

MOVES-AIRPACT4 Integration 2013: Why Local Inputs?

June 6, 2013

Northwest Airquest MOVES Workgroup

AIRPACT4 Domain and Counties



 AIRPACT4 domain

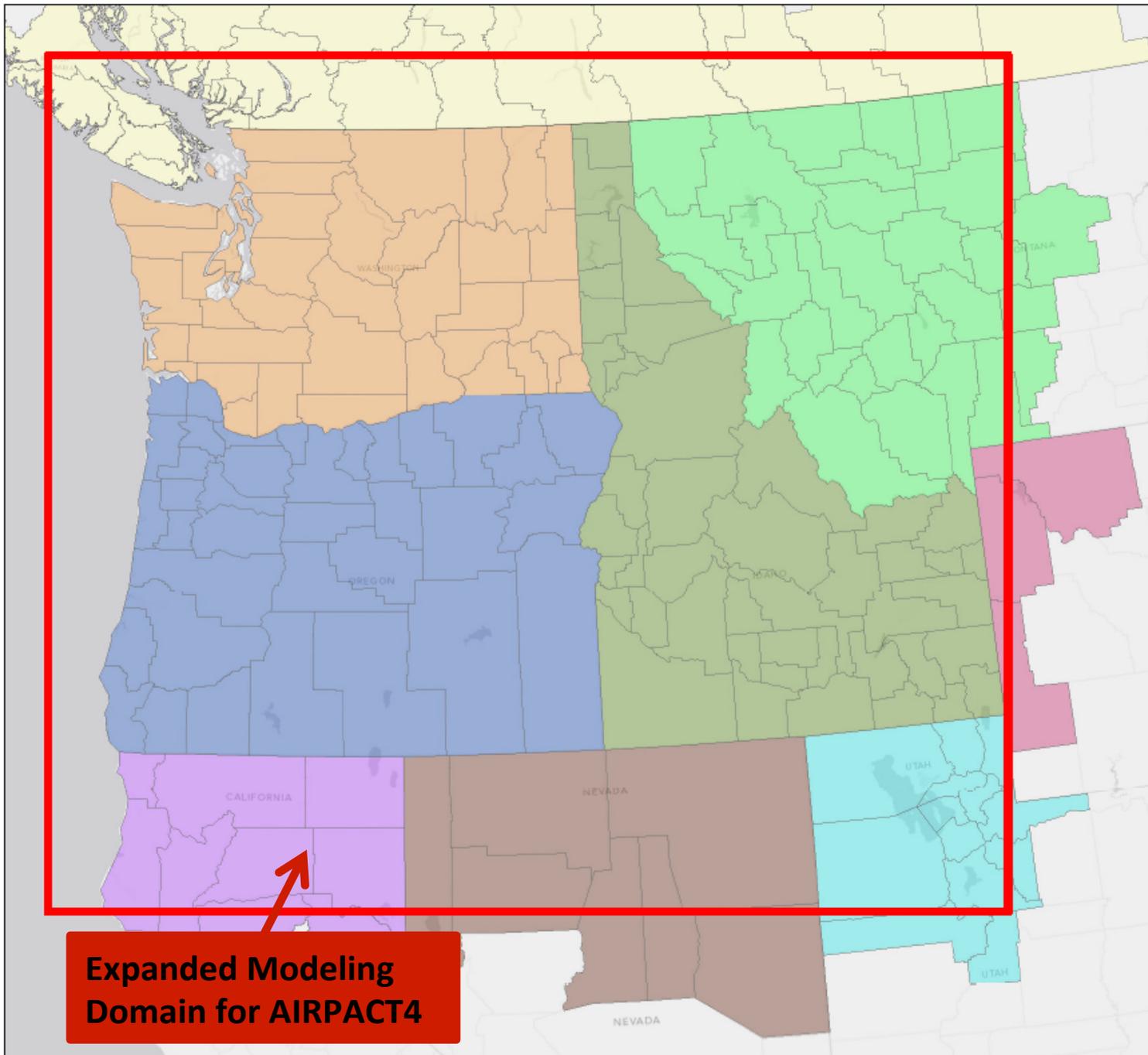
States

-  California
-  Idaho
-  Montana
-  Nevada
-  Oregon
-  Utah
-  Washington
-  Wyoming
-  Canada

150

 Kilometers

**Expanded Modeling
Domain for AIRPACT4**



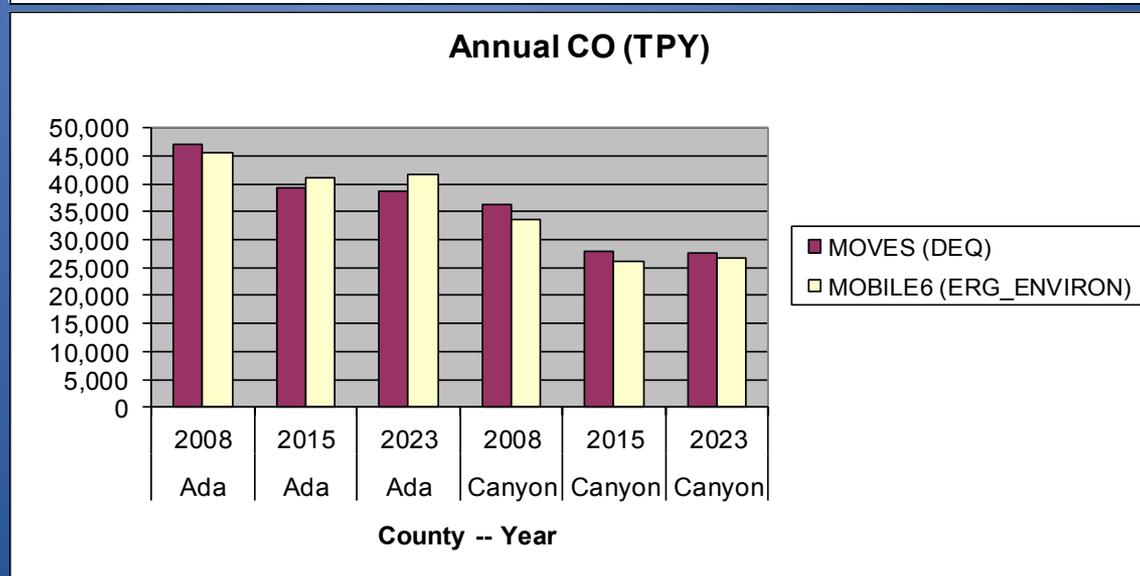
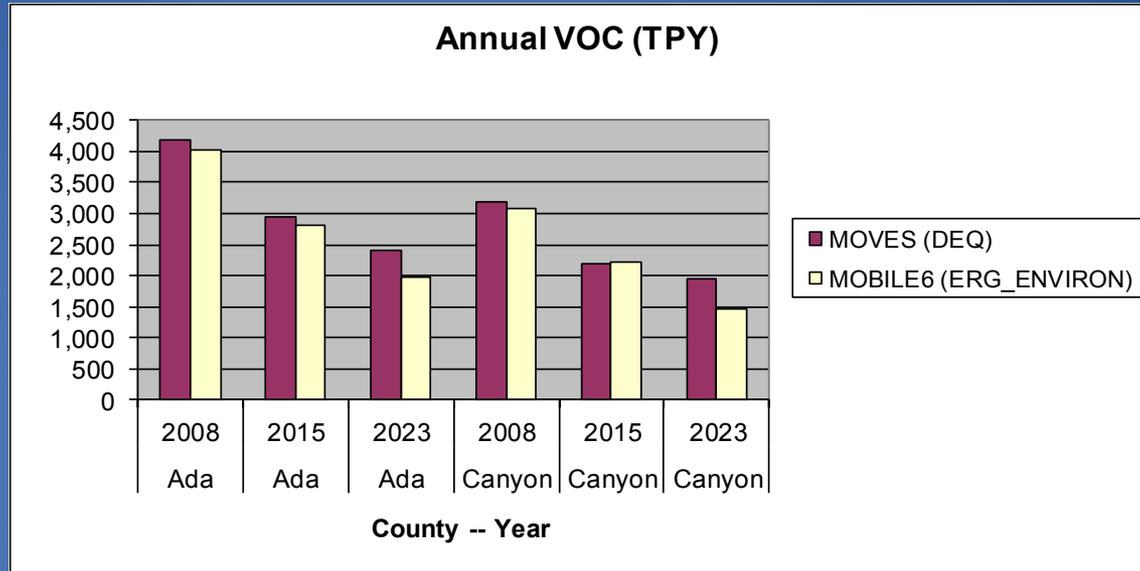
Why Switch Mobile Source Models?



- MOVES replaced MOBILE6.2 by EPA in March 2010
 - Required for regulatory purposes by March 2013
- MOVES model performance significantly improved compared to MOBILE6.2
 - WSU CO/NO_x study highlighted discrepancy between model and observations in PNW
 - Treasure Valley PM₁₀ Maintenance Plan Update work led to direct MOBILE6.2-to-MOVES comparison (following slides)
- Logical Timing
 - NW Airquest already upgrading AIRPACT-3 to AIRPACT-4

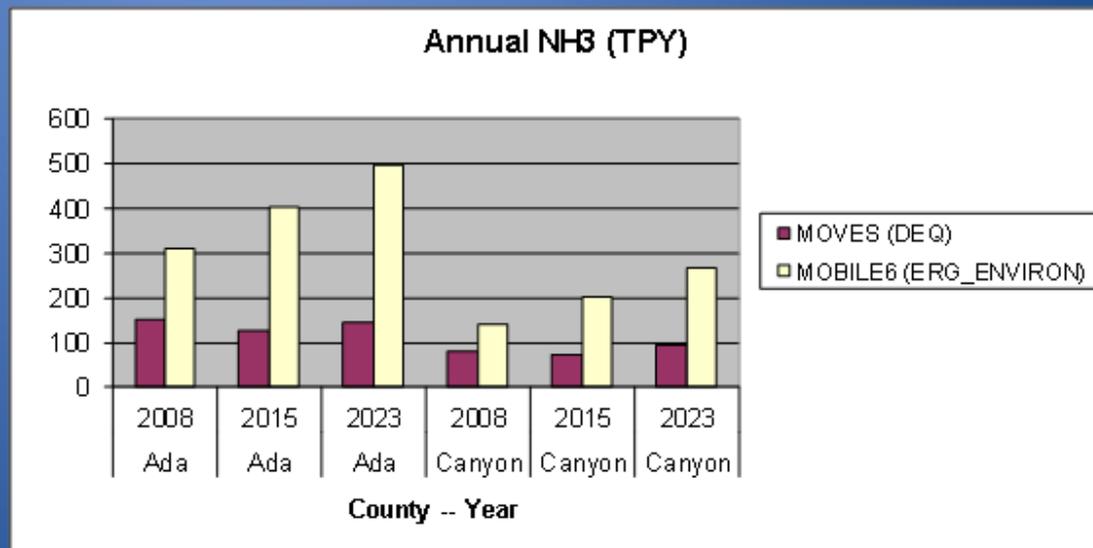
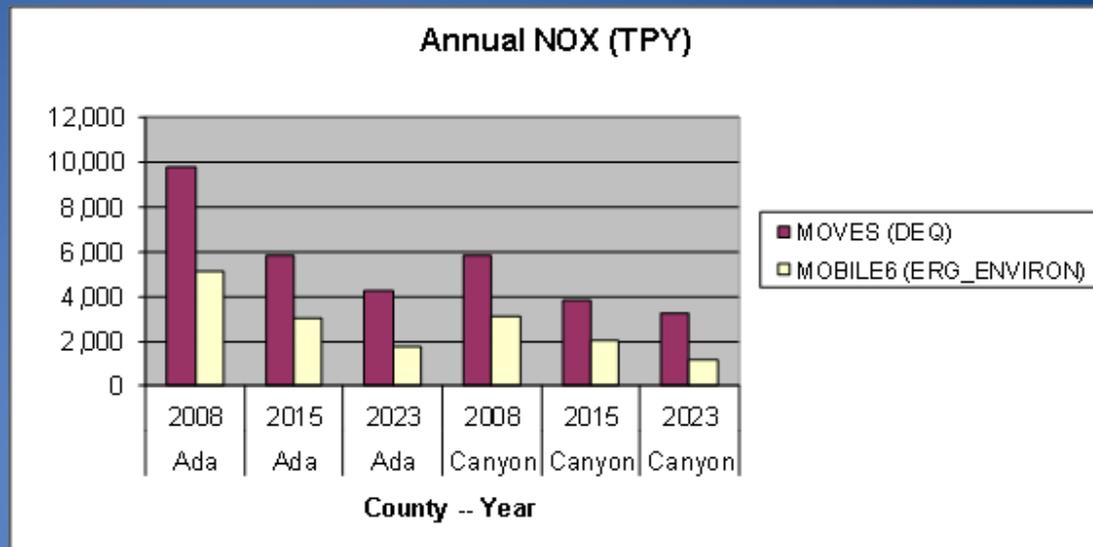
MOVES vs. MOBILE6.2 Results for Treasure Valley (Boise Area)

Not much visible difference between VOC and CO between MOBILE6.2 and MOVES.



MOVES vs. MOBILE6.2 Results for Treasure Valley (Boise Area)

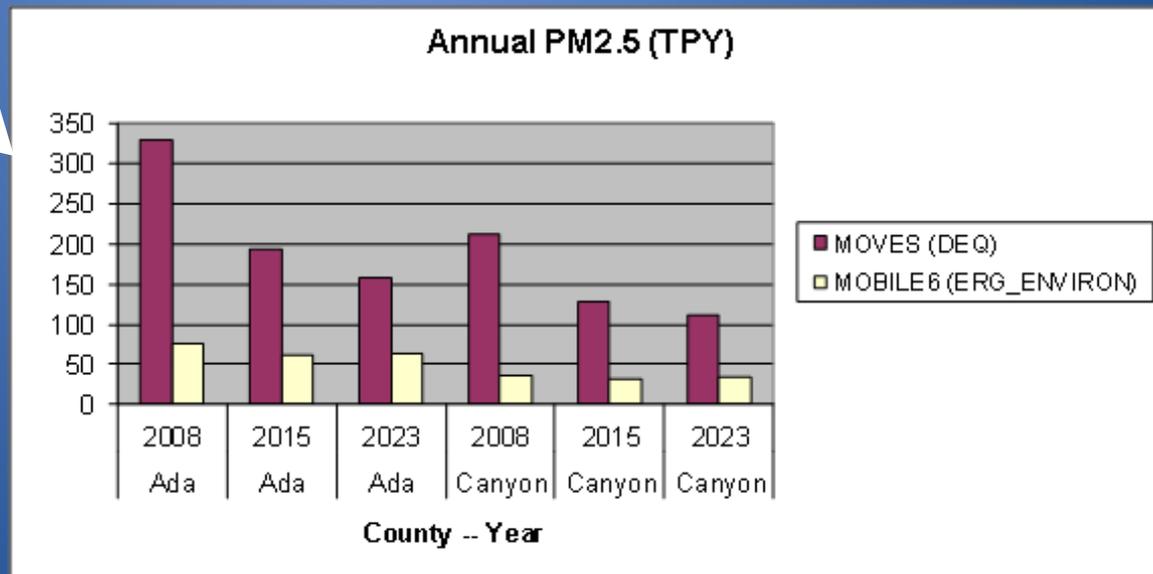
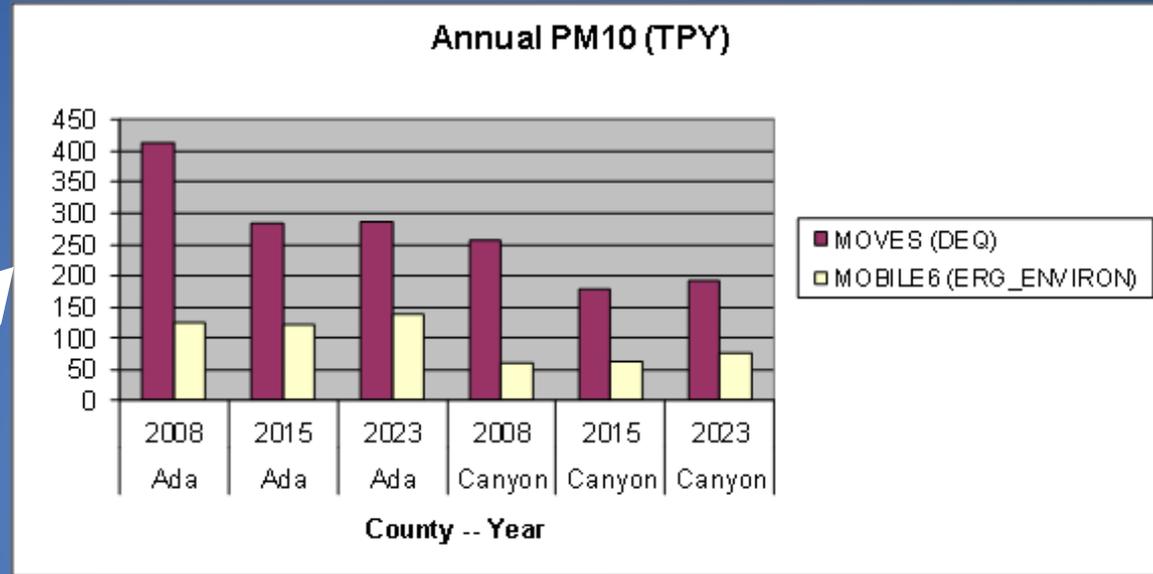
Huge increase in NO_x seen in MOVES, making it difficult to meet regulatory budgets consistently.



MOVES vs. MOBILE6.2 Results for Treasure Valley (Boise Area)

Increases of up to about 400% seen in PM levels in MOVES.

(But direct PM is a relatively small source.)



MOVES-to-AIRPACT Project Plan

1. Establish the SMOKE-MOVES integration process in AIRPACT4 using mostly “national default” inputs.

Step 1 Status:

- i. MOVES look-up table generated for entire AIRPACT-4 modeling domain;
 - ii. Integration with AIRPACT-4 modeling system - *Ongoing*
2. Refine Input files using local data for MOVES and SMOKE - *Ongoing*

Local Inputs

What constitutes “local” in MOVES?

- Dependent on modeling scale
- County Scale used for AIRPACT-4
 - Potential local inputs for each county in modeling domain...that is 119 counties in OR, WA and ID alone!

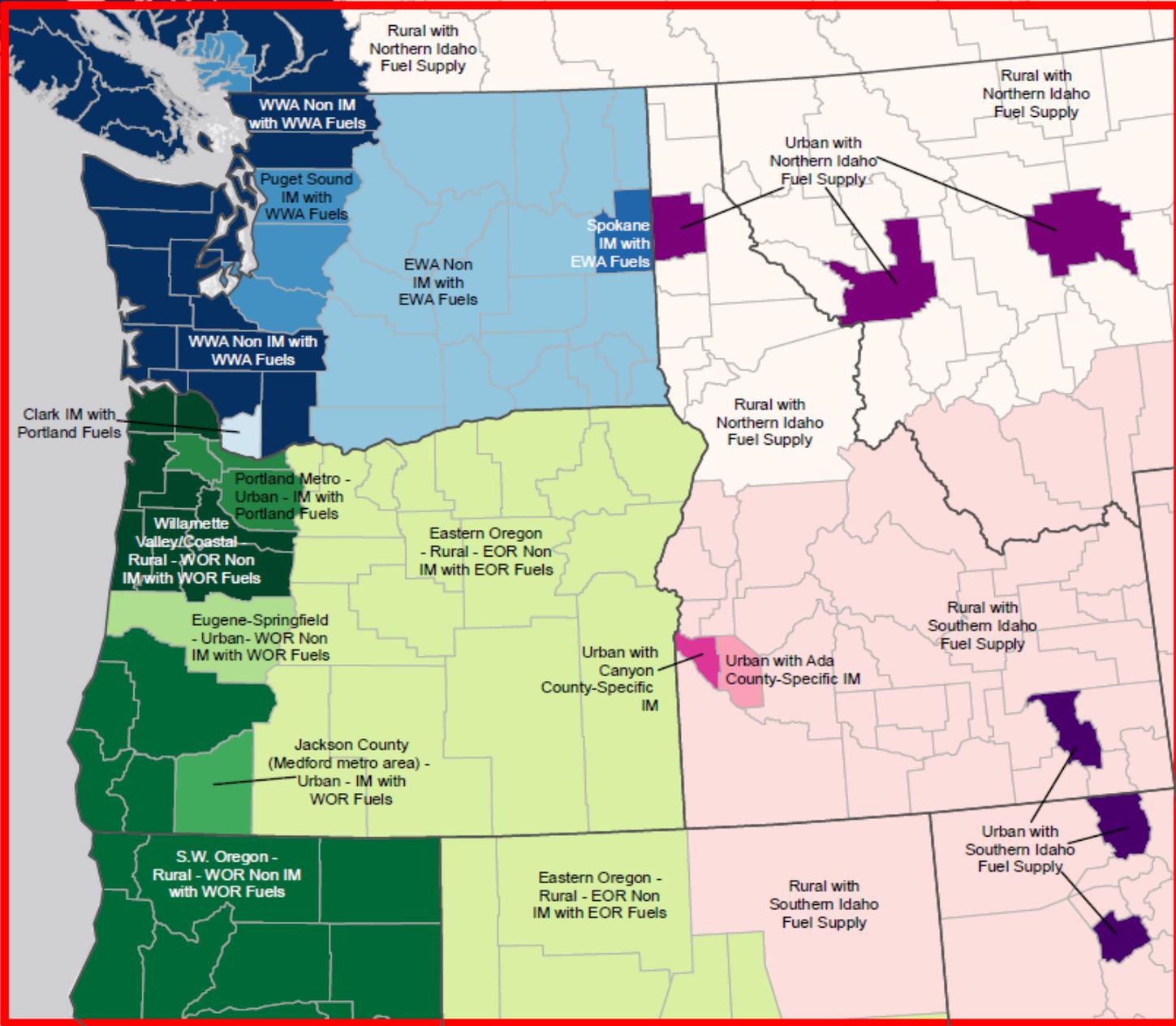
Local Inputs Continued...

Solution: Simplify MOVES model runs by combining similar areas!

- Identical MOVES inputs used for several counties in a “County Group” based upon the following:
 - Fuel parameters
 - Fleet age distribution
 - Inspection and maintenance (I/M) programs
- 2011 National Emission Inventory timed such that it coincided with MOVES-AIRPACT integration efforts

AIRPACT4 County Fuel Groups

130 Kilometers



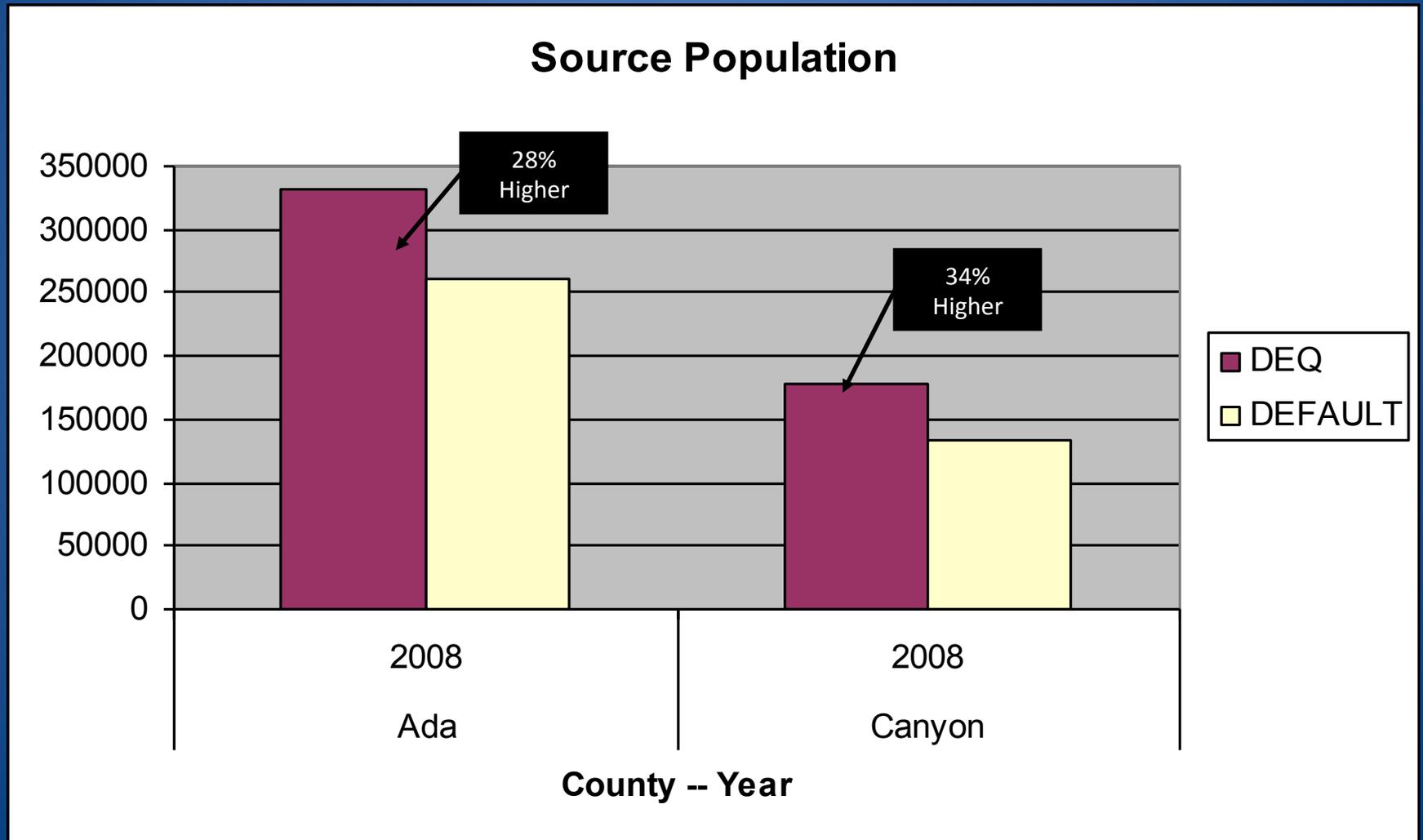
 AIRPACT4 domain boundary

Why Local Inputs?

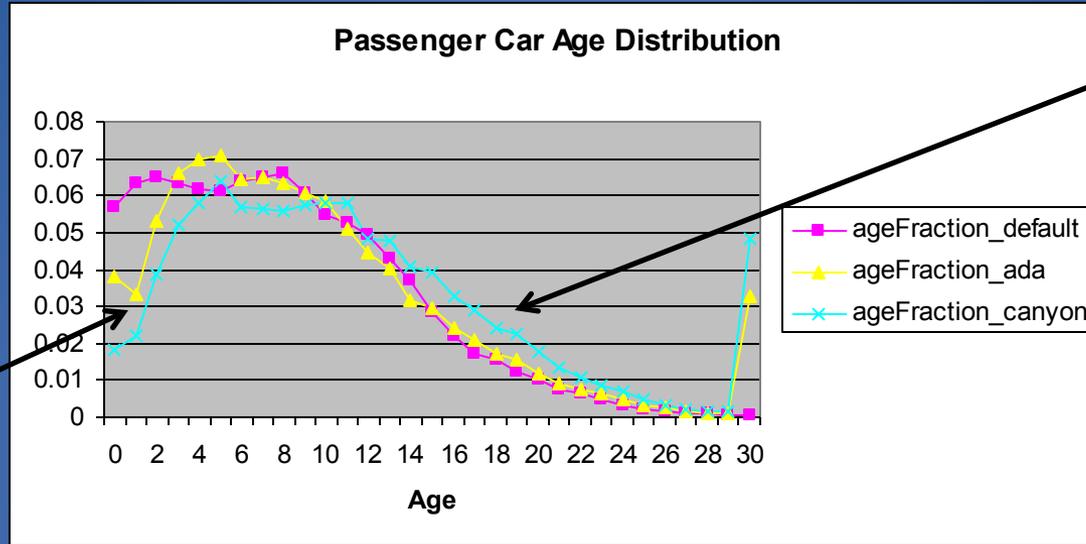
Q: If we already have MOVES emissions from a “national default” run, do we really need local emissions?

A: YES!!! Local inputs *drastically* affect emissions estimates in model output.

MOVES Inputs: Default vs. Local – Treasure Valley (Boise)

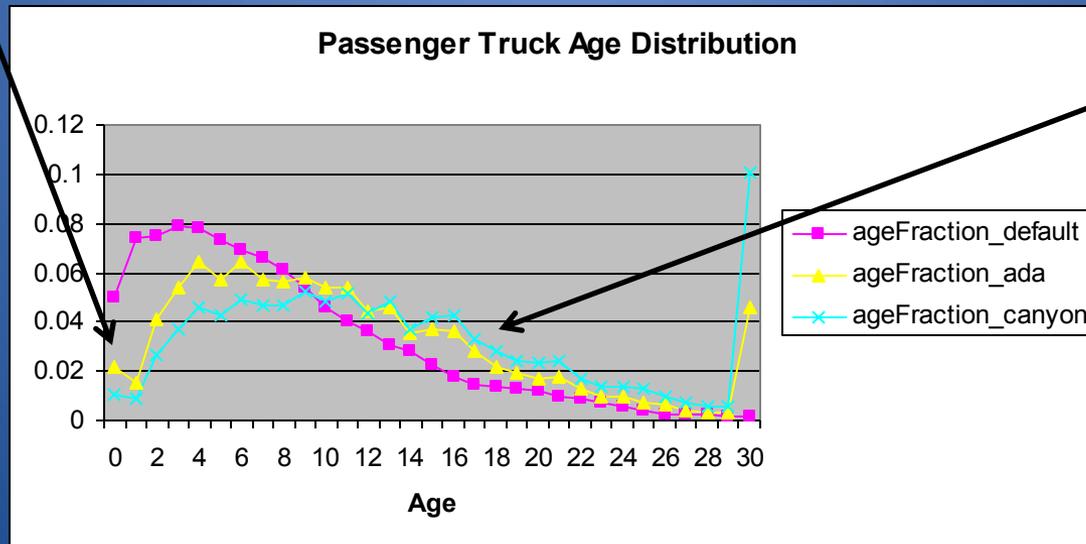


MOVES Inputs: Default vs. Local – Treasure Valley (Boise)



Ada and Canyon counties have fewer new cars and trucks than default inputs.

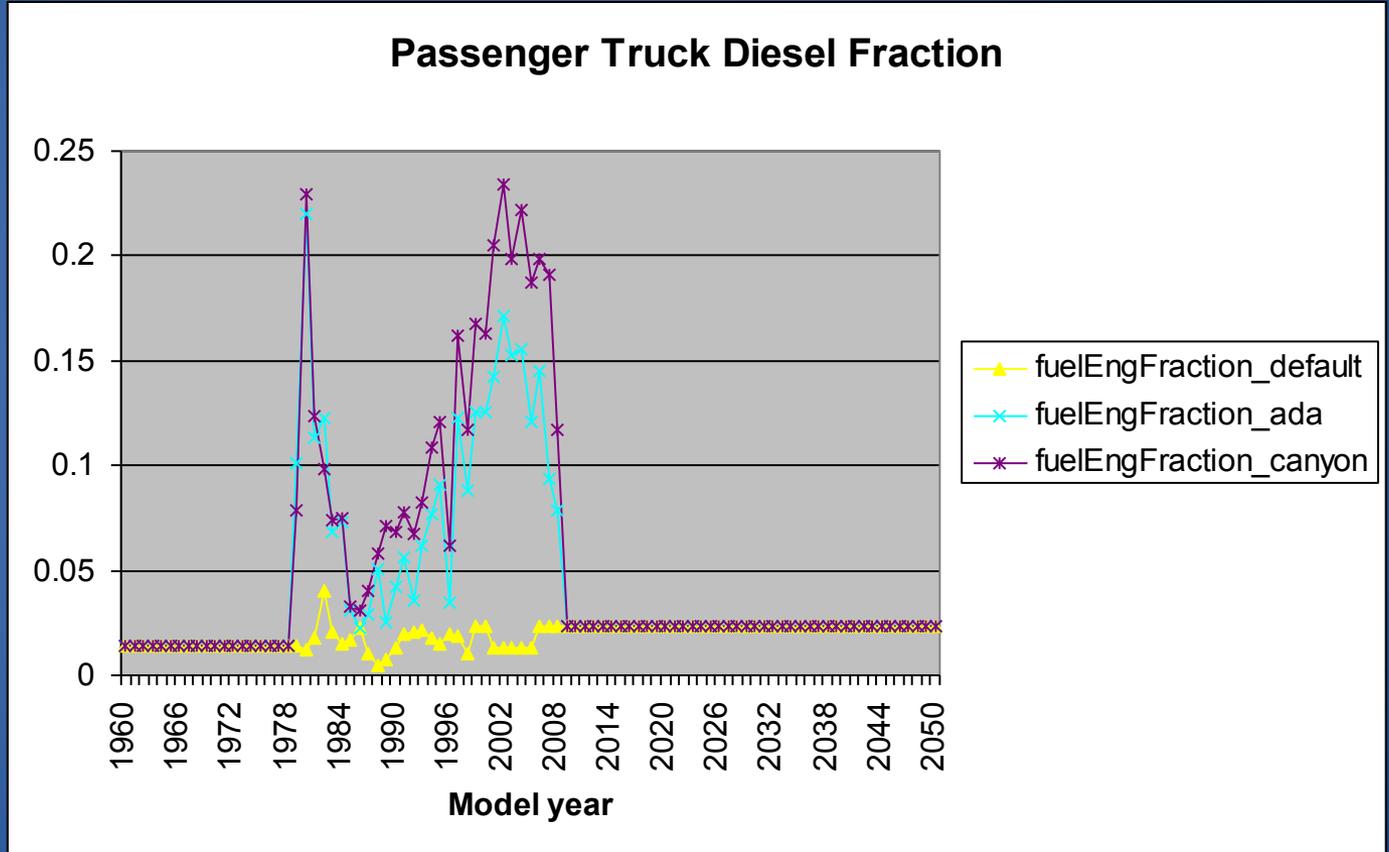
Canyon County fleet has more older cars than default inputs.



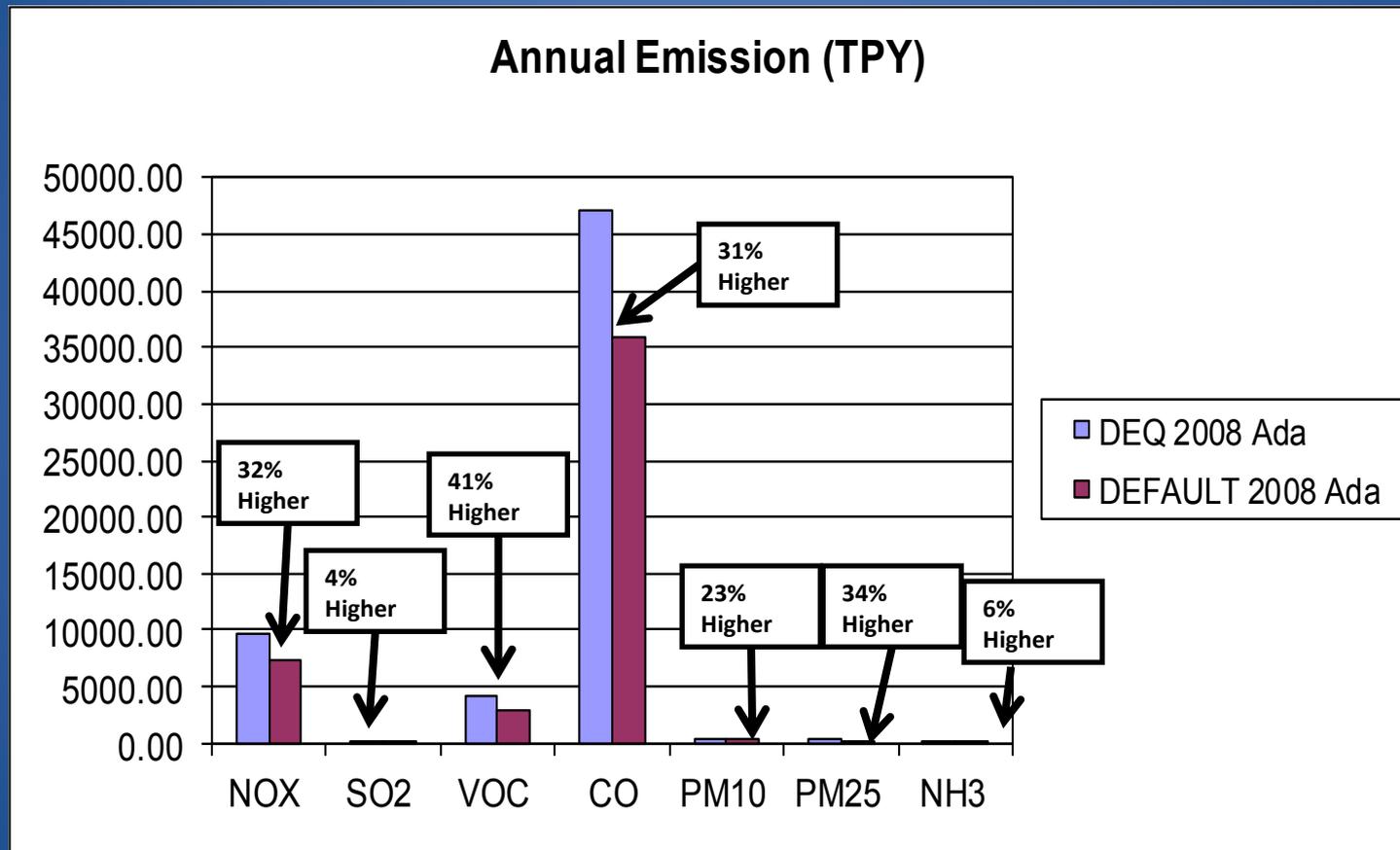
Both Ada and Canyon counties have more older trucks than default inputs.

MOVES Inputs: Default vs. Local – Treasure Valley (Boise)

Ada and Canyon counties have a *much* larger diesel fraction than default inputs.



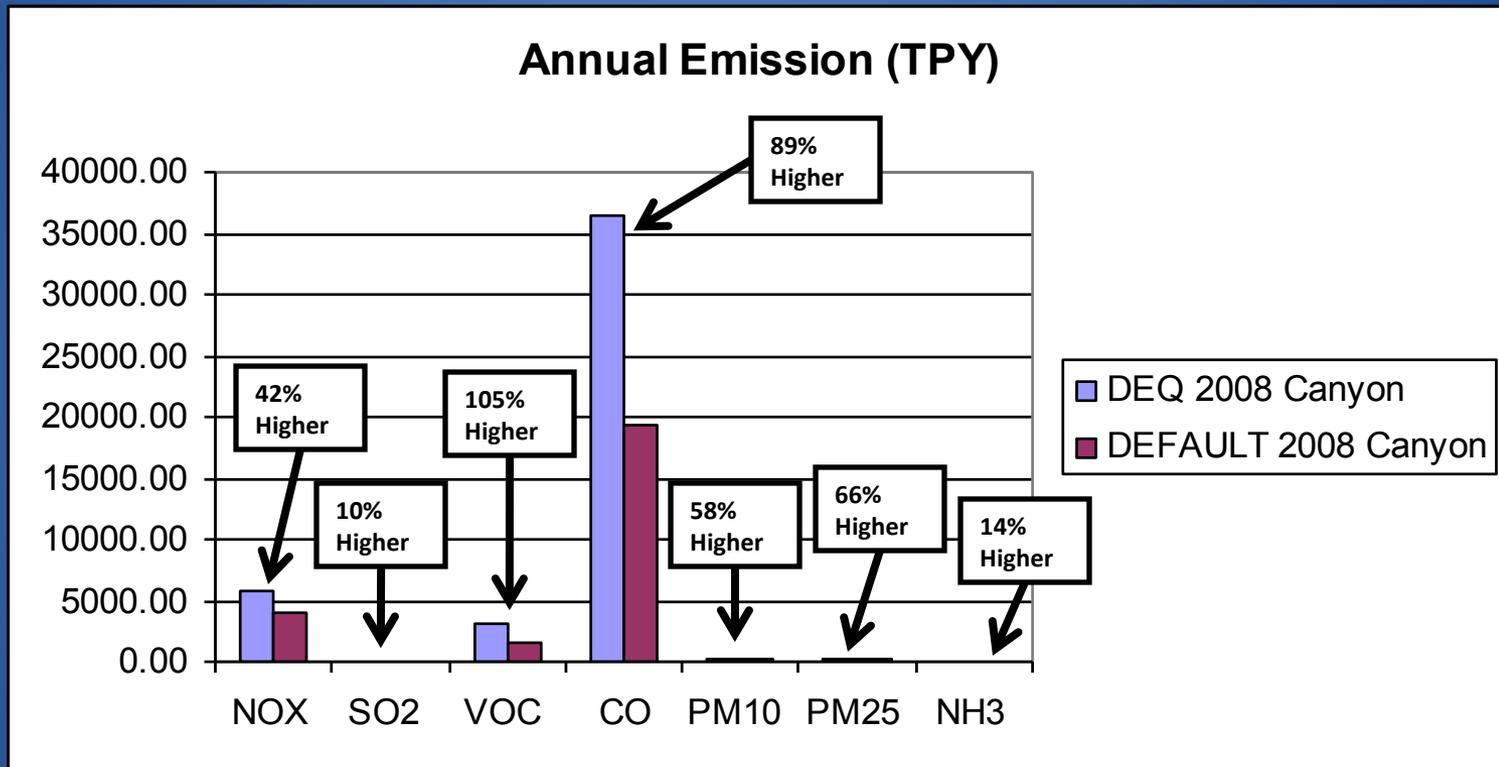
MOVES Output: Default vs. Local – Ada County (Boise)



Why do the national default inputs underestimate emissions?

- Fleet age is older than the national defaults
- Fleet mix is comprised of more trucks than national defaults

MOVES Output: Default vs. Local – Canyon County (Rural Area Near Boise)



Canyon County displays a larger deviation from defaults than Ada County due to an even older, heavier fleet.

Take-Home Points

MOVES Outputs are very different from MOBILE6.2 in Treasure Valley:

- NO_x almost double – will shift VOC/NO_x ratios
- PM_{2.5} and PM₁₀ up to four times higher

MOVES model results are very sensitive to local inputs (vs. national defaults) with some being critical:

- Source Type (Vehicle) Population
- Age Distribution
- Fleet Mix/ VMT Mix
- Meteorology (Temperature)

Up Next...

- Produce and format the local inputs for MOVES and SMOKE
- Generate new lookup tables using local MOVES inputs and integrate them into daily AIRPACT-4 process
- Local inputs for large urban areas are highest priority

Questions?

