KY AND IN EXPERIENCES WITH MOVES

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Tennessee Model Users Group
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• KY MOVES Pilot Group
  • KYTC – Jesse Mayes
  • KYDAQ – Joe Forgacs
  • FHWA – Jeff Houk & Larry Heil
  • MPOs -
    • Louisville – Randy Simon & Craig Butler
    • Cincinnati – Andy Reser
    • BLA – Vince Bernardin
• INDOT & Muncie, IN MPO experiences
We will walk through all the necessary steps for making a MOVES run for Greene County, IN. Along the way we will discuss various inputs, their development, options and model sensitivity.
• County Scale required for SIP development and conformity demonstrations.

• **Inventories vs. Rates Runs**

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<th><strong>PROS</strong></th>
<th><strong>CONS</strong></th>
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| **Inventories** | • Simple, no post-processing MOVES  
• Shorter MOVES runs  
• Clearer guidance | • Must make MOVES runs to demonstrate conformity |
| **Rates**       | • *May be able fully automate conformity without MOVES*  
• Doesn’t require two input tables | • More complex, requires post-processing MOVES  
• Long MOVES run times for SIP development  
• MOVES runs likely needed for peak spreading, etc. |
TIME SPAN

- Important not to aggregate time above hours and to use all hours of the day.
- For ozone inventories, we’re looking at a July weekday.
- For PM2.5 annual inventories, interagency consultation will determine whether multiple seasons and weekends will have to be modeled separately.
VEHICLES & ROAD TYPE

• For Greene County, only gasoline and diesel vehicles are modeled.

• It is helpful to model all road types, even if one does not exist in the base year. This avoids input tables changing dimensions.
For Greene County, only NOx and VOCs are significant ozone precursors. VOCs require MOVES to model other pollutants (Total HCs, Non-CH4 HCs).
• Remember, even for Greene County, an Alternative Vehicles, Fuels & Tech file must be created and imported to remove the default CNG transit buses.
• Using grams for mass units avoids rounding problems in built-in post-processing scripts.
• Reporting at least distance is a good idea as a check to ensure all VMT is properly accounted for.
• Reporting by Road Type is also often helpful.
• Reporting by Model Year and Fuel Type are not recommended.
AGE DISTRIBUTION

- Key difference from MOBILE6: 30 years
- Light vehicle distributions from registration data
- Preliminary 2009 IN data being quality assured shows an older, dirtier fleet than 2004
  - For some pollutants, for some areas, emissions could be as much as 25% higher
- Heavy vehicle distributions from MOVES default age distributions
  - Careful!– these vary by year
AVERAGE SPEED DISTRIBUTION

- Required only for inventory runs
  - by road type, hour & vehicle class
- Data source: Travel demand model
  - Table has 19,968 rows, hence post-processing
- Will also need hourly distributions & VMT fractions
- Speeds must reflect signal & stop delays, per EPA
  - Test without lead to higher NO\textsubscript{x}, lower VOCs
- Other sensitivity tests for slightly higher speeds, slower trucks showed only moderate sensitivity
- Consistency will be the key
RAMP FRACTION

- National default 8% for everything
- Greene County w/ I-69 estimated at 1%
- Sensitivity analysis showed that using more realistic ramp fraction resulted in notably lower emissions versus the default value for all freeways
ROAD TYPE DISTRIBUTION

- Road types share of VMT by vehicle class
- Source: HPMS – VMT fractions & EPA converter
- Will need to use multiple years to establish new distributions – significant year to year variation
VARIATION BY VEHICLE CLASS 2007-2009

20-25% decrease in NO\textsubscript{x}
• Use defaults for area unless interagency consultation determines otherwise.

• The fuels used in the county data manager must match with those in the run specification.
• EPA’s meteorological data converter can take min/max temperatures & absolute humidity and provide hourly temps and relative humidity.
SOURCE TYPE POPULATION

- New for MOVES – number of garaged vehicles by vehicle class for start and soak emissions
- Light duty vehicles from registration data
- Heavy duty vehicles may be developed from national default relationship with VMT
- May make sense to collect local info on number of refuse trucks & buses by type
- Same VMT & speeds with different vehicle populations can result in very different emissions
VEHICLE TYPE VMT

• **Annual VMT** by vehicle class from TDM & VMT fractions & converter spreadsheet

• Fraction in each month, by vehicle class & fraction in weekday/weekend, by vehicle class & road type
  • Based on INDOT count adjustment factors

• Fraction in each hour, by vehicle class, road type & day (1,560 rows)
  • Defaults vs. new tables from ATR data vs. modeled
  • Issues with peak-spreading
FINAL THOUGHTS

• **MOVES** emissions estimates are generally significantly higher than **MOBILE6**
  
• Update SIP first before conformity
  
• Emissions estimates with *new registration data* are also generally significantly higher
  
• **MOVES** will require post-processing
  
• Either for speed distributions for inventories
  
• Or for post-processing and applying rates