

MOVES2013 Model Development :

Planned Model Enhancements

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The word "MOVES" is displayed in a stylized, metallic, 3D font with a glowing effect, set against a dark, gradient background.

Planned Model Enhancements

- Processing upgrade
- New road types
- New Inputs / Importer – start process
- Fuel Supply “wizard”
- Enhanced hydrocarbon speciation
- Enhanced particulate matter speciation
- MOVES International

Processing Upgrade

- **MOVES processing algorithm changes**
 - Previously, emission rates were calculated by calculating the inventory, then dividing by VMT or population. For MOVES2013, we plan to do rates first.
- **Changes are deep in the code and mostly invisible to the user**
 - Regulatory Class added to output (*optional*) in addition to source type
 - Minimal changes to GUI look and feel
- **Complete in MOVES2013 for non-evaporative processes**
- **Significant improvement in model run-time**

New Road Types Added (1)

- **New road types added to MOVES2013**
 - NONROAD road type represents all non-road source types
 - Urban freeway ramp
 - Rural freeway ramp
- **New ramp calculation algorithm**
 - Compute operating mode distributions for each ramp speed bin (16 speed bins 5 mph increments)
 - MOVES2010 currently applies an operating mode distribution based on the average freeway speed.
 - Change will likely increase emission rates slightly

New Road Types Added (2)

- **No changes to user inputs ... except**
 - Allow separate ramp fractions for rural and urban ramps
- **Output changes / options for freeways**
 - Combined freeway and ramp outputs (rates and inventory)
 - Separate freeway and ramp outputs (rates and inventory)
 - No changes to urban or rural arterial road types

New Inputs / Importer – Vehicle Starts

- **Vehicle “Start” algorithm in MOVES uses...**
 - Default vehicle trip patterns
 - Vehicle population data
- **Some users want to enter location-specific start data derived from data or Travel Demand Modeling**
- **We are creating new “Importer” in MOVES2013 to allow users to provide specific vehicle start data and distributions when available or use defaults**

New Inputs / Importer – Vehicle Starts (con't)

- **User may enter one or all of the input data sets**
 - Starts per day input
 - Starts distribution by HOUR-DAY
 - Starts distribution by SOURCE-TYPE
 - Starts distribution by MONTH
 - Starts distribution by OPERATING MODE
 - Soak time distribution
- **New output in units of “grams / start” will be available.**

Fuel Supply “WIZARD”

- **Potential new MOVES2013 feature**
- **Optional – current inputs and algorithm will be retained in MOVES2013**
- **The concept of “Region” will be added to the fuel supply**
- **GUI changes**
 - consolidate MOVES fuel inputs in one importer
 - add a “Fuel Wizard” button
- **Fuel Supply Wizard**
 - Requires input of only a few major fuel parameters (ethanol volume, sulfur, RVP, etc.)
 - MOVES will compute remaining fuel parameters based on refinery modeling

Enhanced Hydrocarbon Speciation

- Speciation of total organic gases (TOG)
- Required for air quality modeling
- Calculations currently performed in SMOKE-MOVES model (*interface program*)
- Migrate to MOVES2013 for technical reasons
- Primary testing, analysis and development of speciation profiles, chemical equations and factors were done by EPA OAQPS

Particulate Matter Speciation

- **Perform PM speciation directly in MOVES2013**
 - MOVES to provide species needed for air quality modeling
 - Include 15 additional PM species needed in next version of CMAQ 5.0
 - Redefine MOVES PM species to be consistent with CMAQ species ('MOVES Organic Carbon' = 'CMAQ Organic Carbon')
 - Eliminate post-processing step to prepare PM inventories for SMOKE-MOVES and CMAQ
 - Allow MOVES users to apply separate PM profiles for distinct vehicle types and processes. For example:
 - Model year groups (pre-2007 diesel, post-2007 diesel)
 - Emission processes (Starts, Running, Extended idle)

Enhanced Hydrocarbon and PM Speciation

- **MOVES Input changes**
 - Additional chemical compounds on pollutant panel
 - Additional processing time if selected
 - User Option – most users will not need all speciation features
- **MOVES Output changes**
 - Additional chemical compounds in output, if selected
 - Speciated hydrocarbon results reported in terms of molecular units

MOVES International

- **A external tool to create and phase-in emission rates to account for different national emission standards**
- **Option to input and report emission rates in pure metric units**
- **Updated Rate of Progress tool to allow users to enter any year.**

Model Enhancements Status (January 2013)

- Processing upgrade partially complete
 - New road type mostly complete
 - New “Starts” input designed
 - Fuel ‘Wizard’ planned
 - HC speciation designed
 - PM speciation designed
 - MOVES International partially complete
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- Please provide feedback on enhancements!