technologically challenged by the 2025 standards."

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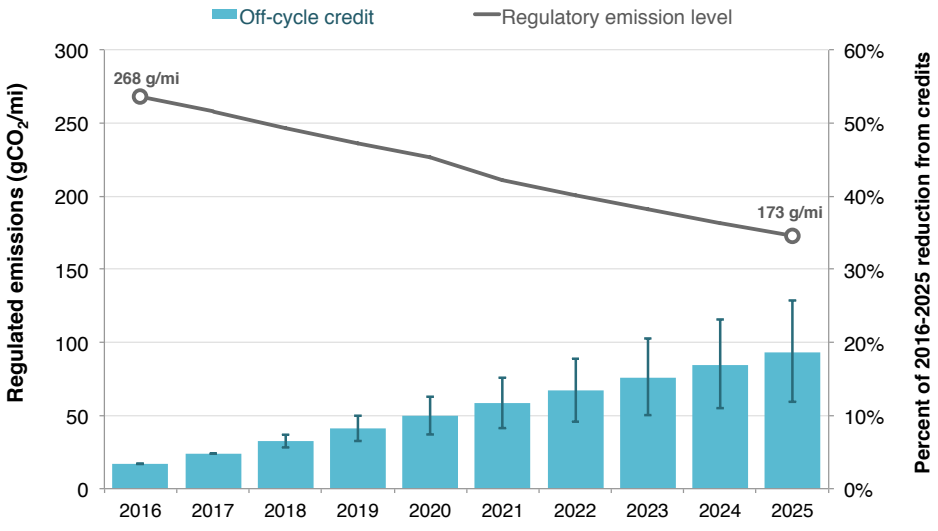

Increase in off-cycle credit use as a percentage of regulated CO2 reduction

Table 3. Actual CO_2 emissions for 2015 and 2018 Camry compared with modeled results for specific technology packages.

	gCO_2/mi		Model	% reduction vs 2015 Camry		
	Actual veh.	Model	reduction v no-tech	Actual	Model	
OMEGA tech path 0		237.5	15.2%			
2015 actual	232.0	234.7	16.2%			
2018 actual w/o EFR2	188.9	189.9	32.2%	18.6%	19.1%	
2018 actual	188.9	187.9	32.9%	18.6%	19.9%	
Adjustments					**Adj. Model**	**CO_2 adj.**
14:1 to 13:1 CR	188.9			18.6%	19.0%	+ 1.2%
+10% performance	188.9			18.6%	17.7%	+ 1.5%

Publication details

How things work: OMEGA modeling case study based on the 2018 Toyota Camry
Author: John German
Download: https://www.theicct.org/publications/how-things-work-omega-modeling-case-study-based-2018-toyota-camry

How will off-cycle credits impact U.S. 2025 efficiency standards?
Authors: Nic Lutsey, Aaron Isenstadt
Download: http://www.theicct.org/publications/US-2025-off-cycle

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