



METROPOLITAN
TRANSPORTATION
COMMISSION

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Memorandum

TO: Air Quality Conformity Task Force

DATE: April 24, 2013

FR: Harold Brazil

W.I.:

RE: EMFAC2011 Effects on PM_{2.5} Emission Inventory Trends

At the March 2013 Conformity Task Force meeting, MTC staff discussed the Draft Plan Bay Area conformity analysis approach and draft results. This memo and the attached charts provide additional detail regarding the PM_{2.5} emissions and outline some of the factors driving the PM_{2.5} emissions results.

The draft PM_{2.5} emissions results showed a significant reduction in total on-road PM_{2.5} emission inventory levels between 2008 and 2014. However, after 2020, PM_{2.5} emissions begin a very gradual increase through 2040, the horizon year of the analysis.

A variety of factors contribute to produce the PM_{2.5} emission inventory trends identified in the draft conformity analysis results. Below is a listing of some of the key factors.

- EMFAC2011 Background and New Input/Baseyear Data: The most important improvement in EMFAC2011 is the integration of the new data and methods to estimate emissions from diesel trucks and buses. EMFAC2011 uses the same diesel truck and bus vehicle populations, miles traveled and other emissions-related factors developed for the Truck and Bus Rule approved by the ARB in 2010. The model includes the emissions benefits of the truck and bus rule and the previously adopted rules for other on-road diesel equipment.

Light-duty motor vehicle fleet age, vehicle type, and vehicle population in EMFAC2011 is based on 2009 California Department of Motor Vehicles data. These data along with the new diesel truck and bus data, satisfies guidance issued by the U.S. Department of Transportation, Federal Highway Administration that requires that vehicle fleet data used in transportation conformity analyses be no older than 5 years.

- Statewide Truck and Bus Regulation: The California Air Resource Board's (ARB) Truck and Bus Rule regulation requires diesel trucks and buses that operate in California to be upgraded to reduce emissions. Heavier trucks must be retrofitted with PM filters beginning January 1, 2012, and older trucks must be replaced starting January 1, 2015. By January 1, 2023, nearly all trucks and buses will need to have 2010 model year engines or equivalent. This regulation results in significant reductions of tailpipe emissions, including PM_{2.5}, between 2008 and 2020.
- LEV II - Amendments to California's Low-Emission Vehicle regulations: The ARB first adopted Low-Emission Vehicle (LEV) standards in 1990. These first LEV standards ran from 1994 through

2003. LEV II regulations, running from 2004 through 2010, represent continuing progress in emission reductions. As the states passenger vehicle fleet continues to grow and more sport utility vehicles and pickup trucks are used as passenger cars rather than work vehicles, the new, more stringent LEV II standards are necessary for California to meet federally-mandated clean air goals outlined in the 1994 State Implementation Plan (SIP).

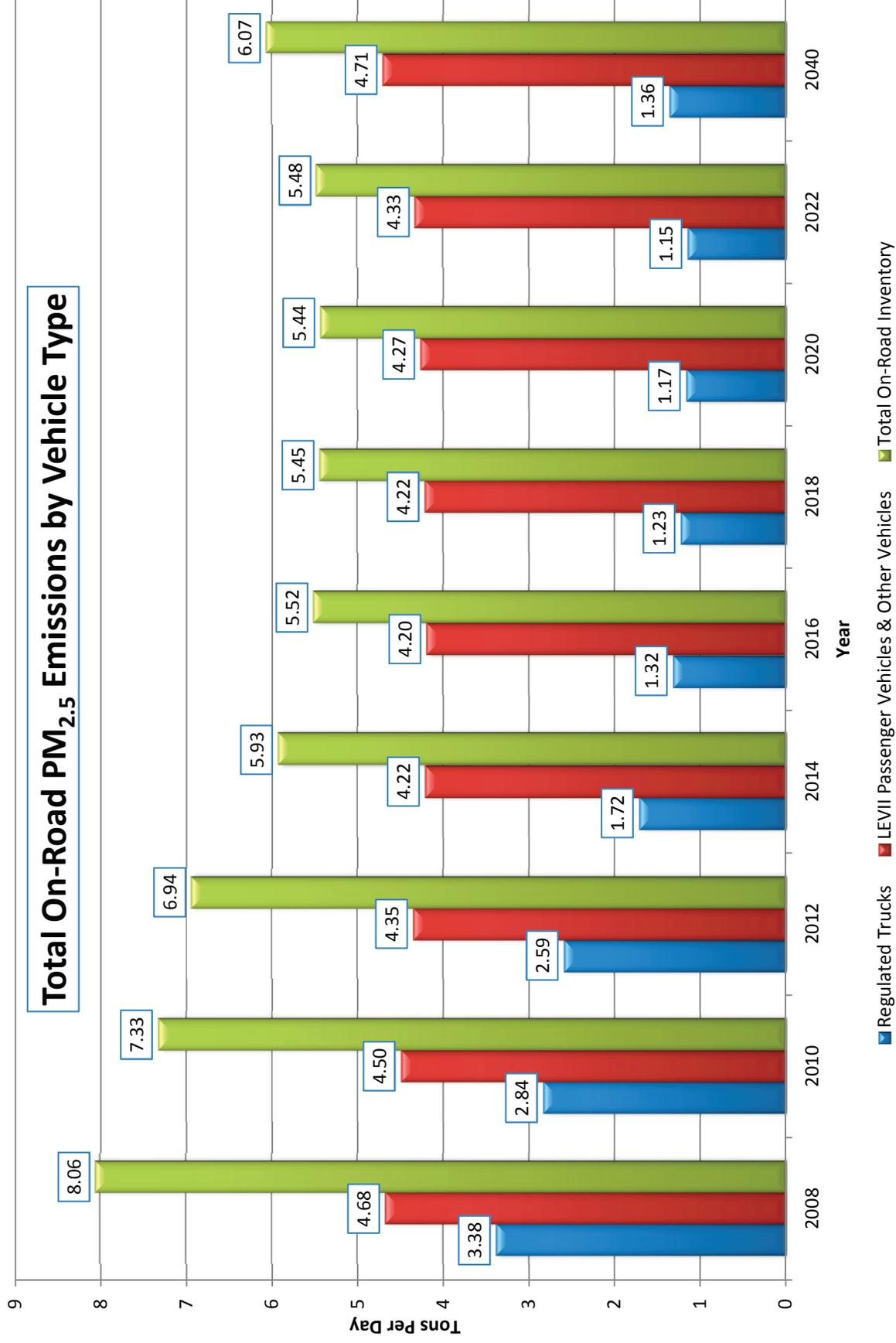
In August 2012, ARB submitted a regulatory proposal, referred to as LEV III, which would allow vehicle manufacturer compliance with the U.S. Environmental Protection Agency's GHG requirements for model years 2017-2025 to serve as compliance with California's adopted GHG emissions requirements for those same model years.

- VMT Growth Impacts: Between 2008 and 2040, overall VMT in the region is projected to increase at the rates outlined below. While the regulations outlined above offset increases related to increased VMT over the initial period of the Plan, towards the later years PM_{2.5} is projected to increase as overall population and VMT increase. In addition, emission rates for other PM_{2.5} components (e.g. brake and tire wear) stay relatively constant through the analysis period.
 - Regional VMT is predicted to increase by **21.2** percent between 2008 and 2040, a 1.01 percent per year growth rate.
 - Regulated truck VMT is predicted to increase by **34.5** percent between 2008 and 2040.
 - Passenger vehicle and other vehicle VMT is predicted to increase by **20.1** percent between 2008 and 2040.

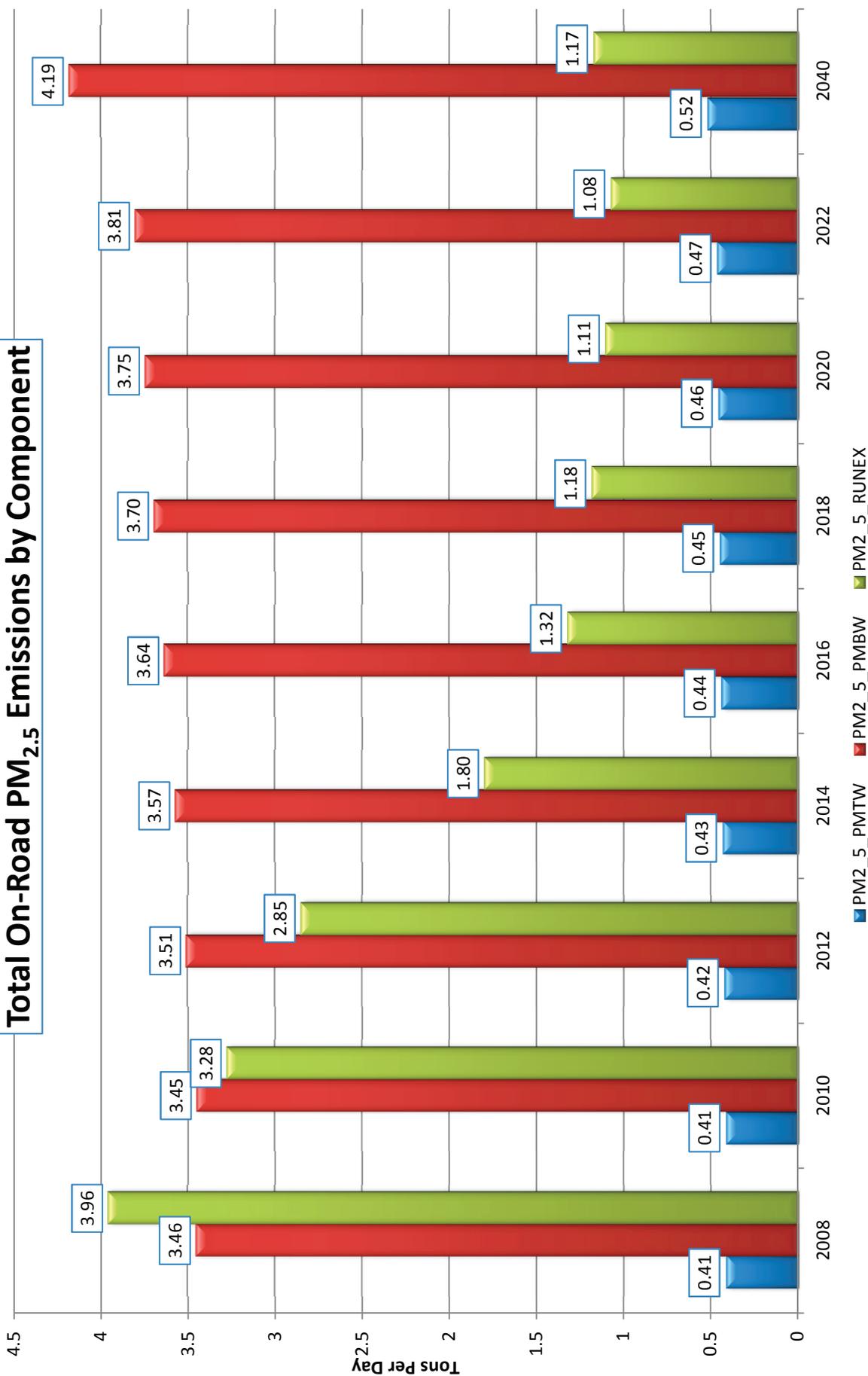
Sources for this information include:

1. EMFAC2011 Technical Documentation, ARB - September 19, 2011 (Updated January 2013)
2. Technical Support Document: Proposed Regulation for In-Use ON-Road Diesel Vehicles, ARB - Mobile Source Control Division, Heavy-Duty Diesel In-Use Strategies Branch, October 2008
3. <http://www.arb.ca.gov/msprog/levprog/leviii/factsht.pdf>

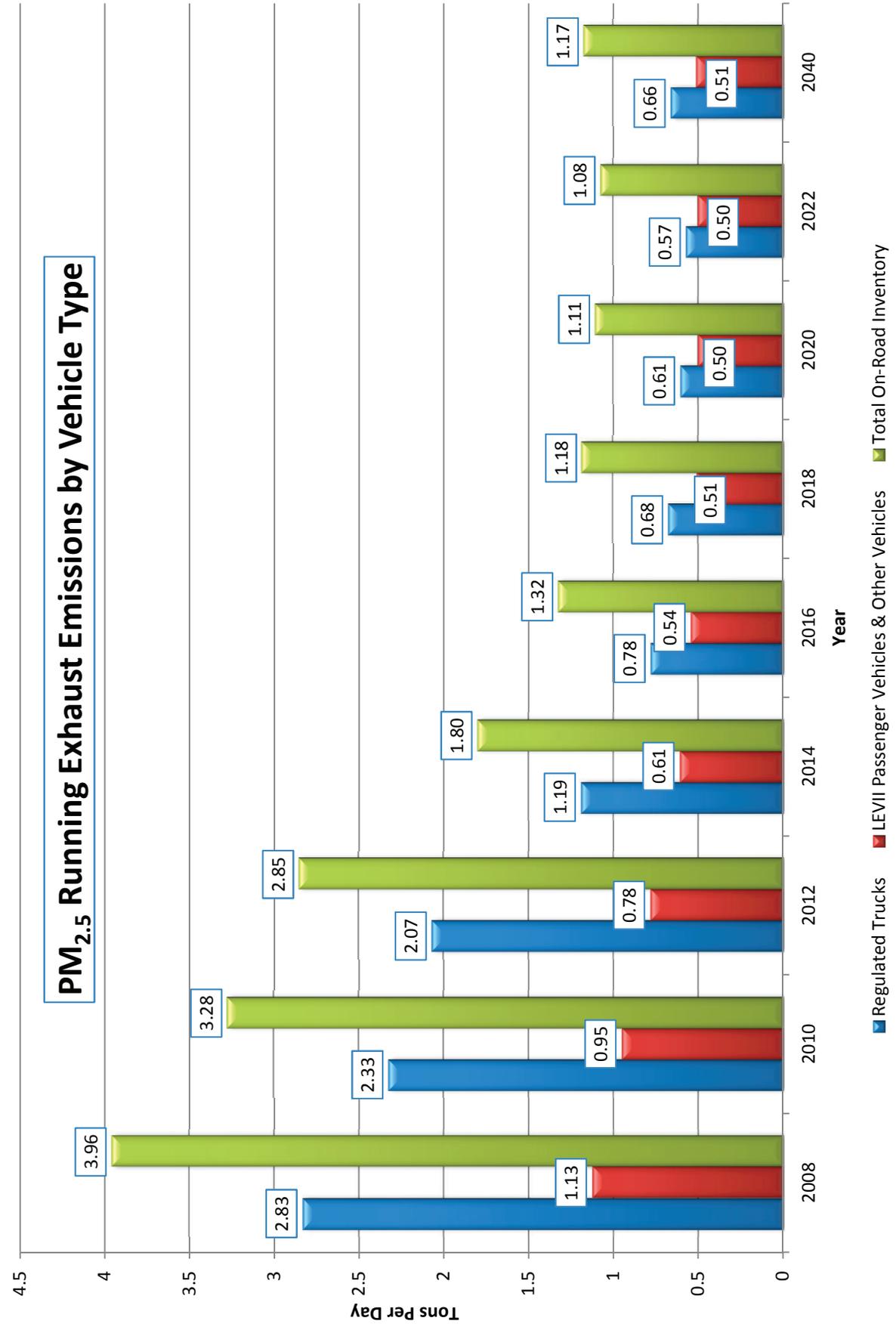
Total On-Road PM_{2.5} Emissions by Vehicle Type



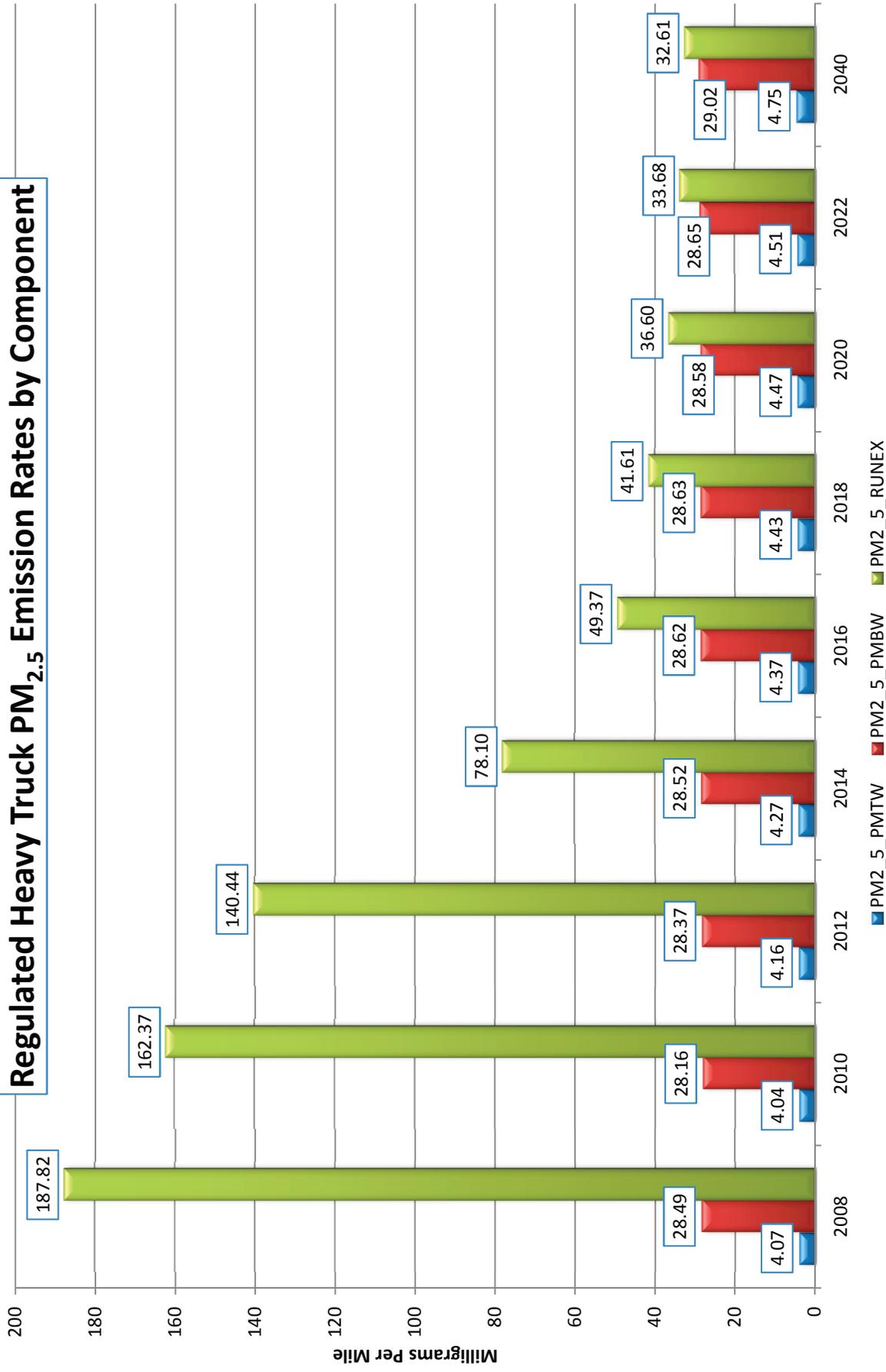
Total On-Road PM_{2.5} Emissions by Component



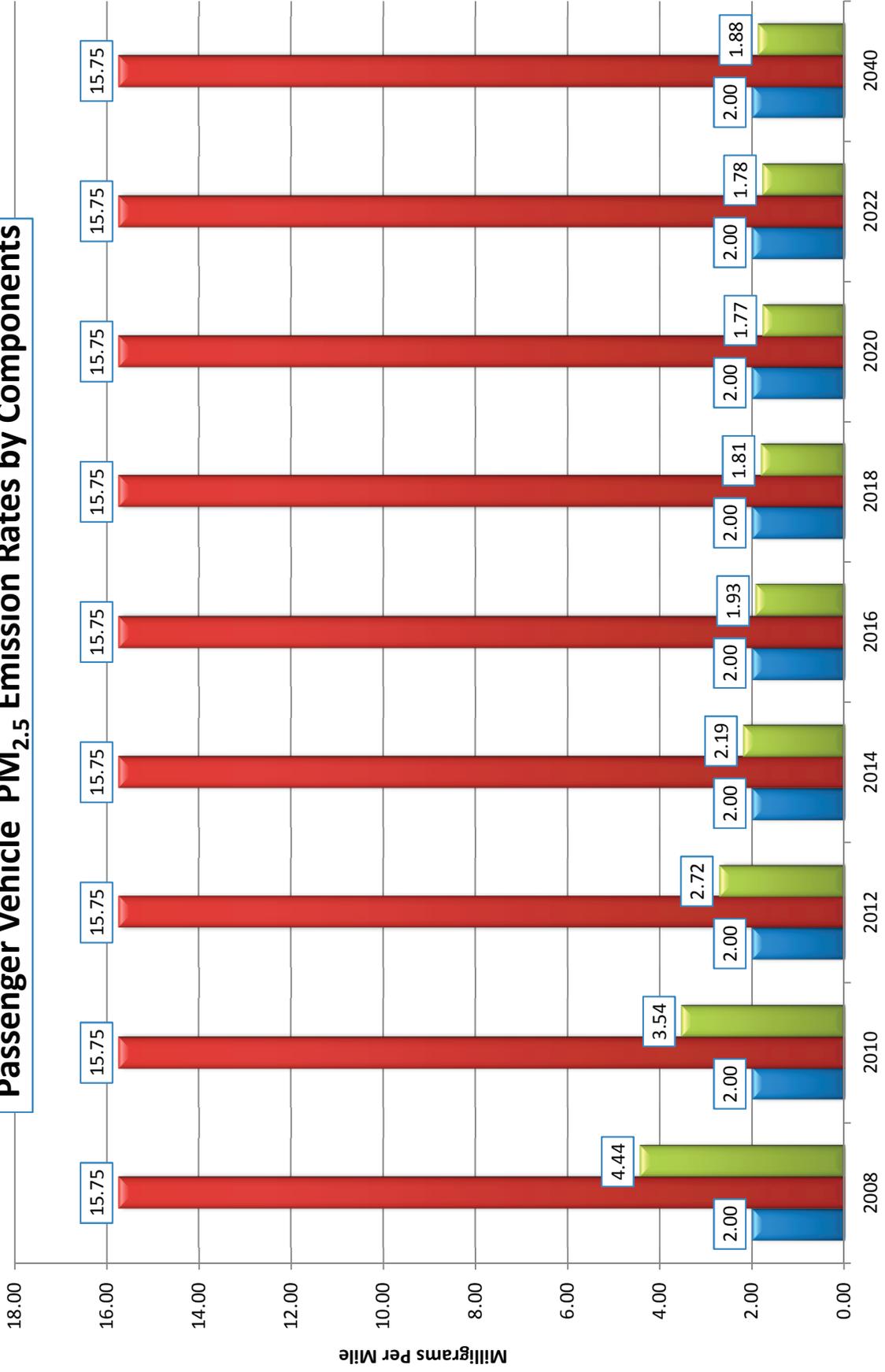
PM_{2.5} Running Exhaust Emissions by Vehicle Type



Regulated Heavy Truck PM_{2.5} Emission Rates by Component

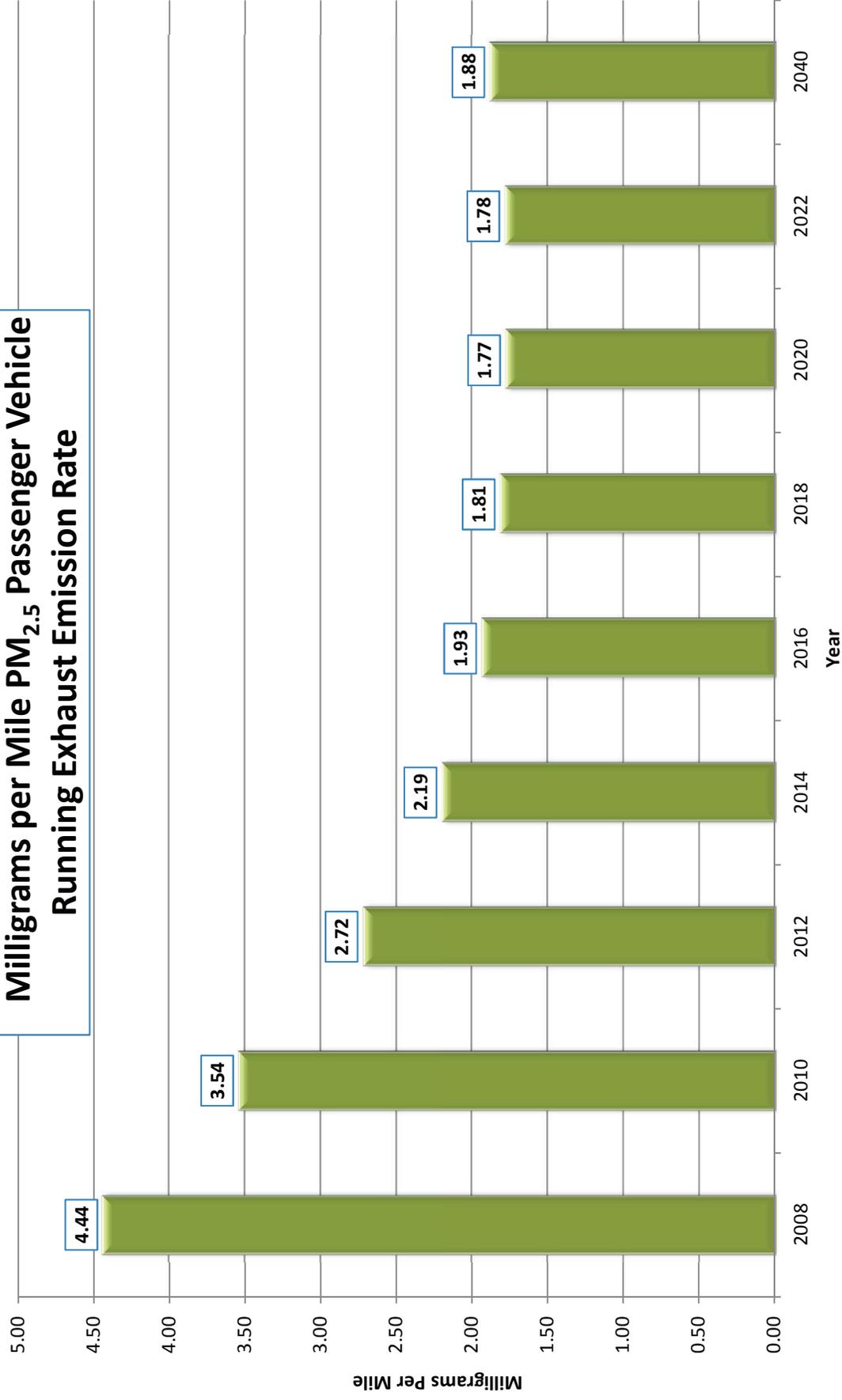


Passenger Vehicle PM_{2.5} Emission Rates by Components

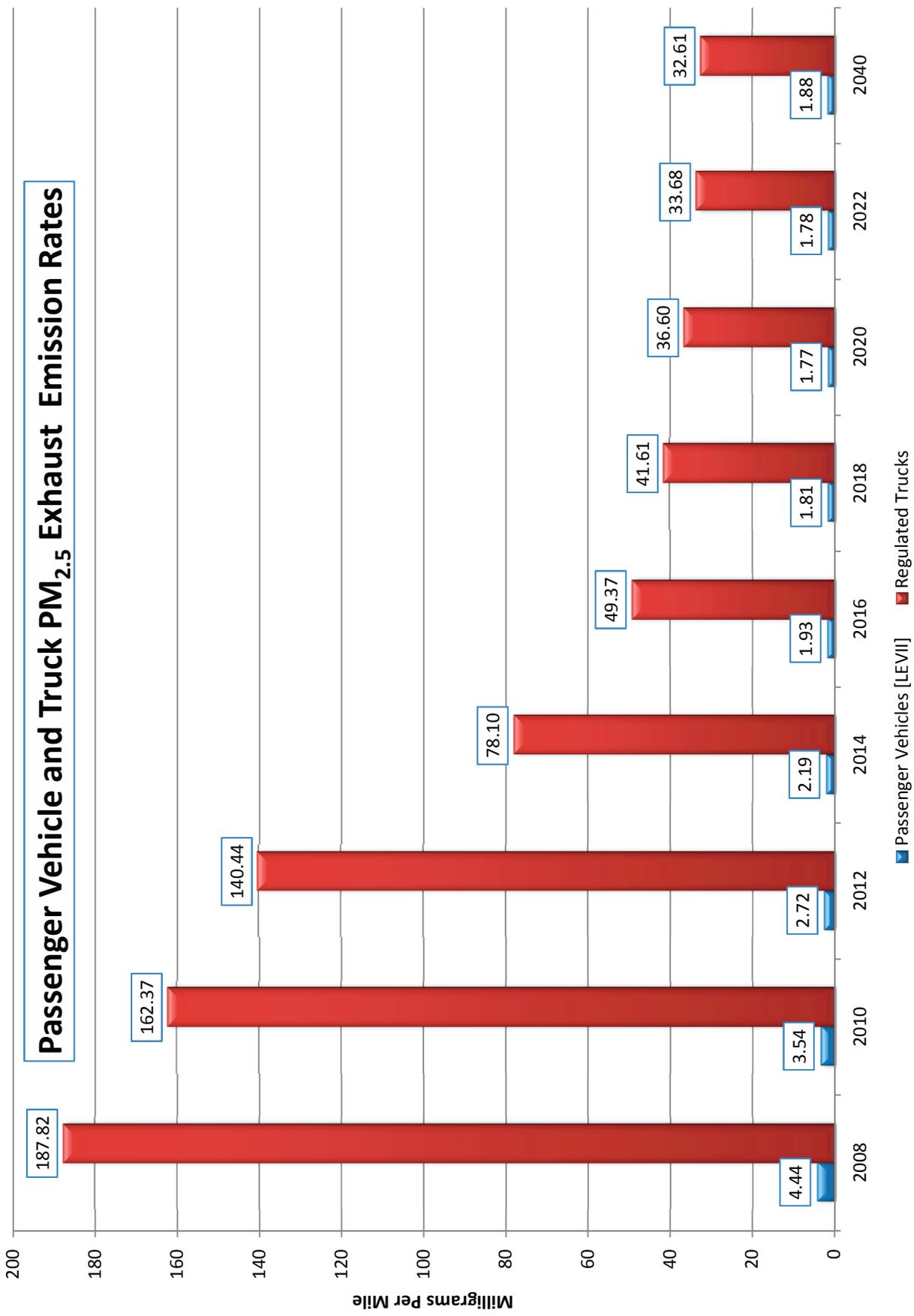


■ PM_{2.5}_PMTW ■ PM_{2.5}_PMBW ■ PM_{2.5}_RUNEX

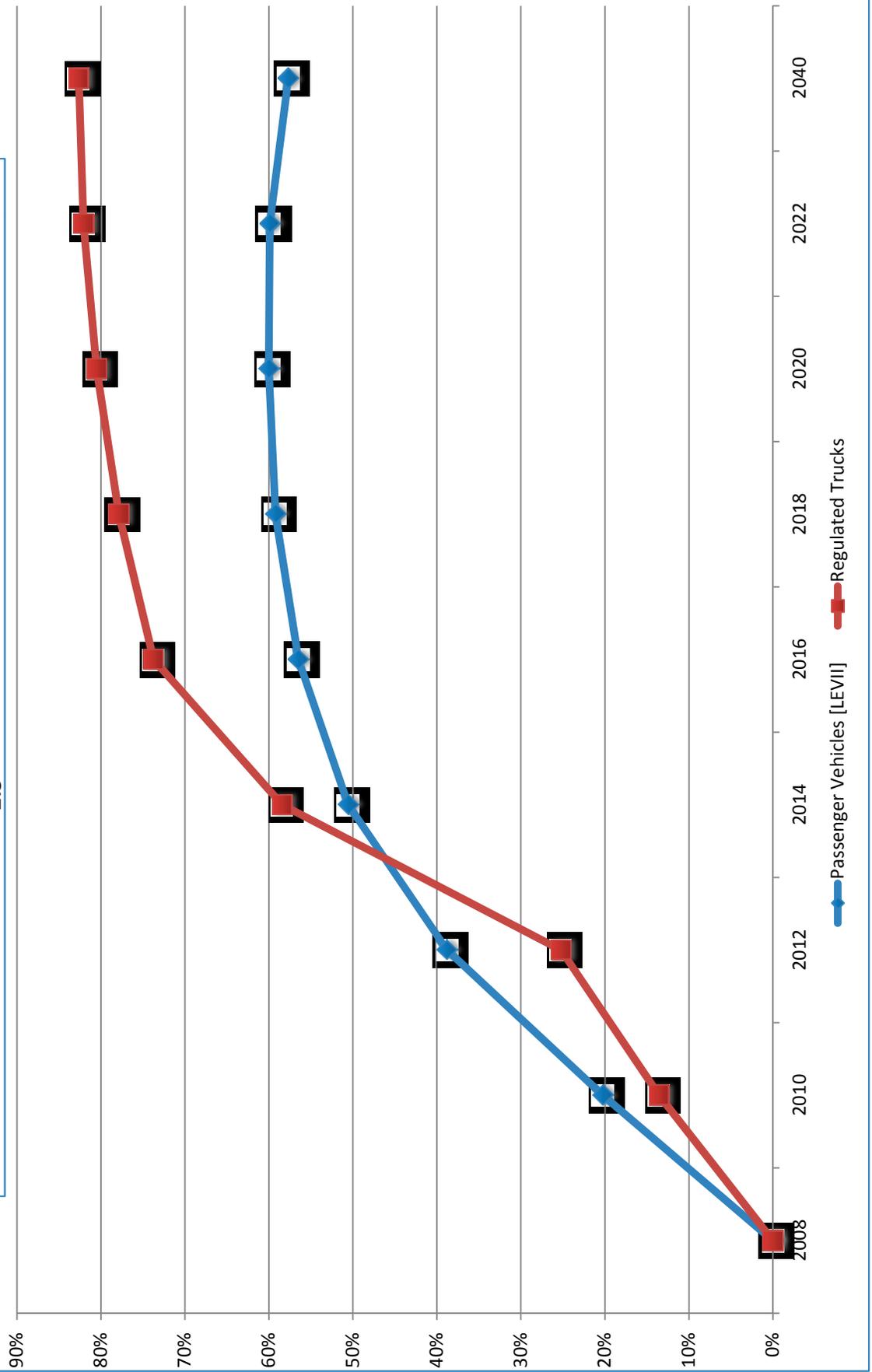
Milligrams per Mile $PM_{2.5}$ Passenger Vehicle Running Exhaust Emission Rate



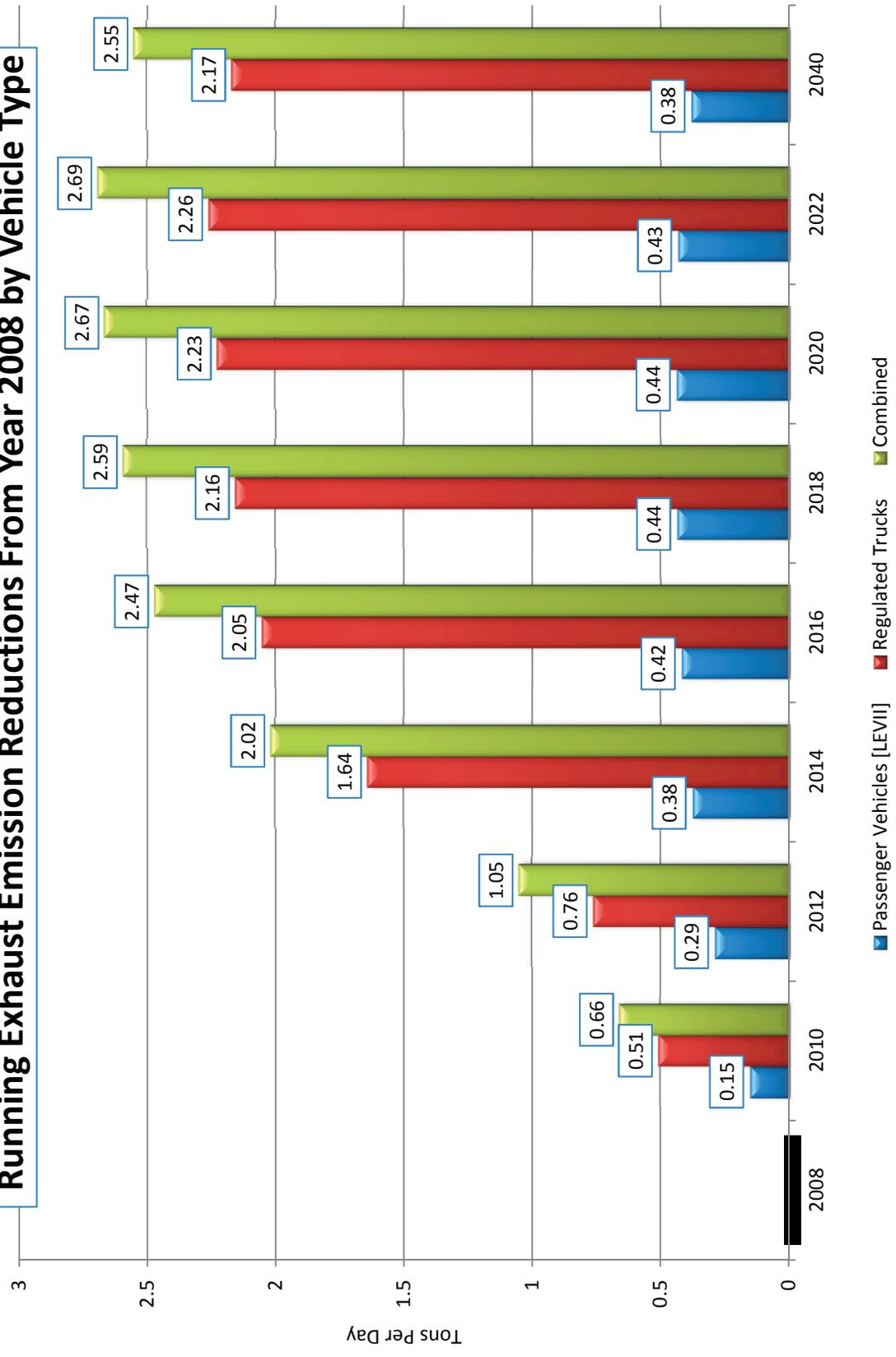
Passenger Vehicle and Truck PM_{2.5} Exhaust Emission Rates



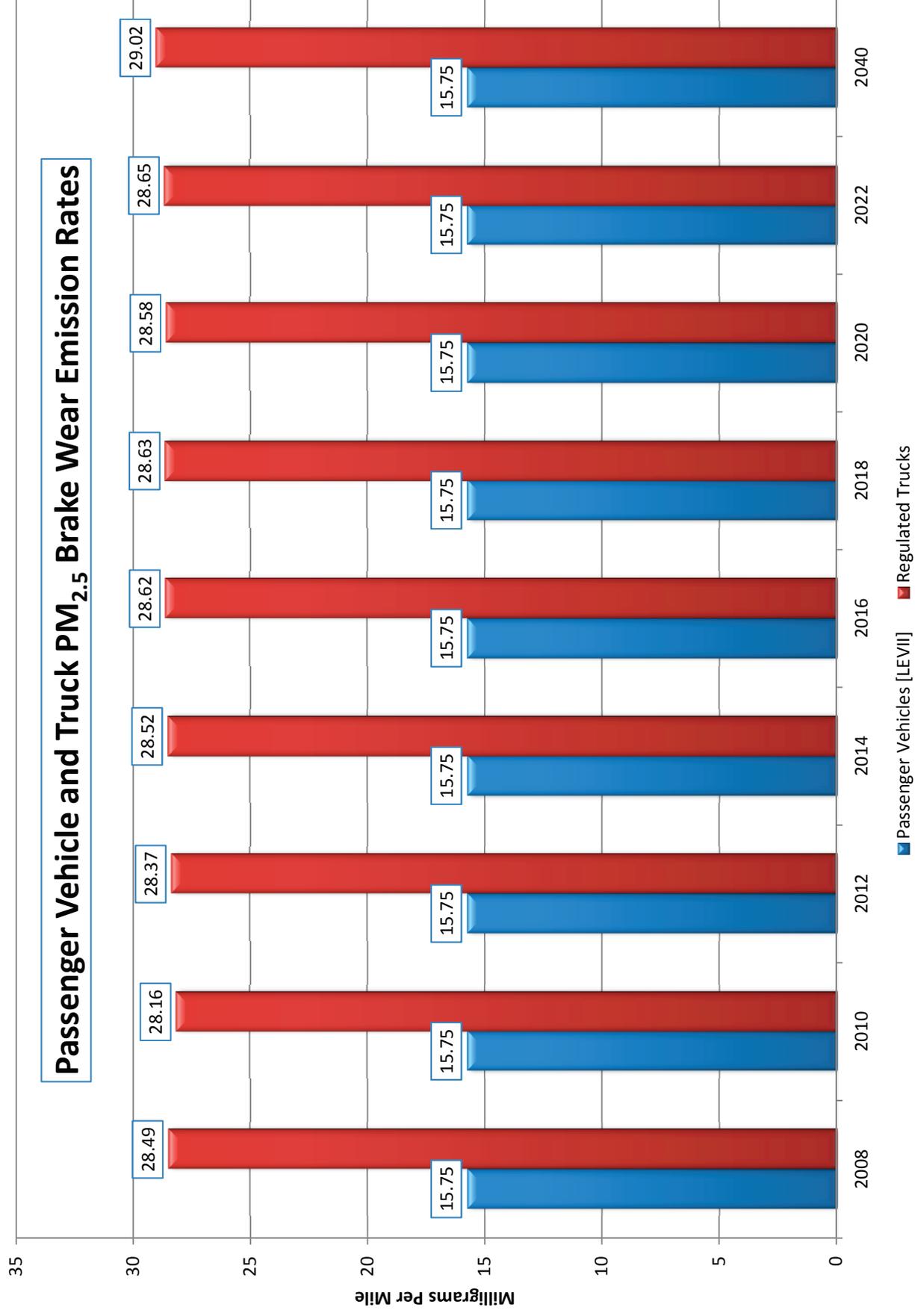
Percent Reduction in PM_{2.5} Exhaust Emission Rates by Vehicle Type



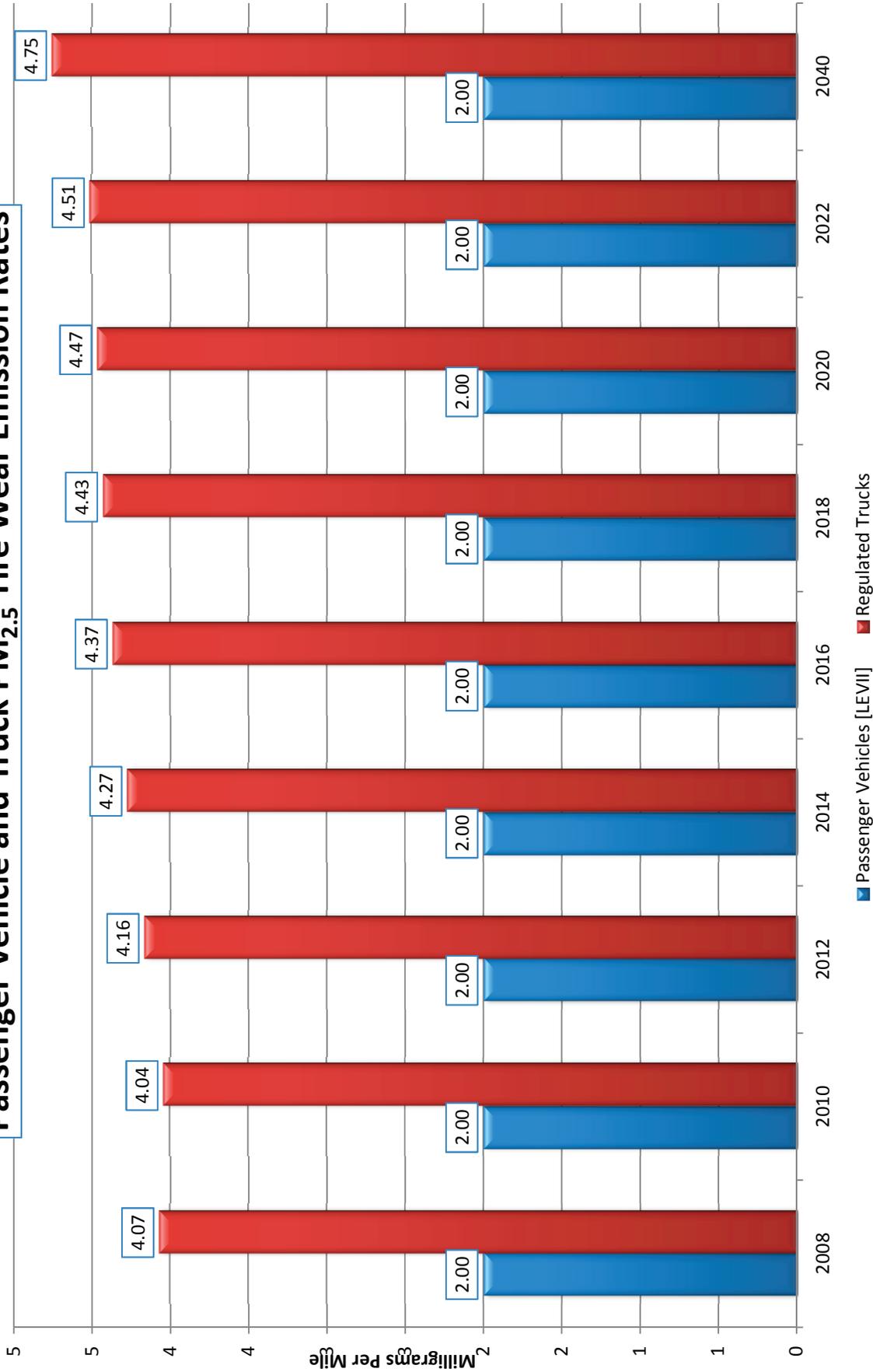
Running Exhaust Emission Reductions From Year 2008 by Vehicle Type



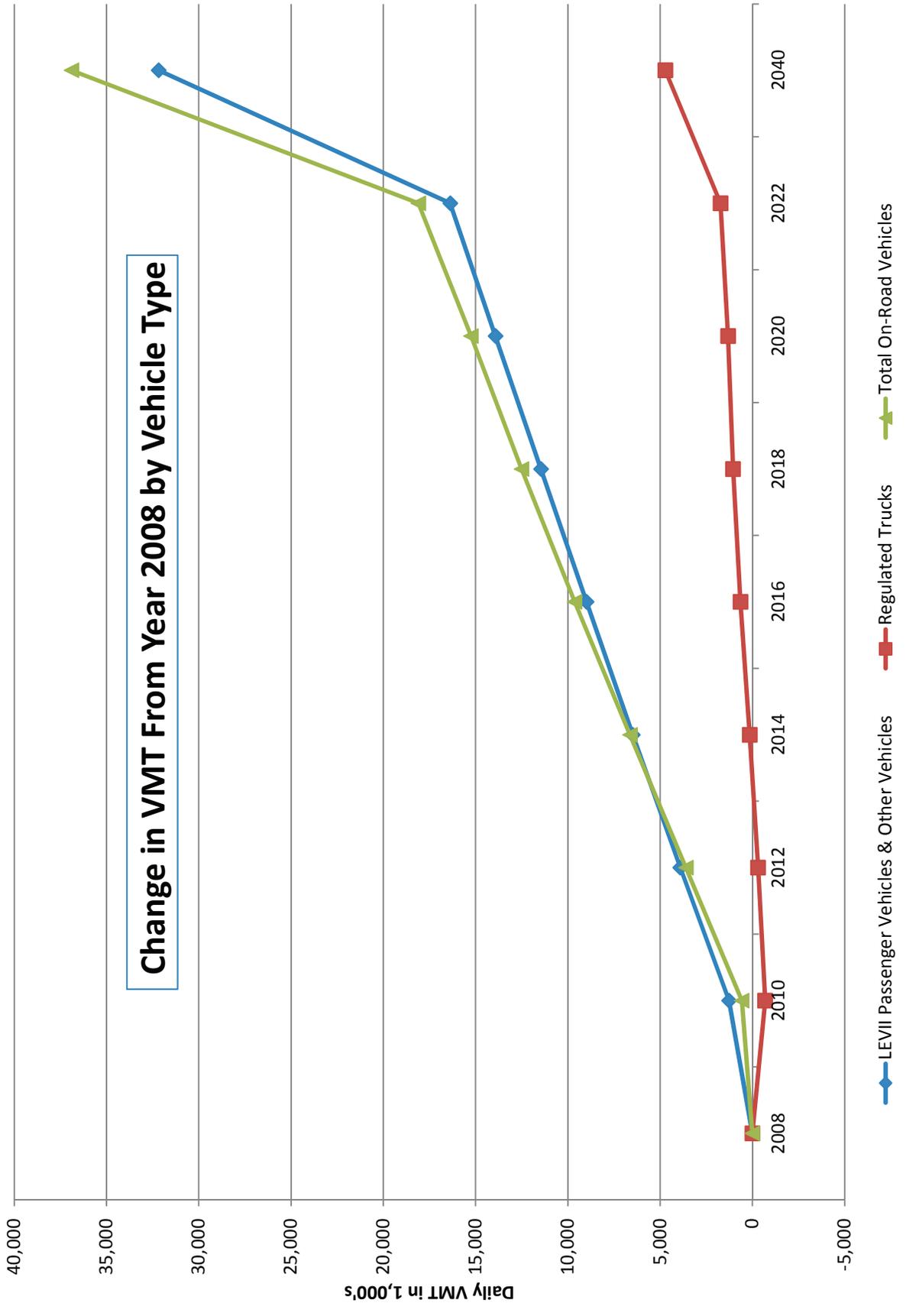
Passenger Vehicle and Truck PM_{2.5} Brake Wear Emission Rates



Passenger Vehicle and Truck PM_{2.5} Tire Wear Emission Rates



Change in VMT From Year 2008 by Vehicle Type



Percent Change in VMT From Year 2008

