

Update to MOVES Vehicle Populations

FACA MOVES Review Workgroup

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The MOVES logo is displayed in a stylized, metallic, three-dimensional font with a glowing effect, set against a dark, gradient background.

Population Update Overview

- **MOVES vehicle populations have been developed through a variety of public and purchased datasets**
- **Current national default population defined by:**
 - fuel type
 - regulatory class (weight-specific)
 - source use type (based on driving patterns)
 - model year
- **Proposing 2011 as a new base year**
- **Future year populations forecasted by:**
 - sales growth factor
 - survival/scrappage rate

2011 Base Year

- **1990 and 1999 are the base years currently available in MOVES2010b**
 - MOVES restricts any modeling from 1991 to 1998
- **Calendar years (CYs) 2000 through 2010 are now historical years**
- **The 2011 population is based on recently purchased vehicle registration data**

2011 Population Data Sources

- **RL Polk and Co.**
 - Vehicle counts by model year (MY), fuel type, and gross vehicle weight (GVW) for the US and Puerto Rico
 - based on aggregated state-level registrations
 - does not include motorcycles or motor homes
 - buses and refuse trucks have not been separated from other trucks
 - Purchased in May 2012
 - Contains vehicles from MY 1966 to 2012
- **VIUS (Vehicle Inventory and Use Survey)**
 - Collected by the Census Bureau for the US Dept. of Transportation
 - Yields source type fractions by model year (1986-2002), fuel type, and regulatory class
 - Extended out MY 1986 fractions for earlier years and MY 2002 fractions for later years

2011 Population by Fuel Type and Regulatory Class from Polk

Fuel Category	fuelTypeID	Vehicle Count
Gasoline	1	232,971,709
Diesel	2	9,346,874
Natural Gas	3	18,647
TOTAL		242,337,230

Type of Vehicle	regClassID	Vehicle Count
Light Duty Vehicles	20	124,273,837
Light Duty Trucks	30	105,774,562
Light Heavy Duty Trucks (8,500-14,000 lbs)	41	5,851,553
Light Heavy Duty Trucks (14,000-19,500 lbs)	42	1,529,655
Medium Heavy Duty Trucks (19,500-33,000 lbs)	46	2,107,957
Heavy Heavy Duty Trucks (33,000+ lbs)	47	2,799,666
TOTAL		242,337,230

Bus Populations Data Sources

- **Transit Buses**

- Fuel splits taken from the National Transit Database (NTD)
- Vehicle sales provided by manufacturers to EPA
- No studies available on weight distributions
 - Planning to use weight data from AQMC's natural gas/diesel bus analysis last summer

- **School Buses**

- Fuel splits are unchanged from MOVES2010b
- Vehicle sales from the School Bus Fleet Fact Book
- Weight distributions were provided by US DOT

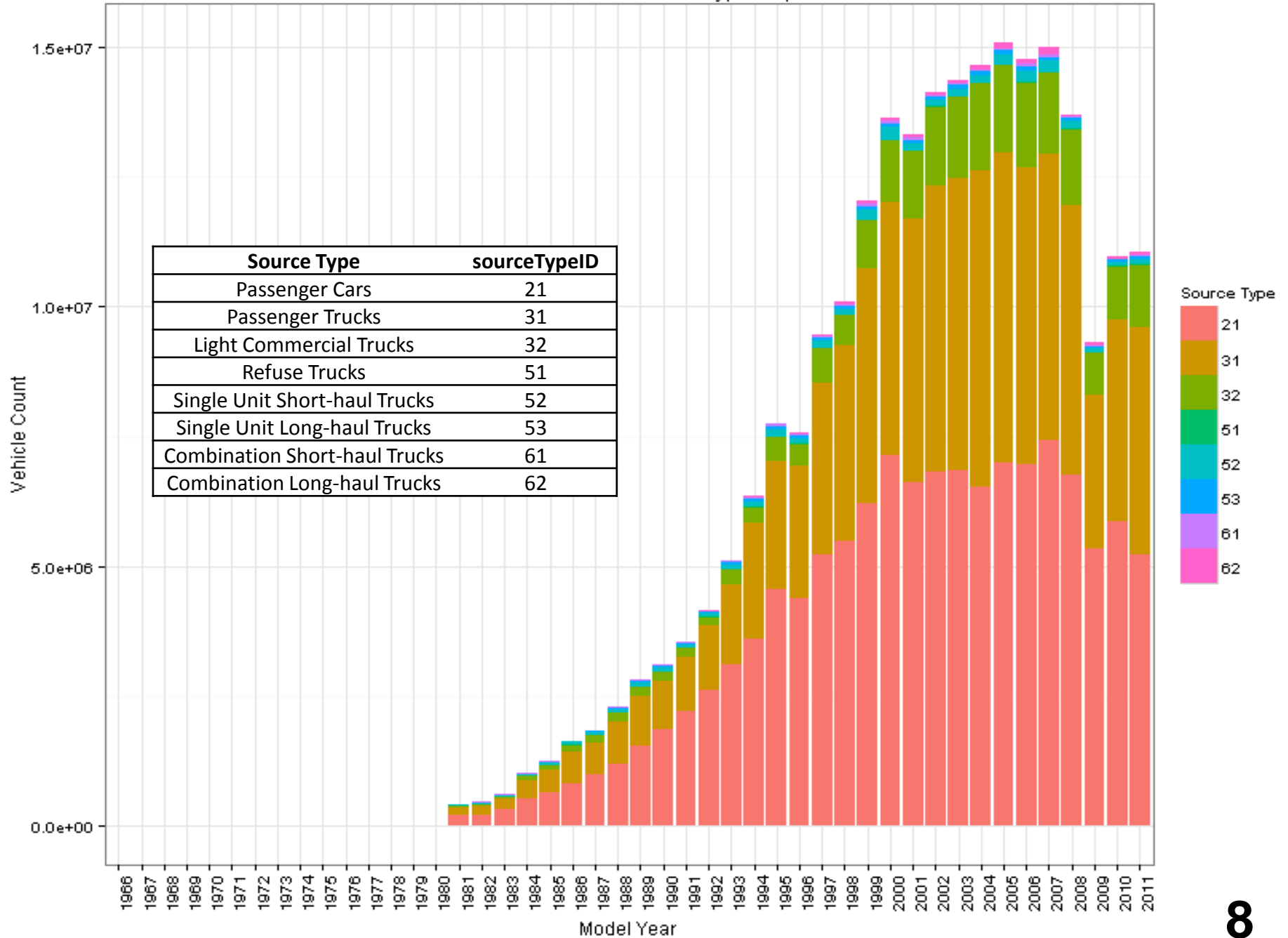
- **Intercity Buses**

- All intercity buses are assumed to run on diesel
- Vehicle sales have not been updated since MOVES2010b
- Weight distributions were provided by US DOT

2011 Base Year Development

- **Step 1. Generated VIUS source type fractions by regulatory class, model year, and fuel type**
- **Step 2. Cleaned Polk CY 2011 dataset**
 - Consolidated into MOVES fuel types
 - Mapped truck GVW (Classes 1-8) to regulatory classes
 - Created 2a/2b truck split
- **Step 3. Subtracted out buses of the Polk dataset**
 - Transit, school, and intercity bus populations were developed separately
- **Step 4. Applied VIUS fractions to Polk vehicle counts to compute source type populations**

2011 Base Year Population by Model Year



Source Type Population

BASE YEAR 2011 POPULATION BY SOURCE TYPE

Source Use Type	sourceTypeID	CY 1999 Population from MOVES2010b	CY 2011 Population from MOVES2010b	Updated CY 2011 Population (with bus adjustment) from Polk
Passenger Cars	21	130,162,978	115,699,157	124,262,748
Passenger Trucks	31	57,190,199	85,603,894	88,861,134
Light Commercial Trucks	32	19,106,250	28,598,767	21,517,132
Intercity Buses	41	84,454	129,904	83,751
Transit Buses	42	55,706	71,831	67,684
School Buses	43	592,029	880,075	690,558
Refuse Trucks	51	88,607	74,990	181,610
Single Unit Short-haul Trucks	52	4,470,797	5,383,678	3,415,794
Single Unit Long-haul Trucks	53	264,435	715,127	1,279,460
Combination Short-haul Trucks	61	1,084,366	1,180,916	963,341
Combination Long-haul Trucks	62	803,337	1,444,829	1,027,554
TOTAL		213,903,158	239,783,168	242,350,766

Data Sources for Population Projections

- **Historical Years (2000-2010)**

- Oak Ridge National Laboratory's Transportation Energy Data Book (TEDB) reports annual vehicle sales and registration data for historical years from Polk and the Federal Highway Administration (FHWA)
- Current survival and scrappage rates from National Highway Traffic and Safety Administration (NHTSA) and Oak Ridge
 - Rates will remain the same as MOVES2010b

- **Future Years (2012-2050)**

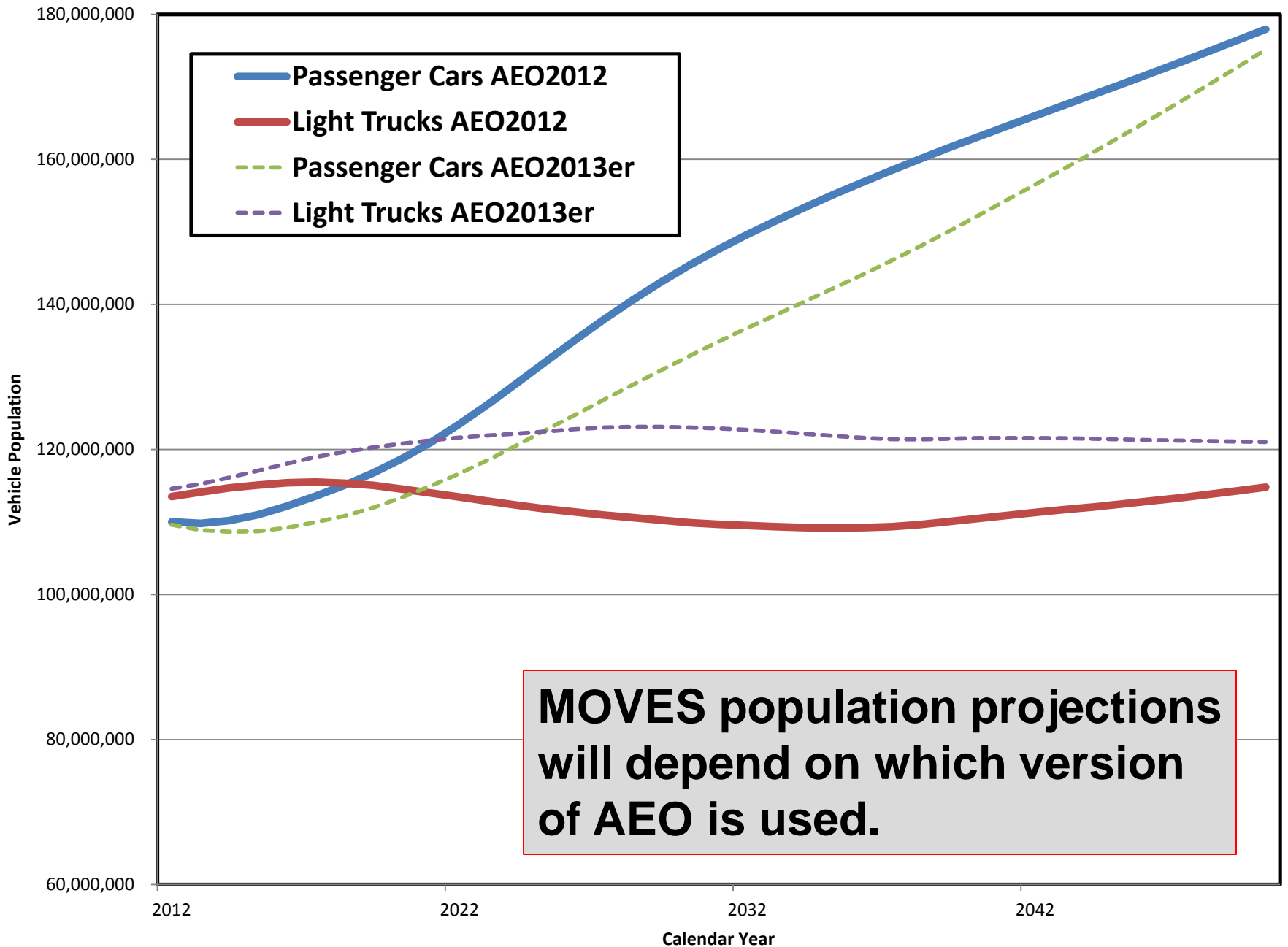
- US Energy Information Administration's Annual Energy Outlook (AEO) projects sales growth factors for future years
 - All sales growth factors from MY 2012 to 2050 will be based on AEO projections

Update to 2000-2010 Populations

- **Step 1. Replace sales projections with actual sales figures from TEDB for 2000 to 2010 and calculate updated populations for those years**
- **Step 2. Compare calculated population to base year population for 1999 and 2011**
 - Are there gaps between the calculated and base year populations?
- **Step 3. Adjust calculated populations to be consistent with base year populations**

Update to 2012-2050 Populations

- **Step 1. Update sales growth factors from AEO projections**
- **Step 2. Apply updated sales growth factors to the 2011 base year population**
- **Step 3. Calculate populations for every year from 2012 to 2050**
 - Must check that future populations are consistent with historical populations



MOVES population projections will depend on which version of AEO is used.

Final Thoughts

- **The population and activity updates will affect national default data for 2000 and later**
- **These updates will be added to the MOVES documentation and go out for peer review**
- **Suggestions about newer or alternative data sources are welcome**

Thank You!
Questions?

MOVES

