

**EPA Decision Document:  
Off-Cycle Credits for American Honda  
Motor Company, Inc.**



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

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## Introduction

EPA's light-duty vehicle greenhouse gas (GHG) rules include opportunities for manufacturers to generate CO<sub>2</sub> credits for technologies that provide CO<sub>2</sub> 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, American Honda Motor Company ("Honda") submitted an application requesting off-cycle credits for implementation of a Cold Storage Evaporator (CSE) technology used to increase engine shutoff time and thereby increase the effectiveness of the Idle Start-Stop (ISS) system.

EPA published a notice in the *Federal Register* on August 20, 2020 announcing a 30-day public comment period for this application.<sup>1</sup> EPA received and has reviewed the comments regarding the methodologies presented for determining the credits sought by Honda and is hereby approving the technologies, methodologies for determining credits, and credit levels as described in Honda's application and in the *Federal Register*.

Section II of this document provides background on EPA's off-cycle credits program. Section III provides EPA's decision. This Decision Document applies to the application referenced herein. Future requests for credits for implementations of the same technology, same methodology and similar analyses in future model years for the same or different manufacturers and/or models may be considered, at EPA discretion under the regulations, without additional public notice or comment periods.<sup>2</sup> Decision Documents describing the approvals of any such subsequent credit requests will be made available as these approvals are granted.

## 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<sub>2</sub>) credits for those off-cycle technologies that achieve CO<sub>2</sub> reductions in the real world but where those reductions are not adequately captured on the test procedure used to determine compliance with the CO<sub>2</sub> standards. The first is a predetermined list of

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<sup>1</sup> 85 FR 51428, August 20, 2020.

<sup>2</sup> See 40 CFR 86.1869-12(d)(1)(ii)

credit values for specific off-cycle technologies that may be used beginning in model year 2014.<sup>3</sup> 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 CO<sub>2</sub> credits.<sup>4</sup> 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<sub>2</sub> credits.<sup>5</sup> 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<sub>2</sub> 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.

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<sup>3</sup> See 40 CFR 86.1869-12(b).

<sup>4</sup> See 40 CFR 86.1869-12(c).

<sup>5</sup> See 40 CFR 86.1869-12(d).

- The application must contain a detailed description of the off-cycle technology and how it functions to reduce CO<sub>2</sub> 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.<sup>6</sup> 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. 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, any credits approved by EPA are being approved only to the extent that the regulatory caps on credits for certain technologies or categories of technologies are not exceeded. In this case, the credit for Cold Storage Evaporator (CSE) is considered a credit for increasing engine shutoff time and effectiveness of Idle Start-Stop systems and not an A/C efficiency credit – and therefore not subject to the A/C efficiency GHG off-cycle credit cap.

## **EPA Decision on Off-cycle Credit Application**

### **Cold Storage Evaporator (CSE)**

Honda requested GHG credits for use of a CSE technology implementation that increases the effectiveness of the ISS system as compared to that of ISS technology using baseline non-CSE technology for specific vehicle models in the 2017 and later model years. The Honda application describes how Honda's implementation of CSE increases ISS effectiveness in terms of GHG reduction both by extending engine-off time during ISS shutoff events in moderate warm weather operating conditions as well as by reducing the range of more severe operating conditions (higher ambient temperatures, sun load and humidity conditions) under which ISS engine shutoff events would otherwise be prohibited entirely by equivalent non-CSE systems. Honda provided test data and analysis to support and quantify the off-cycle

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<sup>6</sup> See 40 CFR 86.1869-12(d)(2).

credits requested. EPA reviewed the application for completeness and made it available for public review and comment as required by the regulations.

EPA received limited public comments on the Honda application and has considered those in the context of the regulatory language and intent. EPA received comments from the Alliance for Automotive Innovation that were supportive and recommended timely approval of the methodologies for determining off-cycle credits. EPA has evaluated the application and finds that the methodologies described therein are sound and appropriate. Therefore, EPA is approving the credits requested by Honda for the 2017 and later model years and models as described in the application. All information necessary to determine the total Megagrams of credits must be included in the reporting to EPA as appropriate, and the total Megagrams for each fleet and model year should be included in a summary of credit averaging, banking, and trading as soon as practicable.