#### Mobile source modeling: Planning and State Mobile Emissions

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## **State Of Technology**



- LADCO works directly with USEPA to build onroad and nonroad emissions inventories for modeling, We pool resources and expertise.
- MOVES is EPA's JAVA/MYSQL/Fortran tool for calculating onroad(cars/trucks) emissions.
- Needs fleet age/technology, activity, fuel, vehicle population and speed.
- LADCO has worked with Coordinating Research Council(CRC) to improve MOVES inputs like speed, age, and temporal profiles.

#### Coordinating Research Council(CRC) Auto/Oil industry group

- 6 projects LADCO spearheaded with CRC to evaluate MOVES inputs
- A-84: Identified the input variables most likely to impact modeling and inventories: vehicle age, car/truck mix, vehicle count, speed distribution, road type distribution.
- A88, National VIN decode for 2011, get vehicle counts. Use models to get passenger/heavy truck mix
- A100 Use of telemetry data to improve MOVES inputs: speed distribution, temporal
- A103 Improve cloud based computing
- A106 Improved start information from telemetry
- A115 Re-evaluate VIN decode techniques and update age distributions.
- A-119(Pending) project to build modeling to remote sensing tools.

# Age Distribution Example A-88



**MI, source Motorcycle** 



# **Chicago Telemetry Data**



#### **Telemetry Data Improvement** Weekday, LD Passenger Vehicles











# **Onroad Mobile Data Strengths**



- We continue work with states and cities to improve transportation data. This includes reflecting the differences between states and cities.
- Changes to these inputs do have a measureable effect on emissions.
- Are vigilant that even if inputs are good will model produce realistic emissions.
  - Use satellite and remote sensing data to verify inventories and models
  - Compare ground based measurements and Inventories

# **Heavy Duty Off Cycle Idling**



### **Heavy Duty Defeat Device**



 Aftermarket Defeat Device – "any part or component... where a principal effect...is to bypass, defeat, or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle..."

### EPATuner Emissions Tests

Stock Calibration/Equipment Versus Emissions-Equip. Removed Tuners





### **Nonroad Sources**



- EPA recently added nonroad source calculation into MOVES. The model creates emissions estimates for engines that do not operate on highways.
- Difficult to inventory because of diversity of sources, across many industries, low individual emissions, large composite emissions.
  - Recreational vehicles, all-terrain vehicles and off-road motorcycles;
  - Logging equipment, chain saws;
  - Agricultural equipment, tractors, combines;
  - Construction equipment, graders and back hoes;
  - Industrial equipment, forklifts and sweepers;
  - Residential and commercial lawn and garden equipment, tillers, leaf and snow blowers
  - Recreational and commercial marine vessels, power boats and oil tankers
  - Railway equipment, train and switching engines
  - Aircraft, Baggage handling equipment, jets and prop planes.





## **LADCO Improvements to Rail**



- LADCO and IL, MI have put significant effort into rail inventories.
- Included passenger(Amtrak) and commuter(METRA) into inventories into national inventory for the first time ever.
- Use proprietary rail administration database of link level activity and we identified yards as points.
- METRA change is the most significant recent change. Metra's fleet is older, 10% of fleet will upgrade by 2023.





#### OTAQ vs ERTAC Rail Line-Haul NOX emission rate(grams/gallon)



### What Can We Do About Vehicle Emissions?



- •VW Settlement
- Diesel Emissions Reduction Act (DERA)
- Heavy Duty Diesel Devices
- Heavy Duty Diesel Device Idling

### LADCO's Role in Characterizing Reductions



- LADCO works with EPA to build the future year emissions inventories
- Growth and Control inputs come from states/LADCO for anything beyond federal regulations
- Emissions changes are put into inventories, modeled, and eventually put into SIPS.
- Often the base year activity needs to be modified to give us something to reduce from.
- States has to show ozone/haze impact from controls

### **2016 Platform Data Access**

views.cira.colostate.edu/wiki/wiki/10197 Additional Analysis Products



- 2016beta is available now
- Intermountain West Data Warehouse (IWDW)
  - Download the complete emissions modeling platform
  - Modular downloads of the entire air quality (CAMx and CMAQ) platform
  - Interactive analysis tools
- LADCO Data Viewer
  - Archive of static summary plot



### **Questions and Contact**



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