

EPA Releases MOVES2014b Mobile Source Emissions Model: Questions and Answers

What is MOVES, and why is EPA releasing MOVES2014b?

EPA's MOtor Vehicle Emission Simulator (MOVES) is a state-of-the-science emission modeling system that estimates emissions for onroad motor vehicles and most nonroad equipment types for criteria pollutants, greenhouse gases, and air toxics. EPA announced the release of MOVES2014 in October 2014 (79 Federal Register 60343). In November 2015, EPA released MOVES2014a, a minor update to MOVES2014.¹

EPA is now releasing MOVES2014b to improve estimates of emissions from nonroad mobile sources. MOVES2014b does not significantly change the onroad criteria pollutant emissions results of MOVES2014 and is not considered a new model for State Implementation Plan (SIP) and transportation conformity purposes.

What has changed from MOVES2014a to MOVES2014b?

MOVES2014b improves nonroad engine population growth rates, nonroad Tier 4 engine emission rates, and sulfur levels of nonroad diesel fuels. Technical reports that explain these changes are available on the MOVES web site. A full list of the changes in MOVES2014b is provided in the appendix of this document.

What needs to be done to switch to MOVES2014b?

Instructions for downloading and installing MOVES2014b are available on the MOVES web page at www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves.

Run specifications and databases that worked with MOVES2014a will also work with MOVES2014b; no conversions are necessary.

Users should always specify in their documentation what version of MOVES was used to create emissions results for SIPs, conformity and other purposes.

¹ The MOVES2014a Question and Answers document is available at <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100NNR0.txt>.

When should MOVES2014b be used for SIPs and transportation conformity analyses?

MOVES2014b is the most recent version of EPA's motor vehicle emissions model for state and local agencies to estimate volatile organic compounds (VOCs), nitrogen oxides (NO_x), particulate matter (PM_{2.5} and PM₁₀), carbon monoxide (CO), and other precursors from cars, trucks, buses, motorcycles, and most categories of nonroad equipment for SIPs and transportation conformity determinations outside California.

In general, EPA believes the states should use the latest version of MOVES that is available (now MOVES2014b) for new SIP development outside of California. However, state and local agencies that have already completed significant work with MOVES2014 or MOVES2014a do not need to redo or revise that work with MOVES2014b.

Onroad Emissions. EPA does not consider MOVES2014b to be a major MOVES update (i.e., new emissions model) for SIP and transportation conformity purposes, and there will be no new grace period for either regional or project-level conformity analyses using MOVES2014b.² EPA encourages state and local agencies to use the latest version of the MOVES model available at the time that any conformity modeling begins. The guidance document "Policy Guidance on the Use of MOVES2014 and Subsequent Minor Revisions for State Implementation Plan Development, Transportation Conformity, and other Purposes" (available at www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves) applies to MOVES2014b as well and provides additional details on when and how MOVES2014b should be used. State and local agencies should consult their EPA Regional Office to resolve any questions for a particular nonattainment or maintenance area.

Nonroad Emissions. EPA recommends that MOVES2014b be used to model nonroad emissions for all new SIP development, although state and local agencies that have already completed significant work with MOVES2014a, MOVES2014, NONROAD2008, or NMIM2008 can continue to do so in order to allow for timely submission of the SIP.

MOVES2014 was the first version of MOVES to include nonroad emissions, and the model produced nonroad emission estimates that were equivalent to those from NONROAD2008 and NMIM2008. MOVES2014b includes significant improvements to nonroad inventory estimation and is EPA's best tool for that task.

Air Quality Model Inputs. EPA recommends MOVES2014b be used to model emissions intended for use in air quality modeling. MOVES2014b includes updates to the CB05 and CB6CMAQ chemical mechanisms, and the addition of the SAPRC07T chemical mechanism. These updates make MOVES output more compatible with the most recent air quality models. MOVES users should consult with air quality modeling staff to evaluate the importance of these updates for their specific modeling needs.

Can MOVES2014b be used to estimate greenhouse gas emissions?

Yes, MOVES2014b is EPA's latest and best tool for estimating greenhouse gas (GHG) emissions.

² The 2-year grace period for MOVES2014 and MOVES2014a ended on October 7, 2016 (79 FR 60343).

MOVES2014b includes updates to better characterize greenhouse gas emissions from nonroad equipment. The model also accounts for all national fuel economy and GHG standards for cars and trucks as of October 2015. In addition, EPA has developed MOVES technical guidance that describes how to use MOVES to estimate GHG emissions and/or energy consumption from on-road vehicles in a state or metropolitan area (see the final question below for a link to this document). State and local agencies estimating GHG emissions in the transportation planning process should consider using the latest version of MOVES for GHG emissions analyses in the future. EPA notes that there are no SIP and transportation conformity requirements for GHGs.

Can MOVES2014b be used to estimate mobile source toxic emissions?

MOVES2014b estimates emissions for all major mobile source air toxics (MSATs) for both on-road and nonroad sources and includes updates to the estimates of toxic emissions from nonroad equipment. MOVES2014b is EPA's best available tool for quantifying emissions of these MSATs. State and local agencies, academic institutions, and other parties who are interested in analyzing MSAT emissions from transportation activities are encouraged to use MOVES2014b. EPA notes that there are no SIP and transportation conformity requirements for air toxics.

Is additional training required to use MOVES2014b?

There are very minor differences in the operation of MOVES2014b compared to MOVES2014a, and no additional training is required to run it. The "User Reference Interface Manual Appendix: MOVES2014b" (see link below) details the interface changes. EPA will be offering webinars to explain what MOVES2014b is and how it differs from MOVES2014a, and will update training materials to refer to MOVES2014b. EPA will continue to provide on-site multi-day training courses as needed for new users. Users will be able to find information on training dates and locations by visiting the MOVES web page.

What resources are available for MOVES2014b?

The MOVES web page (www.epa.gov/moves) is the source for MOVES2014b software as well as previous versions of MOVES, technical documentation, guidance documents, tools for using MOVES, and information on MOVES training. The following documents provide additional information on MOVES2014, MOVES2014a and MOVES2014b:

- The "MOVES User Interface Reference Manual Appendix: MOVES2014b" (available at www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves) explains changes to the user interface for MOVES2014b.
- The "MOVES User Guide" (available at www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves) provides detailed instructions for using MOVES.
- "Policy Guidance on the Use of MOVES2014 and Subsequent Minor Revisions) for State Implementation Plan Development, Transportation Conformity, and Other Purposes (available at www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves) describes how and when to use MOVES2014 and subsequent minor revisions for SIP development, transportation conformity, general conformity, and other purposes.
- "MOVES2014, MOVES2014a, and MOVES2014b Technical Guidance: Using MOVES to Prepare Emission Inventories for State Implementation Plans and Transportation

Conformity” (available at www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves) provides guidance on creating a Run Specification and adding local data using the County Data Manager for SIPs and regional transportation conformity analyses.

- “Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas” (available at www.epa.gov/state-and-local-transportation/project-level-conformity-and-hot-spot-analyses) provides guidance on using MOVES for quantitative PM10 and PM2.5 hot-spot analysis for transportation projects.
- “Using MOVES in Project-Level Carbon Monoxide Analysis” (available at www.epa.gov/state-and-local-transportation/project-level-conformity-and-hot-spot-analyses) describes how to use MOVES to model CO emissions from transportation projects.
- “Using MOVES for Estimating State and Local Inventories of On-Road Greenhouse Gas Emissions and Energy Consumption- Final” (available at www.epa.gov/state-and-local-transportation/estimating-road-greenhouse-gas-emissions) describes how to use MOVES to estimate GHG emissions and/or energy consumption from on-road vehicles in a state or metropolitan area.

If you have technical questions about MOVES2014b, please contact the MOVES team at mobile@epa.gov. If you have SIP or conformity questions, please contact your EPA Regional Office.

Appendix

Change from MOVES2014a to MOVES2014b	Implication
Update nonroad growth indices.	For most locations and sectors, this change will decrease nonroad equipment populations (and thus emissions), but results vary depending on the economic sector, the state, and the county’s base year population.
Update Tier 4 nonroad diesel engine classifications, population splits, speciation, and emission rates.	These changes better account for emissions from large diesel engines with advanced after-treatment. The changes generally decrease future year emissions.
Update nonroad diesel fuel sulfur levels.	These updates affect nonroad emissions for sulfate and PM.
Updates to the CB05 and CB6CMAQ chemical mechanism outputs used for air quality modeling and addition of SAPRC07T output.	These updates provide better linkage with air quality models.
Improved menu and documentation for post-processing scripts.	These improvements should help reduce mistakes in user post-processing of MOVES results.
Updated technical guidance.	More detailed instructions for MOVES users, including clarification that MOVES2014 is not designed to model mid-level ethanol blends, additional language on how to estimate changes in state fuel programs, and information on how to use local information and rates from MOVES2014b to develop county-specific nonroad inventories.