

KY AND IN EXPERIENCES WITH *MOVES*

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ENGINEERING • SURVEYING • PLANNING • ENVIRONMENTAL SERVICES

BACKGROUND

- **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**

OVERVIEW

- 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.

SCALE

- County Scale required for SIP development and conformity demonstrations.
- Inventories vs. Rates Runs

| | PROS | CONS |
|--------------------|---|---|
| Inventories | <ul style="list-style-type: none">• Simple, no post-processing MOVES• Shorter MOVES runs• Clearer guidance | <ul style="list-style-type: none">• Must make MOVES runs to demonstrate conformity |
| Rates | <ul style="list-style-type: none">• <i>May be able fully automate conformity without MOVES</i>• Doesn't require two input tables | <ul style="list-style-type: none">• 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.

POLLUTANTS

- For Greene County, only NO_x and VOCs are significant ozone precursors. VOCs require MOVES to model other pollutants (Total HCs, Non-CH₄ HCs)

STRATEGIES

- Remember, even for Greene County, an Alternative Vehicles, Fuels & Tech file must be created and imported to remove the default CNG transit buses.

OUTPUT

- 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_x, lower VOCs
- Other sensitivity tests for slightly higher speeds, slower trucks showed only moderate sensitivity
- Consistency will be the key

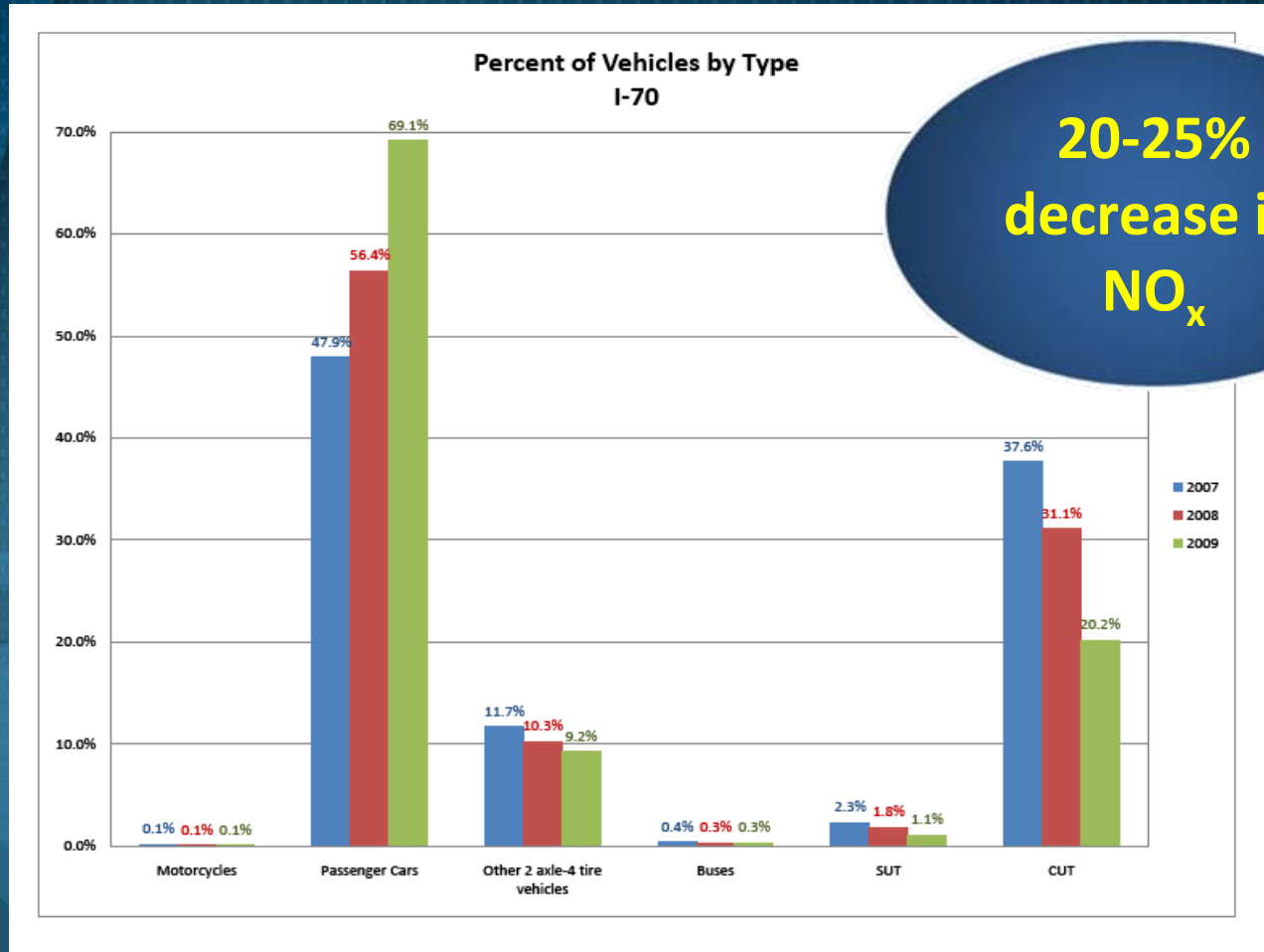
RAMP FRACTION

- 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



FUEL SUPPLY & FORMULATION

- 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.

METEOROLOGY

- 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