

Modeling Mobile Source Emissions

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Current US EPA Modeling Efforts

- † MOBILE 6
- † Nonroad
- † MOVES - The New Generation Model
- † IVEM - The International Model

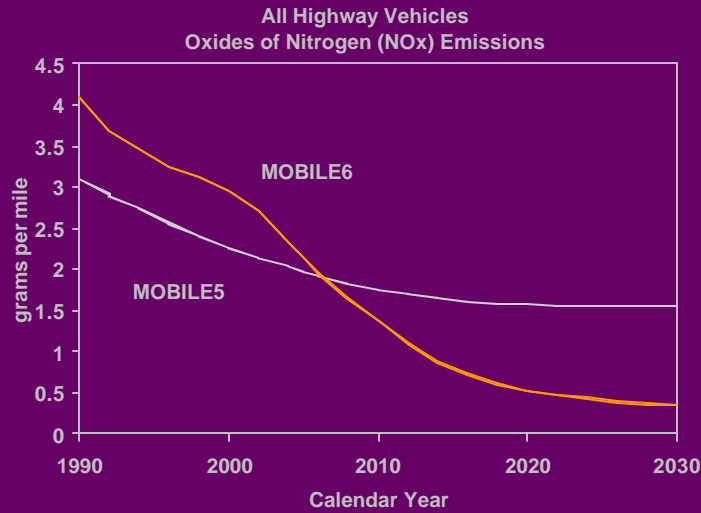
MOBILE 6

- † EPA's Highway Mobile Source Emission Factor Model
- † Final released January 2002
- † Available free on EPA's web site:
 - † www.epa.gov/otaq/models.htm

Estimates/Projects Emissions

- † Hydrocarbons HC
- † Carbon Monoxide CO
- † Oxides of Nitrogen NOx
- † Particulate Matter PMx
- † Ammonia NH3
- † Toxics
 - † Acetaldehyde , Acrolein, 1,3 Butadiene, Exhaust and Evaporative Benzene, Formaldehyde, Exhaust and Evaporative MTBE
- † Up to 50 user supplied other inputs
- † Carbon Dioxide (12/02) CO2

Fleetwide NOx Emissions



Applicability to Other Places?

- † Model designed for U.S. fleet
- † Core calculations not easily adapted
 - † Requires recoding and recompiling
 - add local emission factors
 - map local fleet mix with correction factors
 - include local environmental conditions
 - † ERG currently doing this for Mexico
- † But, quick and simple estimates can be done!

Quick and Simple Estimates

- † With the user-supplied input function in the Toxics model you can input:
 - † Local emission factors
 - By pollutant
 - By model year and vehicle class
 - † Local fleet mix
- † Model will calculate projections to future years and show milligrams per mile

Training Resources

- † Training materials available on website
 - † www.epa.gov/otaq/models.htm
- † Includes:
 - † Computer-base training
 - † Course materials (Power Point slides)
 - audio visual materials from course
 - † User's Guide

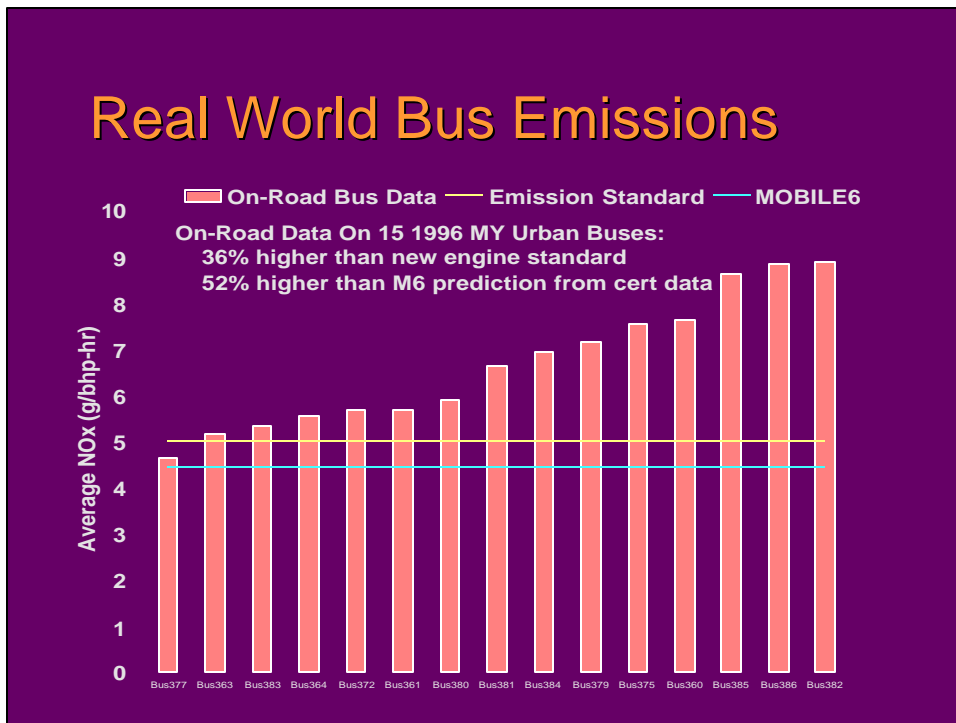
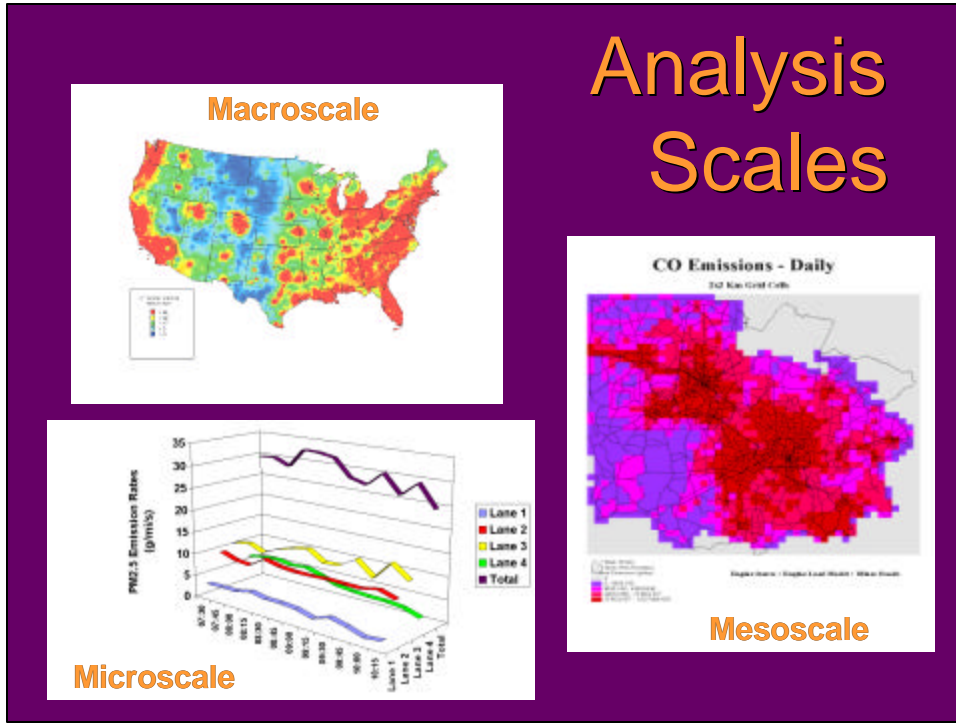
Nonroad Model

- † Estimates emissions from non-highway mobile sources
 - † 80 different categories
- † Easily used internationally
 - † Local population data
 - † Local activity data (hours per year)
 - † Fuel oxygen and sulfur content
 - † Ambient average temperature

MOVES: The New Generation

Multi-Scale Motor Vehicle and Engine Emission System

- † MOBILE is 20 years old
- † Current questions exceed current tools
 - † Multi-scale capability
- † Improve the science
 - † Data driven vs. assumption driven
 - † Easy updates
- † Improve the software
 - † Start from scratch
 - † Modular, flexible, well designed, efficient, modern
- † Improve the features

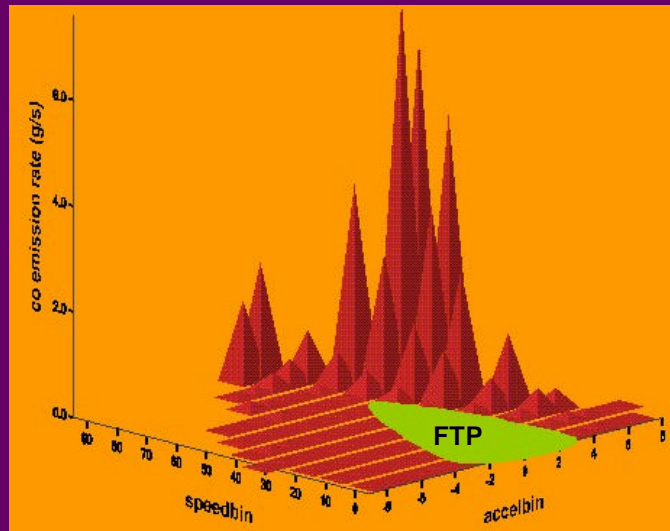


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Models Only as Good as the Data

- † Cheaper, faster, better data needed
- † On-road, in-use emission measurement
- † Portable Emission Measurement Systems - PEMS
 - † ROVER (first generation)
 - † SPOT (second generation)
 - † Commercial development underway
- † MOVES will rely heavily on PEMS data
 - † Plan is for model to readily accept new data quickly and easily without any reprogramming

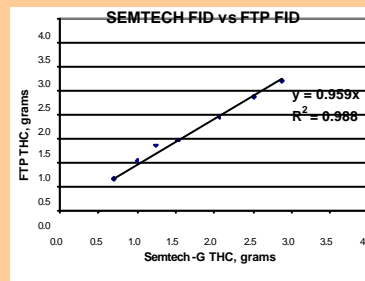
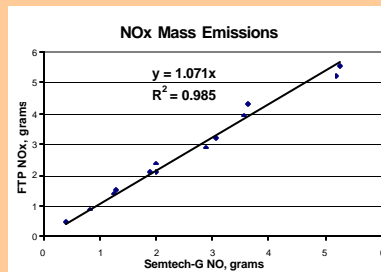
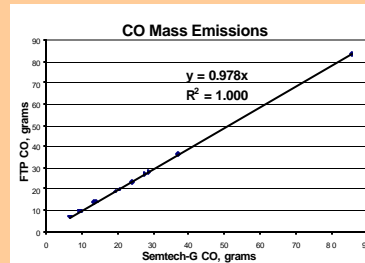
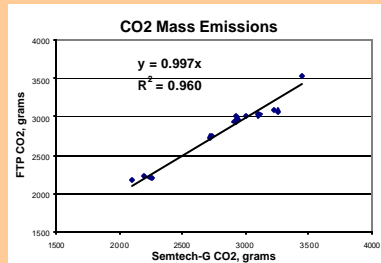
Real World vs. Driving Cycle



SEMTECH-G - Sensors, Inc.



Semtech Correlation Test



MOVES Schedule

† Complete Design	2002
† Core Model	2003
† Greenhouse gases	2004
† HC, CO, NOx, PM, Toxics	2005 (release)
† Off road vehicles	2006

IVEM

International Vehicle Emissions Model

- † Being developed for EPA by the University of California-Riverside (CE-CERT)
 - † All major pollutants of concern included
 - † Allows for regional-specific adjustments of fleet, activity, emission factors, etc.
 - † Designed with international use in mind
- † Due for completion later in 2002
 - † Undergoing testing now in Kenya
 - † Previously tested in Chile
- † Brochures available