Making the Transition to MOVES

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Outline

- **What is MOVES?**
- **MOVES schedule and MOVES versions**
- **Easing the transition**
  - Improvements in handling different geographic domains
  - Data importers
  - Guidance documents
  - Training
- **What you can do to prepare**

MOVES

- **MO**tor **V**ehicle **E**mission **S**imulator
- **State-of-the-art modeling framework**
- **Will replace current models (MOBILE & NONROAD) and expand capabilities**
- **Designed to allow easier incorporation of large amounts of in-use data from a variety of sources**
    - MOBILE structure limited ability to incorporate new emissions data

MOVES – What's different from MOBILE6?

- **Inventory estimation**
  - VMT incorporated in calculation rather than post-processed
- **Designed for analysis at multiple scales**
- **Emission rates on modal basis**
  - MOBILE6 rates based on aggregate driving cycles
  - MOVES rates based on "operating modes"
- **Software framework**
- **New data and methodologies**

MOVES Schedule

- **January 2005**
  - MOVES2004 released
    - Includes energy consumption, greenhouse gases
- **May 2007**
  - MOVES Demo released
    - Basic structure of MOVES without criteria pollutant emission factors
- **Late 2008**
  - Planned release of draft MOVES2008
    - Add draft criteria pollutant emission factors
- **Late 2009**
  - Planned release of MOVES2009
    - Final highway vehicle criteria pollutant model
- **2009+**
  - Add nonroad emissions to MOVES

MOVES Demo

- **Posted May 2007**
- **Has basic MOVES structure but not all functionality planned for later versions**
  - Allow users to become familiar with basic operation of MOVES
  - Get early feedback from users
- **Replaces MOVES2004 for on-road energy consumption, CO2, CH4, N2O, Well-To-Pump**
- **Has placeholder values for HC, CO, NOx, PM, SO4**
  - Criteria pollutant results are meaningless
- **Many features still incomplete**
  - Difficult to change local inputs

MOVES2008

- **Developing draft MOVES2008 for release in late 2008**
  - Adding criteria pollutant emission factor databases
  - Adding additional features to simplify regional and project-level analysis for SIPs and conformity
    - Data importers
    - Improved domain handling capabilities
- **MOVES2008 will be a draft model**
  - No official use requiring MOVES2008
  - Followed by public review, revisions, training, and EPA guidance development
  - May not include all data or features planned for MOVES2009

MOVES2009

- **MOVES2009 planned for release in late 2009**
- **MOVES2009 will be official version of MOVES for on-road vehicles outside of California**
- **Use will be required for:**
  - State Implementation Plans (SIPs)
  - Regional conformity analysis
    - Following regional conformity grace period of 3 to 24 months
  - Project level conformity analysis for PM and CO
    - Following project level conformity grace period which could be shorter than regional conformity grace period
  - NEPA analysis (e.g., air toxics)

Easing the Transition to MOVES

- **Improving handling of different domain sizes**

- **Developing data importers to simplify data input**

- **Preparing guidance documents**

- **Planning outreach and training**

Levels of Analysis in MOVES

- **MOVES is designed to work at macro, meso, and micro scales**
- **These translate into different geographic domains:**
  - National
  - Nonattainment Area or County
  - Project
- **Adding GUI for nonattainment area and project level analysis to allow users to specify local inputs**

National Level

- **Uses national default data with allocation to county level**
- **Primary use is broad-scale national analysis**
  - e.g. EPA rulemakings for vehicle standards
  - Not appropriate for use in SIPs or conformity
- **Users can change inputs, but not easily at the county level**
- **Output for nation, states, or counties**
- **MOVES Demo works best for this level of analysis**

Nonattainment Area or County Level

- **Define a "domain" as a single county or group of counties**
- **Users input local environmental, fleet, and activity data similar to what is required in MOBILE**
- **May define subareas**
  - individual counties within a group of counties
  - zones within a single county
- **Output is at the county level by road type**
- **This level of analysis will be appropriate for SIPs and regional conformity analyses**

Project Level

- **Users will be able to define inputs at the project level as individual links in the project**
  - Enter fleet and activity data specific to each link
  - Could enter detailed driving behavior by link
  - Multiple links could be modeled in a single run
- **Users will also be able to input idle and start information if applicable for the type of project**
- **This level of analysis will be appropriate for project level conformity analyses**

Look-up Table Output Option

- **MOVES is an inventory model**
  - designed to produce total emissions incorporating VMT by road and vehicle type
- **A look-up table output option allows users to produce running emission rates in grams per mile if want to post-process results as currently done with MOBILE**
  - This output option will work at all levels – national, nonattainment area, and project
  - EPA is considering g/hour output for non-running emissions

What Are MOVES Data Importers?

- **Software interfaces that can create alternate databases, tables, and data records for use by MOVES**
- **Currently developing data importers to simplify creation of local input files in draft MOVES2008**
- **Advantages**
  - Do not require knowledge of database commands and syntax
  - Can assure the updates are made only to the appropriate tables
  - Can require complete information from users, preventing data gaps
  - Can include some error checks
  - Can be designed to convert data from MOBILE6 to MOVES format

Future Guidance Documents

- **EPA expects to release several guidance documents that will help with the transition for final MOVES**
  - MOVES Technical Guidance for SIPs and conformity
  - Project Level Conformity Guidance for PM
  - MOVES SIP and Conformity Policy Guidance
- **Will release draft guidance for comment sometime after release of MOVES2008**
- **Final guidance documents will be available when MOVES2009 is released**

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MOVES Technical Guidance for SIPs and Conformity

- **Answers these questions:**
  - When can model defaults be used?
  - When is local information needed?
  - What are acceptable sources of local information?

- **See MOBILE6.2 Technical Guidance for examples of past answers to these questions**
  - Registration (age) distribution
  - Mileage accumulation

MOVES

Local Inputs vs. Defaults – Key Considerations

- **Does the input vary by location?**
  - Some inputs are more likely to vary than others
- **How sensitive is MOVES to changes in the input?**
  - Take into account MOVES sensitivity analysis
- **Is local information available?**
  - Ease or difficultly developing local information
  - Quality of local information
- **As with MOBILE6, some local inputs will be required, some will be recommended, some will be optional, and some may be discouraged if local data in unreliable**
  - Your feedback on availability and quality of local data is helpful

Project Level Guidance for PM

- How to do project level analysis for PM2.5 and PM10 with MOVES for conformity
- Similar to Technical Guidance, but focused on specific needs for project level analysis
- Will also address how to use air quality dispersion models for project level conformity analysis

MOVES SIP and Conformity Policy Guidance

- **Answers these questions:**
  - When should MOVES be used for development of new SIPs?
  - When should MOVES be used for new conformity determinations?
    - Conformity grace period can be 3 to 24 months
  - Any other general policy questions for the transition from MOBILE to MOVES

- **Actual date that MOVES becomes official for SIP and conformity purposes is based on Federal Register notice announcing availability**

MOVES Outreach and Training

- **EPA developing a joint training plan with FHWA**
- **Near-term outreach prior to release of draft MOVES2008**
    - Focus on basic information to prepare users for transition
- **More detailed training after release of draft MOVES2008 focusing on use of MOVES for SIPs and conformity**
- **We welcome comments on training needs and priorities**

What Should You Do Now?

- **Start learning to use MOVES as soon as possible**
  - Don't wait for release of MOVES2009
- **Update computer hardware**
  - Dual-core processor (faster is better)
  - At least 1 GB memory (more is better)
  - At least 40 GB storage (more is better, output files can be very large)
  - Consider setting up a distributive network (specs of "master" computer are key)
  - Windows XP or 32-bit Vista
    - Current version of MySQL does not work on 64-bit Vista

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What Should You Do Now?

- **Provide feedback on MOVES Demo**
  - Still time to let EPA know about possible bugs, other concerns
- **Build staff expertise in relational databases and MYSQL**
  - May not be needed for typical runs, but should have an in-house expert for more advanced analysis
- **Plan to attend MOVES training events after release of MOVES2008**
- **Subscribe to MOBILENEWS email list for MOVES updates**

  http://www.epa.gov/otaq/models/mobilelist.htm

Feedback

- **We need your comments and ideas**
  - Does MOVES meet your needs?
  - What parts are easy/hard to use?
- **Official Comment Period:**
  - Begins when MOVES2008 is released
  - Comments are most effective when obtained early
- **We are interested in your ideas to make MOVES better meet your needs**

Questions or Comments?

- Send an email to **mobile@epa.gov**
- Send a letter to:

  MOVES Model Comments

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