


**EPA Decision Document:
Off-Cycle Credits for BMW Group,
Ford Motor Company, General Motors
Corporation, and Volkswagen Group of
America**



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

I. Introduction

EPA's light-duty vehicle greenhouse gas (GHG) rules include opportunities for manufacturers to generate CO₂ credits for technologies that provide CO₂ 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, BMW Group (BMW), Ford Motor Company (Ford), General Motors Corporation (GM), and Volkswagen Group of America (VW) submitted applications requesting off-cycle credits for a variety of technologies and model years. The credits requested are for technologies described in EPA regulations for which there are default credits available for 2014 and later model year vehicles. However, use of the alternative methodology approach, involving public notice and comment, does not preclude seeking these credits for model years prior to 2014.

The present decision document evaluates demonstrations for credits made using the public process pathway, where those credits are generally equivalent to those described in EPA regulations for the 2014 and later model years. BMW applied for off-cycle credits using the alternative demonstration methodology pathway for the following technologies: high efficiency exterior lighting, solar reflective glass/glazing, active seat ventilation, active cabin ventilation, and active engine warmup. Ford applied for off-cycle credits using the alternative demonstration methodology pathway for the following technologies: high efficiency exterior lighting, active seat ventilation, active aerodynamics, active transmission warmup, active engine warmup, and engine idle stop-start systems. GM applied for off-cycle credits using the alternative demonstration methodology pathway for the following technologies: high efficiency exterior lighting, solar reflective glass/glazing, solar reflective paint, active seat ventilation, active aerodynamics, active engine warmup, and engine idle stop-start systems. VW has applied for off-cycle credits using the alternative demonstration methodology pathway for the following technologies: active aerodynamics systems, active seat ventilation, solar reflective glass/glazing, solar reflective surface coating (paint), active engine warmup, active transmission warmup, engine idle stop-start systems, and high efficiency lighting.

EPA published a notice in the *Federal Register* on September 2, 2016 announcing a 30 day public comment period for these applications.¹ EPA received no adverse comments regarding the methodologies presented for determining the credits sought from these technologies by BMW, Ford, GM, and VW, and is hereby approving the technologies, methodologies for determining credits, and credit levels as described in the applications from the manufacturers and in the *Federal Register*. EPA received comments from the Alliance of Automobile Manufacturers (AAM) and from the Union of

¹ 81 FR 60694, September 2, 2016.

Concerned Scientists (UCS).² The comments from AAM were supportive and recommended approval of the methodologies for determining off-cycle credits, noting that approval “will encourage further investment in real-world GHG emission reducing technologies.”

The comments from UCS were not specifically critical of the methodologies, but highlighted the fact that many credits that have been approved by EPA for previous model years have not yet been reported to EPA. Further, UCS requests that the total amount of credits approved by EPA be published in EPA’s final determination. While EPA has approved a number of credit determination methodologies, or in some cases specific gram/mile values associated with certain technologies, often the total Megagrams of credits is not reported to EPA in the manufacturer’s application. EPA agrees with UCS that the lack of reporting of approved credits undermines the transparency of EPA’s program. EPA does find it problematic that previously approved off-cycle credits, some of which were approved by EPA more than two years ago, remain unreported. (Again, it is the total Megagrams of credits, and the impact on a manufacturers’ balance sheet, that has not been reported in a timely manner in some cases.) The regulations generally require that credits be reported within 4 months after the end of a model year. EPA believes that the reporting deadline is no less applicable in cases, such as the credits discussed in the present decision document, where EPA is approving credits retroactively (i.e., for model years that are already complete). These credits should be reported soon after they are approved, since the deadline for reporting credits for these model years has passed. EPA has worked hard to uphold and maintain our commitment to transparency in this program, largely through annual reporting to the public regarding manufacturer performance and progress in meeting the GHG emission standards. An unknown and unreported quantity of credits undermines this transparency, and results in a situation where EPA’s reporting is not fully accurate and complete for all manufacturers. Thus, to ensure that off-cycle credits are reported in a timely fashion, starting with this decision document EPA is stipulating deadlines for reporting the total Megagrams of off-cycle credits and the incorporation of such credits into the manufacturer’s averaging, banking, and trading balance sheet. In general, the deadline will usually be specified as the next upcoming model year reporting deadline, when the manufacturer will next be expected to be submitting GHG credit and compliance information to EPA for a recently completed model year. For example, under the regulations the next credit reporting deadline, for the 2016 model year, is May 1, 2017.

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 (CO₂) credits for those off-cycle technologies that

² The Alliance of Automobile Manufacturers is a trade group representing 12 vehicle manufacturers, including BMW, Ford, GM, and VW,

achieve CO₂ reductions in the real world but where those reductions are not adequately captured on the test procedure used to determine compliance with the CO₂ 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 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 CO₂ 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 CO₂ 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 for model years prior to 2014 to demonstrate off-cycle CO₂ 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.

Further, the regulations specify the following requirements regarding an application for off-cycle CO₂ 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.

³ See 40 CFR 86.1869-12(b).

⁴ See 40 CFR 86.1869-12(c).

⁵ See 40 CFR 86.1869-12(d).

- 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 CO₂ 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.⁶ EPA will consider public comments as part of its final decision to approve or deny the request for off-cycle credits.

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, 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. 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 are not exceeded.

III. EPA Decisions on Off-cycle Credit Applications

A. BMW of North America

BMW of North America (BMW) applied for off-cycle credits using the alternative demonstration methodology pathway for the following technologies: high efficiency exterior lighting, solar reflective glass/glazing, active seat ventilation, active cabin ventilation, and active engine warmup. All of these technologies are described in the predetermined list of credits available in the 2014 and later model years. The methodologies described by BMW are generally equivalent to those used by EPA to establish the predetermined list of credits in the regulations, and would result in the same credit values as described in the regulations. The application covers 2009-2013 model year vehicles. EPA reviewed the application for completeness and made it available for public review and comment as required by the regulations. The BMW off-cycle credit application (with confidential business information redacted) is

⁶ See 40 CFR 86.1869-12(d)(2).

available in the public docket and on EPA's web site at <https://www.epa.gov/vehicle-and-engine-certification/bmw-compliance-materials-light-duty-greenhouse-gas-ghg-standards>.

EPA did not receive any adverse comments on the application from BMW. EPA has evaluated the application and finds that the methodologies described therein are sound and appropriate. Therefore, EPA is approving the credits requested by BMW for the 2009-2013 model years. Caps or limits on credits that are specified in the regulations also apply to the credits being approved in this document. These credits must be reported to EPA not later than May 1, 2017, the date on which reporting of GHG credits for the 2016 model year is due. 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. Ford Motor Company

Ford Motor Company (Ford) applied for off-cycle credits using the alternative demonstration methodology pathway for the following technologies: high efficiency exterior lighting, active seat ventilation, active aerodynamics, active transmission warmup, active engine warmup, and engine idle stop-start systems. All of these technologies are described in the predetermined list of credits available in the 2014 and later model years. The methodologies described by Ford are generally equivalent to those used by EPA to establish the predetermined list of credits in the regulations, and would result in the same credit values as described in the regulations. The application covers 2009-2011 model year vehicles. EPA reviewed the application for completeness and made it available for public review and comment as required by the regulations. The Ford off-cycle credit application (with confidential business information redacted) is available in the public docket and on EPA's web site at <https://www.epa.gov/vehicle-and-engine-certification/ford-compliance-materials-light-duty-greenhouse-gas-ghg-standards>.

EPA did not receive any adverse comments on the application from Ford. EPA has evaluated the application and finds that the methodologies described therein are sound and appropriate. Therefore, EPA is approving the credits requested by Ford for the 2009-2011 model years. Caps or limits on credits that are specified in the regulations also apply to the credits being approved in this document. These credits must be reported to EPA not later than May 1, 2017, the date on which reporting of GHG credits for the 2016 model year is due. 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.

C. General Motors Corporation

General Motors Corporation (GM) applied for off-cycle credits using the alternative demonstration methodology pathway for the following technologies: high efficiency exterior lighting, solar reflective glass/glazing, solar reflective paint, active seat ventilation, active aerodynamics, active engine warmup, and engine idle stop-start systems. All of these technologies are described in the predetermined list of credits available in the 2014 and later model years. The methodologies described by GM are generally equivalent to those used by EPA to establish the predetermined list of credits in the regulations, and

would result in the same credit values as described in the regulations. The application covers 2009-2013 model year vehicles. EPA reviewed the application for completeness and made it available for public review and comment as required by the regulations. The GM off-cycle credit application (with confidential business information redacted) is available in the public docket and on EPA's web site at <https://www.epa.gov/vehicle-and-engine-certification/general-motors-gm-compliance-materials-light-duty-greenhouse-gas>.

EPA did not receive any adverse comments on the application from GM. EPA has evaluated the application and finds that the methodologies described therein are sound and appropriate. Therefore, EPA is approving the credits requested by GM for the 2009-2013 model years. Caps or limits on credits that are specified in the regulations also apply to the credits being approved in this document. These credits must be reported to EPA not later than May 1, 2017, the date on which reporting of GHG credits for the 2016 model year is due. 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.

D. Volkswagen of North America

Volkswagen of North America (VW) applied for off-cycle credits using the alternative demonstration methodology pathway for the following technologies: active aerodynamics systems, active seat ventilation, solar reflective glass/glazing, solar reflective surface coating (paint), active engine warmup, active transmission warmup, engine idle stop-start systems, and high efficiency lighting. All of these technologies are described in the predetermined list of credits available in the 2014 and later model years. The methodologies described by VW are generally equivalent to those used by EPA to establish the predetermined list of credits in the regulations, and would result in the same credit values as described in the regulations. The application covers 2012-2013 model year vehicles. EPA reviewed the application for completeness and made it available for public review and comment as required by the regulations. The VW off-cycle credit application (with confidential business information redacted) is available in the public docket and on EPA's web site at <https://www.epa.gov/vehicle-and-engine-certification/volkswagen-compliance-materials-light-duty-greenhouse-gas-ghg>.

EPA did not receive any adverse comments on the application from VW. EPA has evaluated the application and finds that the methodologies described therein are sound and appropriate. Therefore, EPA is approving the credits requested by VW for the 2012-2013 model years. Caps or limits on credits that are specified in the regulations also apply to the credits being approved in this document. These credits must be reported to EPA not later than May 1, 2017, the date on which reporting of GHG credits for the 2016 model year is due. 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.