

Integration of the NONROAD Model into MOVES:

Proposed Initial Roadmap

Edward Glover

FACA MOVES Review Workgroup

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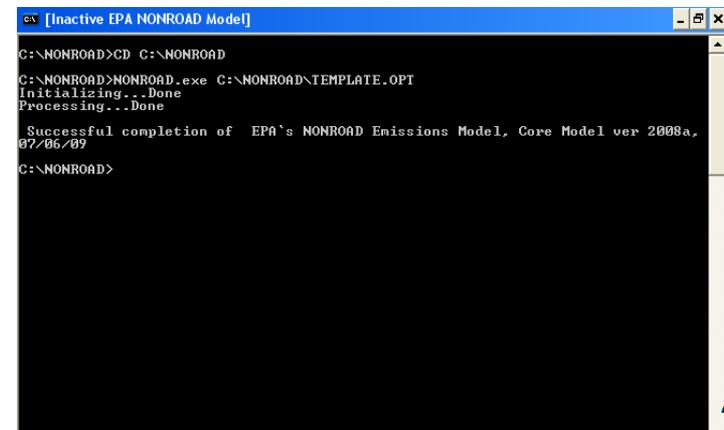
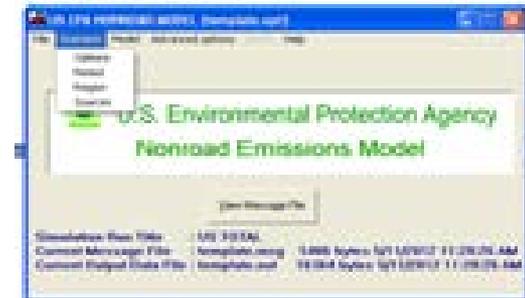
The MOVES logo is displayed in a metallic, 3D-style font with a glowing effect, set against a dark rectangular background.

Overview

- **Brief Description of NONROAD**
- **New Data**
- **New Software**
- **New Algorithm**

NONROAD Model Overview

- Used to estimate NONROAD equipment emission inventories in the USA.
 - EPA Rulemaking Inventories
 - State and Local Usage
- Geographical scale from county to national
- Models most equipment types except locomotive, commercial marine and aircraft
- Models major pollutants and processes
- Calendar year coverage 1970 through 2050

A screenshot of a Windows command prompt window titled "[Inactive EPA NONROAD Model]". The window shows the following text:

```
C:\NONROAD>CD C:\NONROAD
C:\NONROAD>NONROAD.exe C:\NONROAD\TEMPLATE.OPT
Initializing...Done
Processing...Done

Successful completion of EPA's NONROAD Emissions Model, Core Model ver 2008a,
07/06/09
C:\NONROAD>
```

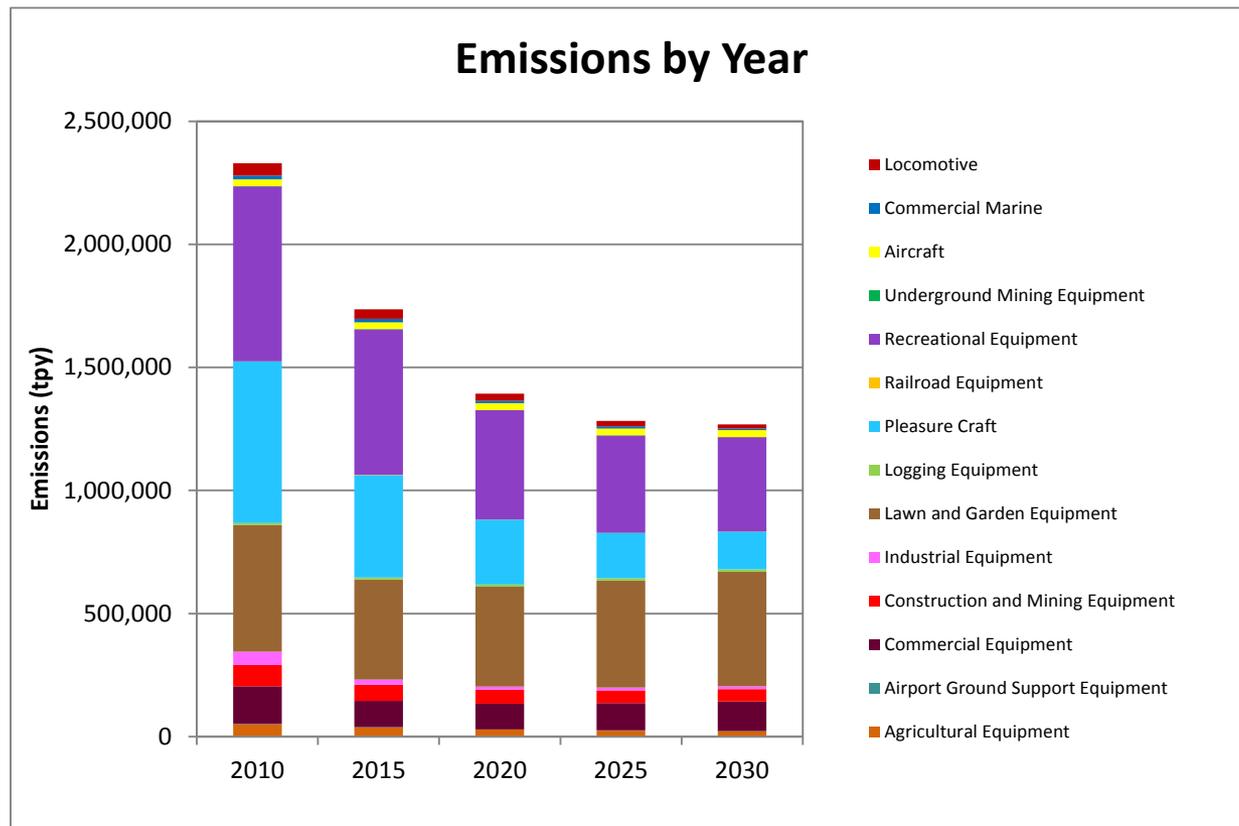
NONROAD Overview (con't1)

- **Original basis is the 1991 NEVES Study**
- **Core code and algorithm developed in 1995**
- **Updated INCREMENTALLY in 1995, 2002, 2005 and 2008.**
- **Coded in FORTRAN95 with a reporting utility coded in Visual Basic 2003.**
- **Utilized in EPA NMIM model**

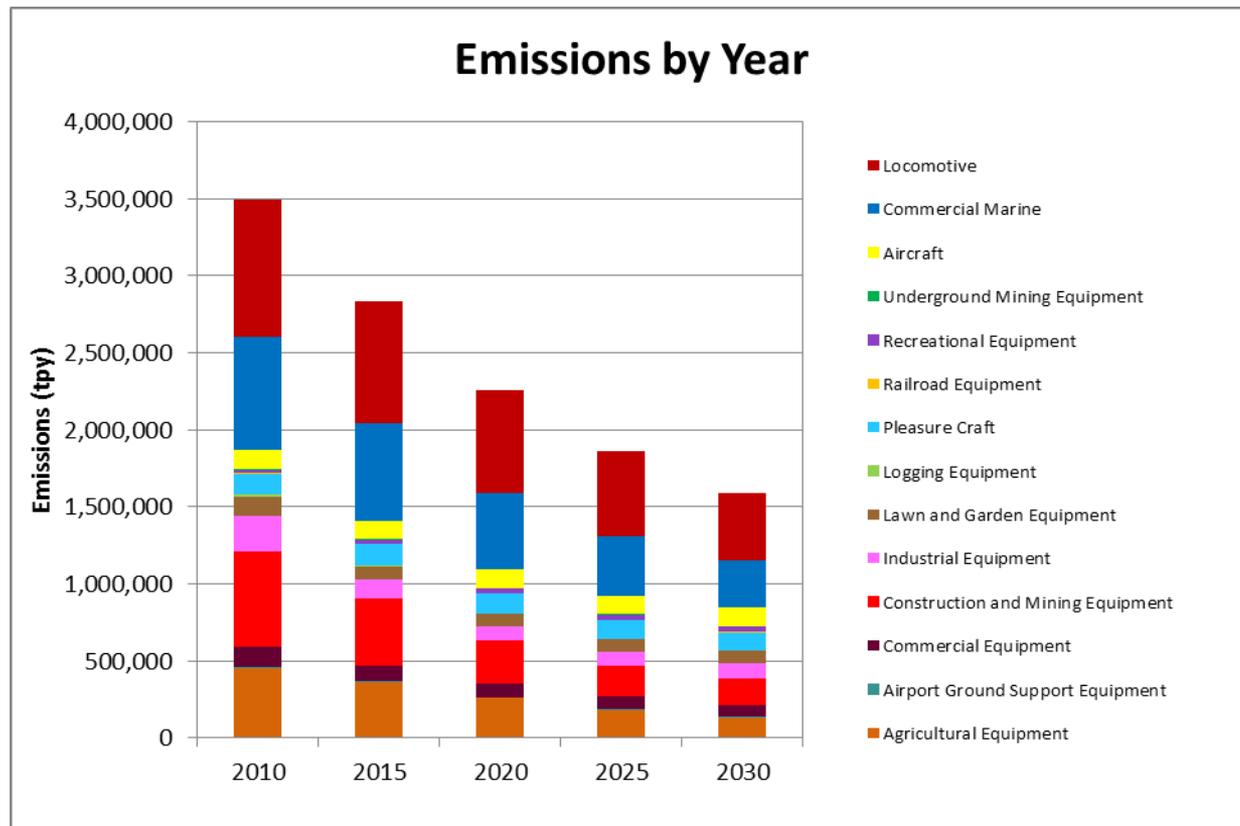
NONROAD Overview (con't2)

- **New underlying NONROAD model data is available for use**
 - Equipment populations
 - Activity estimates
 - Growth / Scrappage estimates
 - Emission factors and Load factors
- **New data may allow changes in underlying algorithm and additional factors**
- **Software needs updating**
 - Fortran 95
 - Data structures should be in a database application
 - GUI needs an update

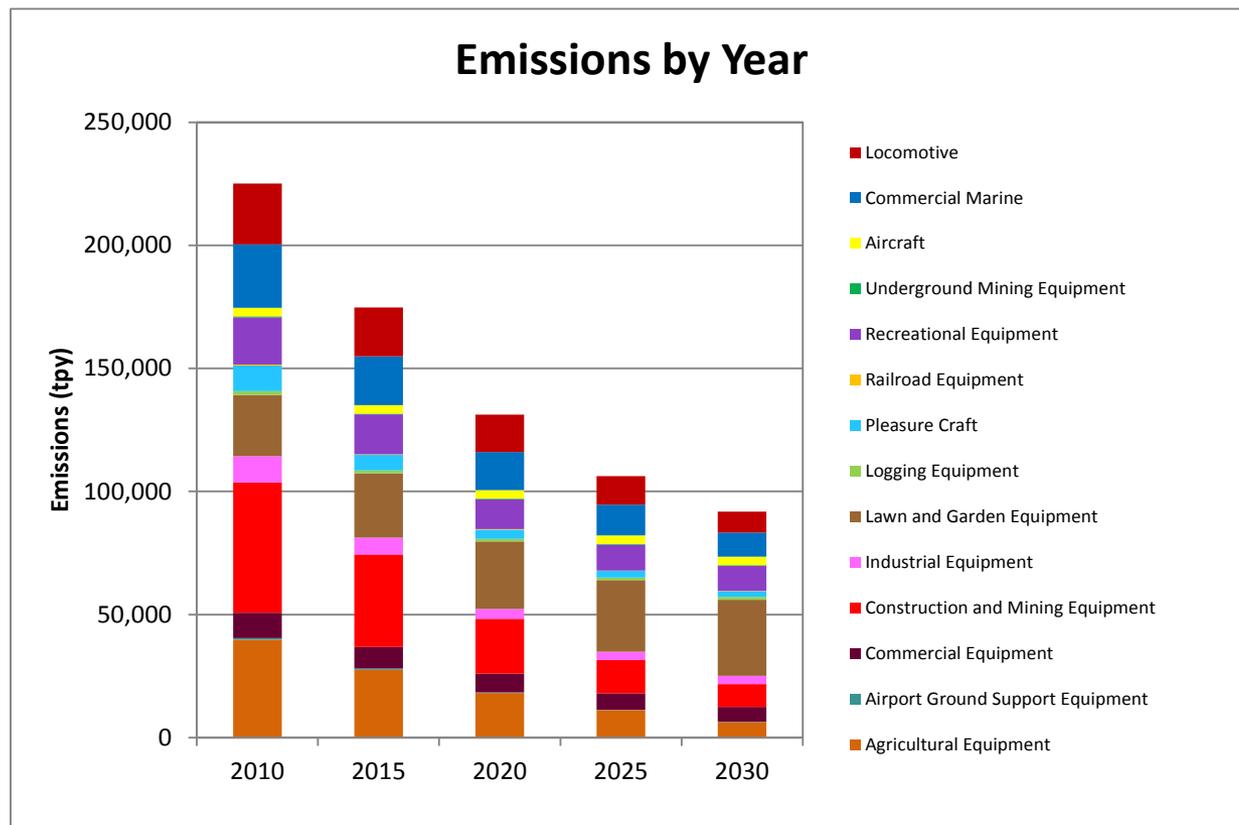
National NONROAD Sector VOC Emissions by Category



National NONROAD Sector NOx Emissions by Category



National NONROAD Sector PM2.5 Emissions by Category



Planned Updates – Activity Data

- **NONROAD Growth and Activity Work by Environ**
 - Currently in Progress
 - Gathering available state data for available categories
 - California
 - Texas
 - LADCO
 - Maricopa County, AZ
 - Baltimore, MD
 - Analyzing US Census of Agriculture (Dept of Ag)
 - Comparing to NONROAD
 - Comparing to Texas 2007 survey
 - Presentation at IEI Conference in Tampa

Planned Updates – Data Purchase

- **Purchase national historical and projected equipment sales database**
 - Revise scrappage algorithm, median life assumptions and rates as needed to translate sales into equipment populations
 - Update populations
- **Obtain additional equipment activity data**
- **Purchase state and county allocation data**

Planned Updates - Coding

- **Phase 1: Insertion of NONROAD code into the MOVES model**
 - NONROAD data files converted to a MySQL database format
 - MOVES model will “Call” current NONROAD Fortran program
 - MOVES GUI expanded to include non-road sectors
 - Combined MOVES – NONROAD model will run similar to NMIM model
 - Currently underway - UNC and Environ work assignment
- **Phase 2: Integrate NONROAD algorithms fully into MOVES**
 - Remove the Fortran program and re-program in Java / MySQL
 - Make software object oriented and totally database driven
 - Phase two not currently scheduled for MOVES2013

Planned Updates – Analysis

- **Phase 1: Develop new emission factors and load factors from EPA NONROAD Pilot study and other available data**
 - Focused primarily on the construction sector
 - New average emission and load factors from newer data
 - Work currently being done by ERG contractor
- **Phase 2: Develop operating mode based emission rates and load factors for NONROAD**
 - PEMS and PAMS data basis
 - New emission factors to use in MOVES
 - New duty cycles
 - Phase two not currently scheduled for MOVES2013