

US EPA ARCHIVE DOCUMENT

MOVES Update

Megan Beardsley
EPA Office of Transportation & Air Quality
CRC On-road Emissions Workshop
March 29, 2004

MOVES



Acknowledgements

**Argonne National
Laboratory**

**Cimulus Software
Development**

EPA MOVES Team:

John Koupal (co-lead)
Mitch Cumberworth (co-lead)
Chad Bailey
David Brzezinski
Penny Carey
Ed Glover

Bob Giannelli
Craig Harvey
Connie Hart
Sue Kimbrough
Larry Landman
Harvey Michaels
Ed Nam
Gene Tierney
Carl Scarbro
Gwo Shyu
Sujan Srivastava
Kitty Walsh
James Warila

What Is MOVES?

- **MO**tor **V**ehicle **E**mission **S**imulator
- **New software framework intended to:**
 - Replace MOBILE & NONROAD
 - Expand Capabilities
 - Additional Sources: Aircraft, Commercial Marine, Locomotive
 - Additional Pollutants: Greenhouse Gases
 - Additional Scope: Life Cycle Analysis

Why A New Modeling Approach?

- **Respond to external review**
 - National Research Council, “Modeling Mobile Source Emissions”
- **Improve the science**
 - New technology provides opportunity to vastly improve emission data
- **Current questions exceed current tools**
 - Analyses at finer scales
 - Life cycle effects
- **Improve the software**

Key Changes from MOBILE

- **Estimating inventories**
 - MOBILE estimates emission factors (grams/mile)
- **Multi-scale analysis**
- **Emission rates on modal basis**
 - MOBILE rates based on aggregate driving cycles
- **Software framework**
 - Relational database structure
 - Graphical User Interface
 - Object-oriented programming approach

Implementation Schedule

- **MOVES2004:** May 2004
 - On-road Energy consumption, CO₂, CH₄, N₂O
 - U.S. at county level inventories 1999 forward
 - Well-to-pump (GREET) integration
- **MOVES2005:** February 2005
 - Draft Aircraft, Commercial Marine, Locomotives
 - Vehicle Manufacture/Disposal component
 - Uncertainty Estimation
- **MOVES2006:** January 2006
 - Final Aircraft, Commercial Marine, Locomotives
 - Draft on-road criteria pollutants & toxics
- **MOVES2007:** June 2007
 - Final on-road
 - Draft non-road

MOVES2004 Features

- **Default energy use and GHG inventories for every county in U.S.**
 - Aggregated state and national level results too
- **Broad range of “what-ifs” and local customization possible**
 - Built-in “wizard” allows user to vary future alternative fuel and advanced technology mix
 - Alternate activity information can be used, e.g.
 - Driving patterns by roadway and average speed
 - VMT scenarios, start and extended idle activity, etc.

Policy Evaluation Potential

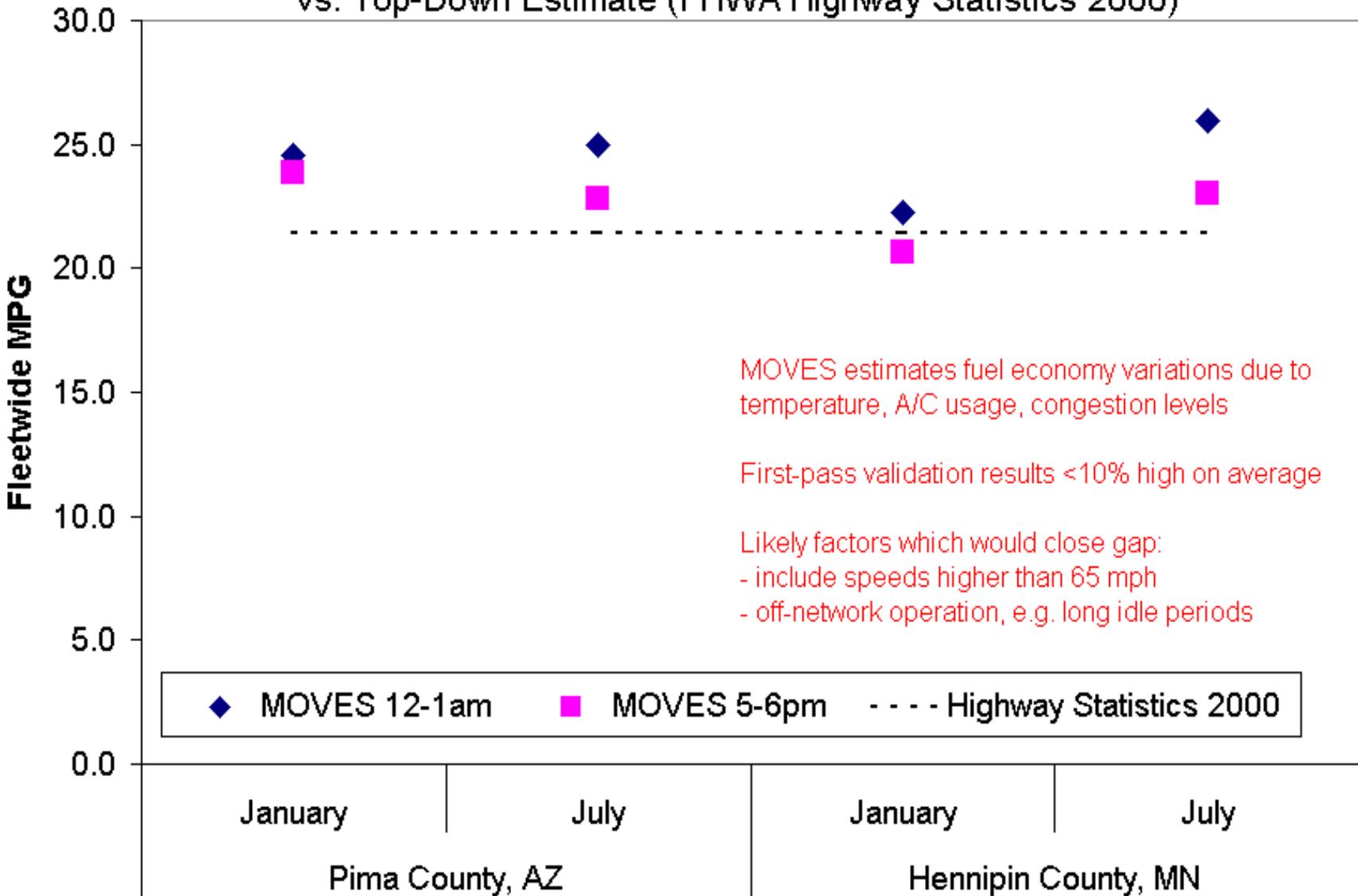
- **Full range of mobile source strategies**
 - Vehicle-based programs
 - Advanced technology and alternative fuel scenarios
 - Reductions/shifts in in-use fleet
 - Fuel programs
 - Transportation programs
 - VMT reduction
 - Speed reductions / traffic smoothing
- **Total energy & inventory projections**
- **Well-to-Wheel analysis**
 - Allows full evaluation of different fuel pathway options

MOVES2004 Release

- **Draft model and User's Guide (May)**
- **Documentation (June)**
 - Emission input development
 - National default fleet & activity input development
 - Design documentation
 - GREET integration
 - Model results
 - Validation and results
- **Workshop in summer**
- **Will trigger new review process**

First-Pass Validation:

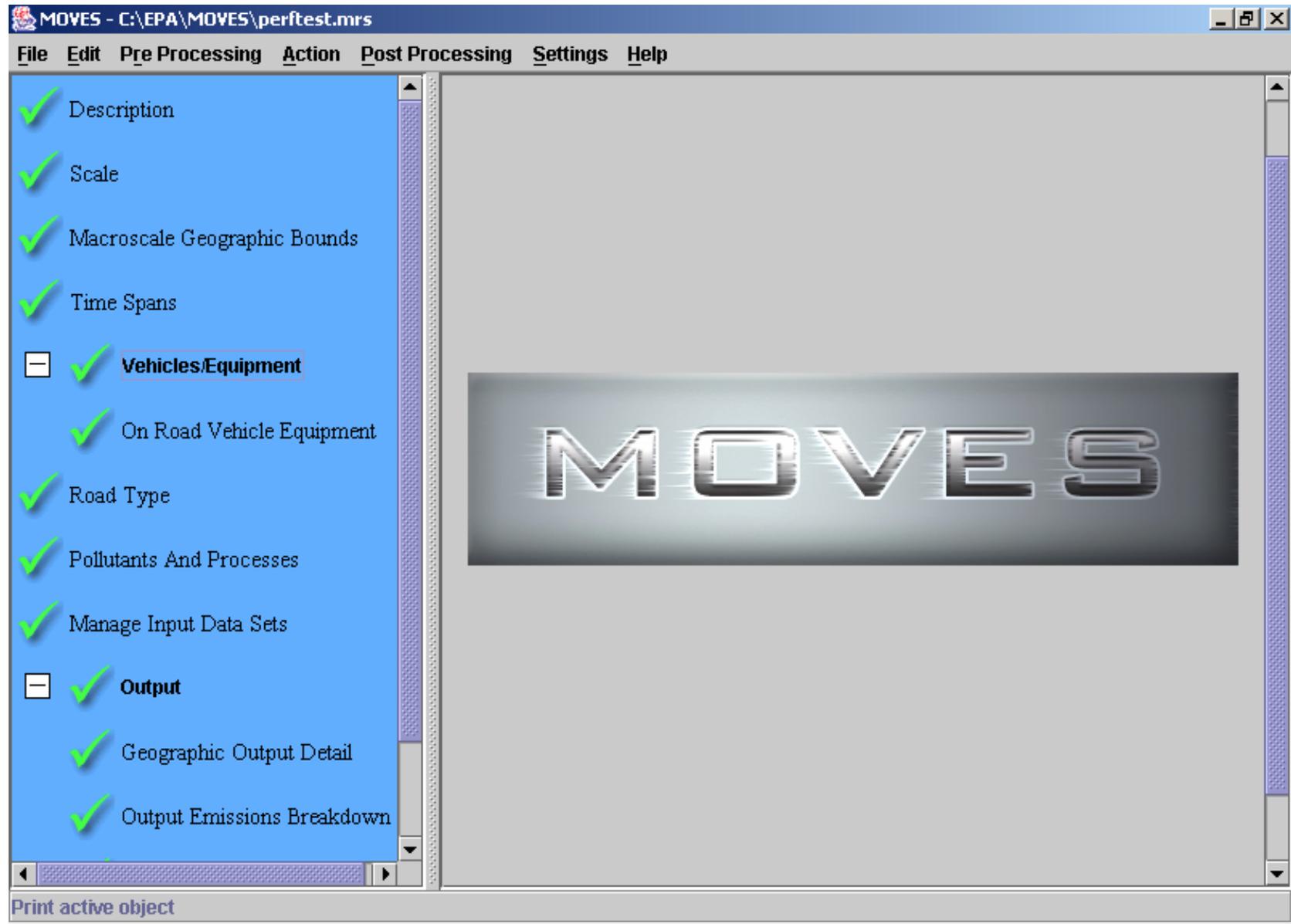
MOVES2004 1999 Fleetwide Passenger Car Fuel Economy Results vs. Top-Down Estimate (FHWA Highway Statistics 2000)



Working with MOVES

- **Installation package**
 - Includes necessary Java and MySQL components
- **User sets up run specifications through Graphical User Interface**
- **Input and output databases stored in MySQL tables**
 - Can be accessed through MySQL, MySQL GUI, or through ODBC porting to Excel, Access, FoxPro etc.
- **Allows distributed processing on multiple computers for larger scale runs**

MOVES Interface (Main Window)



Looking Ahead...

- **MOVES2005**

- Uncertainty estimation
- Aircraft, Commercial Marine, Locomotive
- Vehicle Manufacture/Disposal using GREET

- **MOVES2006**

- High emitter design
- Evaporative emission design
- Data gathering for criteria pollutants and toxics

MOVES Resources

- **Web site:**
 - <http://www.epa.gov/otaq/ngm.htm>
- **Email Listserver:**
 - EPA-MOBILENEWS
- **Email address:**
 - newgen@epa.gov