EPA Decision Document: Off-Cycle Credits for Mitsubishi Motors Corporation

United States Environmental Protection Agency

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Compliance Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

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EPA United States Environmental Protection Agency

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I. Introduction

EPA's light-duty vehicle greenhouse gas (GHG) rules include opportunities for manufacturers to generate CO_2 credits for technologies that provide CO_2 reductions not captured by the 2-cycle emissions test. There are three pathways by which manufacturers can generate off-cycle credits: (1) a pre-determined "menu" of technologies and credits that is available for 2014 and later model years, (2) a testing-based option, and (3) an alternative methodology that includes opportunity for public comment. These are described in more detail in Section II.

Pursuant to those rules Mitsubishi Motors Corporation (MMC) submitted initial applications requesting off-cycle credits prior to May 1, 2020. MMC applied for high efficiency alternator and active transmission warmup off-cycle GHG credits. The credits requested are for technologies described in EPA regulations for which there are predetermined credit values described in §86.1869-12(b).

These technologies and the methodology used to determine the credit values have been previously approved through the public process (§86.1869-12(d)) by EPA.[1,2] Therefore, the EPA is not publishing this request and allowing for public comments as no adverse comments to these technologies have been received to date. Furthermore, the EPA is hereby approving the technologies, methodologies for determining credits, and credit levels as described in the application from MMC.

Section II of this document provides background on EPA's off-cycle credits program. Section III provides EPA's decision. This decision document applies only to the applications referenced herein.

II. EPA's Off-cycle Credits Program

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 off-cycle technologies that achieve CO_2 reductions in the real world but where those reductions are not adequately captured on the test procedure used to determine compliance with the CO_2 standards. The first is a predetermined list of credit values for specific off-cycle technologies that may be used beginning in model year 2014.[3] 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. In cases where additional laboratory

[1] See EPA-420-R-17-003 "EPA Decision Document: Off-Cycle Credits for BMW Group, Ford Motor Company, General Motors Corporation, and Volkswagen Group of America", January 2017
[2] See EPA-420-R-21-015 "EPA Decision Document: Off-Cycle Credits for North American Subaru, Inc.", June 2021
[3] See 40 CFR 86.1869-12(b).

testing can demonstrate emission benefits of an off-cycle technology, 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.[4] The additional emission tests allow emission benefits to be demonstrated over some elements of real-world driving not captured by the GHG compliance tests, including high speeds, hard accelerations, and cold temperatures. Credits determined according to this methodology do not undergo additional public review. The third and last pathway allows manufacturers to seek EPA approval to use an alternative methodology for determining the off-cycle CO_2 credits.[5] This option is only available if the benefit of the off-cycle technology cannot be adequately demonstrated using the 5-cycle methodology. Manufacturers may also use this option 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.

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.

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

- 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.

As part of the review process defined by regulation, the alternative methodology submitted to EPA for consideration must be made available for public comment.[6] The Administrator may waive the notice and comment requirements for technologies for which EPA has previously approved a methodology for determining credits.[7] As noted in the introduction EPA has previously issued notices and sought comment on the credit requests included in MMC's applications.

Although these credits are requested under regulatory provisions that don't explicitly require limitations, or caps, on credit values, EPA is stipulating here that credits for technologies for which there is a regulatory cap must be held to the applicable regulatory cap, including the maximum allowable decrease in the manufacturer's combined automobile and light truck CO_2 credit value of 10 g/mi, if such credits are approved by EPA. For example, for reasons described in the implementing rulemaking documents and analyses, EPA established caps on thermal technology credits of 3.0 grams/mile for cars and 4.3 grams/mile for trucks. The rationale for these caps is applicable regardless of the off-cycle pathway being used to achieve such credits. EPA also established caps on technologies that improve the efficiency of air conditioning systems (5 grams/mile for cars and 7.2 grams per mile for trucks). Thus, credits approved in this Decision Document are being approved only to the extent that the regulatory caps on credits for certain technologies, or categories of technologies, or the 10 g/mi automobile and light truck cap are not exceeded.

III. EPA Decisions on Off-cycle Credit Applications

A. High-Efficiency Alternators

Mitsubishi Motors Corporation (MMC) requested GHG credits for alternators with improved efficiency relative to a baseline alternator, for the 2014 and later model years. 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 2017-2025 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

[6] See 40 CFR 86.1869-12(d)(2).
[7] See 40 CFR 86.1869-12(d)(2)(ii).

in defining a one-size-fits-all credit due to lack of data. Since then, however a methodology 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. MMC proposed to use this now-accepted methodology. EPA has previously approved credits for high-efficiency alternators using this methodology for Ford Motor Company, General Motors Corporation, Fiat Chrysler Automobiles, Hyundai, Kia, Honda, Nissan, Subaru, and Toyota Motor Company.

EPA has evaluated the application and finds that the methodologies described therein are sound and appropriate. Therefore, EPA is approving the credits requested by MMC for the 2014 through 2021 model years. The menu credit cap found in §86.1869-12(b)(2) applies to this off-cycle credit. All information necessary to determine the total Megagrams of credits must be included in the reporting to EPA, and the total Megagrams for each fleet and model year should be included in a summary of credit averaging, banking, and trading.

B. Active Transmission Warm-Up

Mitsubishi Motors Corporation (MMC) applied for off-cycle credits for active transmission warm-up based on the menu credit found in §86.1869-12(b)(1)(vi). The technology described in the MMC application meets the EPA definition for active transmission warm-up found in §86.1869-12(b)(4)(v)(A) for vehicles through model year 2022. The application is approved for vehicles utilizing the active transmission warm-up technology beginning in MY 2014 and ending in MY 2021. The approved credit amount is the value found in the menu at §§86.1869-12(b)(1)(vi)(A) for passenger cars and 86.1869-12(b)(1)(vi)(B) for light trucks. The menu credit cap found in §86.1869-12(b)(2) applies to this off-cycle credit. All information necessary to determine the total Megagrams of credits must be included in the reporting to EPA, and the total Megagrams for each fleet and model year should be included in a summary of credit averaging, banking, and trading.