

# **MOVES Update**

**International Emissions  
Inventory Conference**

**August 15<sup>th</sup>, 2012**

**Chris Dresser  
U.S. Environmental Protection Agency**

The MOVES logo is displayed in a metallic, three-dimensional font with a glowing effect, set against a dark, gradient background.

**MOVES**



# A Brief History of MOVES

- **MOVES2010 (December 2009)**
  - First official release of the MOVES series
- **MOVES2010a (August 2010)**
  - Added light duty GHG and fuel economy rules
    - CAFE standards for MY 2008-2011
    - GHG/ CAFE standards for MY 2012-2016
  - Changes in GHG emissions, but insignificant changes in criteria pollutants
  - Also included some performance and usability improvements
  - A minor revision for SIP and conformity purposes
    - Users can use either MOVES2010 or MOVES2010a

# An Open Process for Informing Users and Getting Feedback

- FACA (Federal Advisory Committee Act) workgroup to review MOVES development
- Peer-review of MOVES technical documents
- 25 hands-on training events to almost 700 users since release of MOVES2010
- Over 2500 responses to user questions submitted via e-mail
- 2-day MOVES workshop in Ann Arbor attended by 230 users
- Ongoing support to AQ and transportation agencies about using MOVES in SIP development and conformity
- Have continued to work on model improvements based on user feedback from all of these sources

# What is MOVES2010b?

- **MOVES2010b**

- Not a new model
- A minor revision that does not change emissions
- Use is recommended but optional for SIPs and conformity analyses, no new grace period for conformity
- Better performance and new features

# How do MOVES2010b Emissions Compare?

- **Criteria pollutant emissions do not change from MOVES2010a**
  - In repeated testing at both county and project scale, differences in criteria pollutant emissions are negligible
- **We do not expect and have not seen any changes in GHG emissions in our tests**
- **Some changes are expected in air toxics**
  - Some updates to factors used to calculate existing air toxics in MOVES
  - Addition of air toxics previously available for MOBILE/NMIM, but not in MOVES2010 or MOVES2010a

## Newly Added Air Toxics in MOVES2010b

- Many air toxics that could be estimated with MOBILE6.2 or NMIM were left out of MOVES2010 and MOVES2010a because of ongoing data development to inform updates
  - Gaseous air toxics, PAHs, metals, dioxins/furans
- Those updates have occurred and emission results are required for the National Emissions Inventory
- MOVES2010b incorporates the addition of those air toxics previously available using MOBILE or NMIM

# Performance Improvements

- **Allows up to 8 workers on a single computer**
  - Can take advantage of this in multi-core computers
  - Impact on speed varies
- **New debugging features and better data recovery for failed network operation**
  - New fields in output database help diagnose run problems
- **Updated to latest versions of JAVA and MySQL**
  - Keeping up with changes in software and improving security
- **Run-time improvements vary based on type of run, whether using multiple workers, etc.**
  - In best cases, improvements are modest

# Custom Domain Improvements

- **Can define separate zones (counties) with separate VMT and other inputs**
  - Meteorology, VMT and vehicle population can vary by zone
- **Can get emission outputs separately for each zone**
- **SCC output option now fully functional**
  - SCC output for custom domains in previous versions was more limited
- **Added Custom Domain functionality makes it easier to do multi-county runs**

## Improvements to CDM/PDM

- **Additional error checks help prevent run failures due to conflicts between RunSpec parameters and user data**
- **Vehicle and fuel technologies tab added (replaces AVFT input in RunSpec panel)**
  - Makes AVFT input more consistent with other user inputs

## Improvements to Rates Option

- Refueling emissions added to RatePerDistance and RatePerVehicle tables
- Added calculation of extended idle emissions in SCC output
- RunSpec options not applicable for emission rates calculation are now grayed out

## Other Improvements

- **HONO, an ozone precursor needed in some air quality modeling, added to model output**
- **Added new counties in Alaska and Colorado**
  - No default data are available
- **New fields added to fuel formulation tables for additional characterization of volatility - T50 and T90**
  - Most users will not change these fuel specifications
  - User modified fuel formulation tables for MOVES2010 and MOVES2010a must be converted to work in MOVES2010b
- **Some additional warning messages have been added**
- **Added hotspot scripts to Post Processing menu**

## Other Items with the Release

- **Tools that help convert RunSpecs and user input databases created with previous versions of MOVES2010 to MOVES2010b format**
- **Updated SIP and Conformity Policy Guidance**
- **Updated MOVES Technical Guidance**
- **Spreadsheet converter to ease input of retrofit program data in MOVES**
- **Updated 2-day training course materials coming later this summer**

## MOVES2013: What's Next?

- **A major upgrade to MOVES**
- **New data**
  - Heavy duty
    - Two new studies
  - Evaporative emissions
    - New studies, adding multi-day diurnals
  - Cold temperature data for new vehicles
  - New fuel effects and fuel supply information
  - Activity
    - New sales, population, and VMT data
    - New studies on VMT and starts
  - New speciation data for VOC and PM

# MOVES2013: What's Next?

- **New Rules**

- Heavy Duty (HD) Greenhouse Gas MY 2014-2018
- Light Duty Greenhouse Gas MY 2017-2025
  - Not yet finalized
- Tier 3
  - Not yet proposed
  - Inclusion is dependent on timing of MOVES 2013 and timing of Tier 3

- **Addition of draft NONROAD emissions**

- Will finalize in a later version

# MOVES2013: What's Next?

- **Other potential improvements**
  - Better Performance
  - Upgraded support for Cloud Computing
  - Improved evaporative emission processing
  - Improved diesel retrofit processing
  - Incorporating VOC and PM speciation
  - Major upgrade for technical documentation
  - Improved error and warning messages
  - Inclusion of features that will allow MOVES to be used internationally
- **Tentative release mid-2013**

## Next Steps

- **Starting new FACA process for MOVES2013**
- **Considering a workshop to bring MOVES users together to talk about developing local fleet and activity inputs**
  - Interest level?
  - Target date would be late fall 2012 or spring 2013