MOVES: On The Move!

Multi-Scale Motor Vehicle and Engine Emissions System

Update for MSTRS
February 2003

Exciting Progress...

- **Model development underway!**
  - Programming has begun
  - Update of fleet and activity database has begun
  - Large data gathering effort nearly complete

MOVES Implementation Plan

- **MOVES GHG (on-road): 2003-2004**
  - Draft inventory release (GHG.1): September 2003
  - Draft policy evaluation release (GHG.2): December 2003
  - Draft mesoscale release (GHG.3): Mid 2004
- **Full on-road implementation: Fall 2005**
  - Add HC, CO, NOx, Toxics, PM, NH_3, SO_2
  - Microscale analysis capability
  - Will replace MOBILE6
- **Off-Road: 2006**
  - Will replace NONROAD

Publications and Outreach

- **Workshop November 2002**
  - Over 100 participants
- **Planning reports published late 2002**
  - Design and Implementation Plan
  - Emission Analysis Plan for MOVES GHG
  - Undergoing public review and formal peer review
- **Currently drafting**
  - Quality Assurance Project Plan (QAPP)

Peer Review Panel

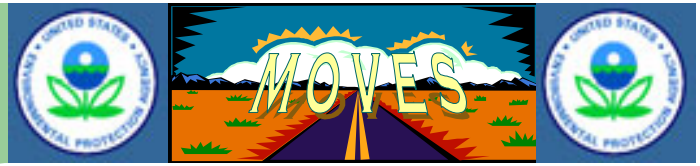
- **Established per agency guidelines**
- **Independent panel chosen and administered by 3rd party contractor**
- **Panel members:**
  - **Dr. Ted Russell**, Georgia Tech, Chair of NRC panel which reviewed EPA models
  - **Dr. Marc Ross**, University of Michigan
  - **Michael Replogle**, Co-Director of the Environmental Defense Fund Transportation Project

Upcoming Conference Presentations

- CRC Real World Emission Conference
- EPA International Emission Inventory Conference
- EPA Conference on Managing Environmental Quality Systems

DOT & DOE Coordination

- **DOT**
  - Will use MOVES for TRANSIMS
  - Working together to insure smooth integration
- **DOE**
  - Joint effort to integrate GREET and MOVES announced at California Fuel Cell Partnership
  - Will create state-of-the-art policy analysis tool to support fuel cell policy analysis



MOVES will compile largest in-use data set ever

- **EPA Mobile Source Observation Database**
- **Large-scale effort to gather thousands of tests from outside sources, including:**
  - CARB (including N_2O)
  - CRC (new heavy-duty chassis testing)
  - UC Riverside (including N_2O)
  - Environment Canada (including N_2O)
  - WVU (very large heavy-duty dataset)
  - IM240 programs
- **Initial PEMS work**

Initial Uses For MOVES GHG

- **Climate inventory support**
  - Inventory of U.S. Greenhouse Gas Emissions and Sinks
  - State/Local inventory development
- **Policy evaluation**
  - One-stop-shopping for “what-if” evaluation:
    - Advanced technology penetration
    - CAFÉ changes
    - VMT changes
    - Operational changes, speed limits, reduced extended idle, etc.
  - Adding well-to-pump via GREET will allow analysis of whole picture using best upstream and downstream info

Ultimate Uses For MOVES

- **In-house inventory support**
  - Rulemakings, trends, GHGs
- **Finer scale modeling assessments**
- **Policy evaluation for all OTAQ programs**
- **SIP and conformity**
- **All mobile sources and pollutants under one roof**

MOVES Software Framework

- Database-driven
  - Enables easy updates with new data
- Language: Java
  - Replaces antiquated FORTRAN
- Graphical user interface
- Designed for multiple-computer processing

Basic MOVES Concepts: Multi-scale analysis

- **Macroscale**
  - Large-scale inventories (e.g. U.S. at county level)
  - 1 hour resolution
- **Mesoscale**
  - More refined inventories, generally at regional level
  - Based on Link-level Travel Demand Model framework
  - 1 hour resolution
- **Microscale**
  - Emission analysis for intersection or group of links
  - 15 minute time resolution
- **Same emission rates feed all scales**

Basic MOVES Concepts: Modal Emission Rates

- **Group activity and emissions into "Bins"**
  - Vehicle Specific Power (VSP) accounts for speed, acceleration, grade, road load
- **Any driving pattern can be modeled based on distribution of time spent in bins**
  - Adds major flexibility compared to MOBILE
- **Provides common emission rates for macroscale, mesoscale, microscale**
- **Independent validation confirms accuracy of the approach**

Conclusion

- Working closely with partners and stakeholders
- Implementation schedule is still sound
- Model development is coming along nicely
- Much has been accomplished, there is much to do...