ENVIRONMENTAL PROTECTION AGENCY **6560-50-P**

[FRL-9998-14-OAR]

Alternative Methods for Calculating Off-Cycle Credits Under the Light-duty Vehicle Greenhouse Gas Emissions Program: Applications from Hyundai Motor Company and Kia Motors Corporation

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: EPA is requesting comment on applications from Hyundai Motor Company ("Hyundai") and Kia Motors Corporation ("Kia") for off-cycle carbon dioxide (CO_2) credits under EPA's light-duty vehicle greenhouse gas emissions standards. "Off-cycle" emission reductions can be achieved by employing technologies that result in real-world benefits, but where that benefit is not adequately captured on the test procedures used by manufacturers to demonstrate compliance with emission standards. EPA's light-duty vehicle greenhouse gas program acknowledges these benefits by giving automobile manufacturers several options for generating "off-cycle" CO_2 credits. Under the regulations, a manufacturer may apply for CO_2 credits for off-cycle technologies that result in off-cycle benefits. In these cases, a manufacturer must provide EPA with a proposed methodology for determining the real-world off-cycle benefit. Hyundai and Kia have submitted applications that describe methodologies for determining off-cycle credits from technologies described in their application. Pursuant to applicable regulations, EPA is making Hyundai's and Kia's off-cycle credit calculation methodologies available for public comment.

DATES: Comments must be received on or before **[insert date 30 days after date of publication in the Federal Register]**.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA–HQ–OAR–2019–0459, to the Federal eRulemaking Portal: http://www.regulations.gov. Follow the online instructions for submitting comments. Once submitted, comments cannot be edited or withdrawn. The EPA may publish any comment received to its public docket. Do not submit electronically any information you consider to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (i.e. on the web, cloud, or other file sharing system). For additional submission methods, the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit http://www2.epa.gov/dockets/commenting-epa-dockets.

FOR FURTHER INFORMATION CONTACT: Roberts French, Environmental Protection Specialist, Office of Transportation and Air Quality, Compliance Division, U.S. Environmental Protection Agency, 2000 Traverwood Drive, Ann Arbor, MI 48105. Telephone: (734) 214–4380. Fax: (734) 214–4869. Email address: french.roberts@epa.gov.

SUPPLEMENTARY INFORMATION:

I. Background

EPA's light-duty vehicle greenhouse gas (GHG) program provides three pathways by which a manufacturer may accrue off-cycle carbon dioxide (CO_2) credits for those technologies that achieve CO_2 reductions in the real world but where those reductions are not adequately captured on the test used to determine compliance with the CO_2 standards, and which are not otherwise reflected in the standards' stringency. The first pathway is a predetermined list of credit values for specific off-cycle technologies that may be used beginning in model year 2014.[1] This pathway allows manufacturers to use conservative credit values established by EPA for a wide range of technologies, with minimal data submittal or testing requirements, if the technologies meet EPA regulatory definitions. In cases where the off-cycle technology is not on the menu but additional laboratory testing can demonstrate emission benefits, a second pathway allows manufacturers to use a broader array of emission tests (known as "5-cycle" testing because the methodology uses five different testing procedures) to demonstrate and justify off-cycle CO_2 credits.[2] The additional emission tests allow emission benefits to be demonstrated over some elements of real-world driving not adequately captured by the GHG compliance tests, including high speeds, hard accelerations, and cold temperatures. These first two methodologies were completely defined through notice and comment

[1] See 40 CFR 86.1869-12(b).
[2] See 40 CFR 86.1869-12(c).

rulemaking and therefore no additional process is necessary for manufacturers to use these methods. The third and last pathway allows manufacturers to seek EPA approval to use an alternative methodology for determining the off-cycle CO_2 credits.[3] This option is only available if the benefit of the technology cannot be adequately demonstrated using the 5-cycle methodology. Manufacturers may also use this option for model years prior to 2014 to demonstrate off-cycle CO_2 reductions for technologies that are on the predetermined list, or to demonstrate reductions that exceed those available via use of the predetermined list.

Under the regulations, a manufacturer seeking to demonstrate off-cycle credits with an alternative methodology (i.e., under the third pathway described above) must describe a methodology that meets the following criteria:

- Use modeling, on-road testing, on-road data collection, or other approved analytical or engineering methods;
- Be robust, verifiable, and capable of demonstrating the real-world emissions benefit with strong statistical significance;
- Result in a demonstration of baseline and controlled emissions over a wide range of driving conditions and number of vehicles such that issues of data uncertainty are minimized;
- Result in data on a model type basis unless the manufacturer demonstrates that another basis is appropriate and adequate.

[3] See 40 CFR 86.1869-12(d).

Further, the regulations specify the following requirements regarding an application for off-cycle CO_2 credits:

- A manufacturer requesting off-cycle credits must develop a methodology for demonstrating and determining the benefit of the off-cycle technology and carry out any necessary testing and analysis required to support that methodology.
- A manufacturer requesting off-cycle credits must conduct testing and/or prepare engineering analyses that demonstrate the in-use durability of the technology for the full useful life of the vehicle.
- The application must contain a detailed description of the off-cycle technology and how it functions to reduce CO_2 emissions under conditions not represented on the compliance tests.
- The application must contain a list of the vehicle model(s) which will be equipped with the technology.
- The application must contain a detailed description of the test vehicles selected and an engineering analysis that supports the selection of those vehicles for testing.
- The application must contain all testing and/or simulation data required under the regulations, plus any other data the manufacturer has considered in the analysis.

Finally, the alternative methodology must be approved by EPA prior to the manufacturer using it to generate credits. As part of the review process defined by

regulation, the alternative methodology submitted to EPA for consideration must be made available for public comment.[4] EPA will consider public comments as part of its final decision to approve or deny the request for off-cycle credits.

II. Off-Cycle Credit Applications

A. High-Efficiency Alternators

Using the alternative methodology approach discussed above, Hyundai and Kia are applying for credits for model years 2010 and later for off-cycle credits using the alternative demonstration methodology pathway for high-efficiency alternators. Automotive alternators convert mechanical energy from a combustion engine into electrical energy that can be used to power a vehicle's electrical systems. Alternators inherently place a load on the engine, which results in increased fuel consumption and CO_2 emissions. High efficiency alternators use new technologies to reduce the overall load on the engine yet continue to meet the electrical demands of the vehicle systems, resulting in lower fuel consumption and lower CO_2 emissions. Some comments on EPA's proposed rule for GHG standards for the 2016-2025 model years suggested that EPA provide a credit for high-efficiency alternators on the pre-defined list in the regulations. While EPA agreed that high-efficiency alternators can reduce electrical load and reduce fuel consumption, and that these impacts are not seen on the emission test procedures because accessories that use electricity are turned off, EPA noted the difficulty in defining a one-size-fits-all credit due to lack of data. Since then, however a methodology

[4] See 40 CFR 86.1869-12(d)(2).

has been developed that scales credits based on the efficiency of the alternator; alternators with efficiency (as measured using an accepted industry standard procedure) above a baseline value could get credits. EPA has previously approved credits for high-efficiency alternators using this methodology for Ford Motor Company, General Motors Corporation, Fiat Chrysler Automobiles, and Toyota Motor Company. Details of the testing and analysis can be found in the manufacturer's applications.

B. Hyundai and Kia Stop-Start System

Hyundai and Kia applied for engine idle stop-start credit covering 2012-2016 model year vehicles with stop-start technology, including hybrid electric vehicles and plug-in hybrid electric vehicles. Based on the analysis presented in their application, they are requesting a credit of 3.7 grams/mile for vehicles with stop-start technology that are not hybrids, and 3.8 grams/mile for hybrid electric and plug-in hybrid electric vehicles.

The methodology used by Hyundai and Kia was essentially the same as that used by Mercedes and approved by EPA in September of 2014.[5] This methodology is based on the following analyses:

- Estimate or measure the total idle fraction as a percentage of all vehicle operation in the real-world;
- Estimate or measure the percentage of idle fraction that the stop-start system is enabled out of all the available idle time (i.e., eligible stop-start percentage or stop-start system effectiveness);

[5] "EPA Decision Document: Mercedes-Benz Off-cycle Credits for MYs 2012-2016." U.S. Environmental Protection Agency, EPA-420-R-14-025, September 2014.

- Determine the benefit of the stop-start system in grams per mile based on A-B emissions testing (i.e., technology on and off);
- Multiply the eligible real world stop-start time (relative to the 2-cycle eligible time) by the stop-start system benefit to estimate the idle stop-start credit; and,
- For vehicles that allow the driver to disable the stop-start system, the frequency of disablement by the driver must be determined.

The Mercedes application and EPA's Decision Document are both available on EPA's website; however, for convenience the table below shows a comparison of the key inputs to the methodologies approved by EPA for Mercedes and proposed by Hyundai and Kia.

Input	**Mercedes (as approved by EPA)**	**Hyundai-Kia (proposed in application)**
Idle Time Fraction	22.7	22.7
System Effectiveness	52%	59.4%
Driver Disablement	11%	1.6%
Credit (g/mi)	~3.5-4.5	3.7-3.8

III. EPA Decision Process

EPA has reviewed the applications for completeness and is now making the applications available for public review and comment as required by the regulations. The off-cycle credit applications submitted by the manufacturer (with confidential business information redacted) have been placed in the public docket (see ADDRESSES section above) and on EPA's web site at https://www.epa.gov/vehicle-and-engine-certification/compliance-information-light-duty-greenhouse-gas-ghg-standards.

EPA is providing a 30-day comment period on the applications for off-cycle credits described in this notice, as specified by the regulations. The manufacturers may

submit a written rebuttal of comments for EPA's consideration, or may revise an application in response to comments. After reviewing any public comments and any rebuttal of comments submitted by manufacturers, EPA will make a final decision regarding the credit requests. EPA will make its decision available to the public by placing a decision document (or multiple decision documents) in the docket and on EPA's web site at the same manufacturer-specific pages shown above. While the broad methodologies used by these manufacturers could potentially be used for other vehicles and by other manufacturers, the vehicle specific data needed to demonstrate the off-cycle emissions reductions would likely be different. In such cases, a new application would be required, including an opportunity for public comment.

Dated: August 5, 2019.

Byron J. Bunker,

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