MOVES Regional Level Sensitivity Analysis

Transportation Research Board Annual Meeting
Regional Transportation Air Quality Subcommittee

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Advancing transportation innovation for the public good

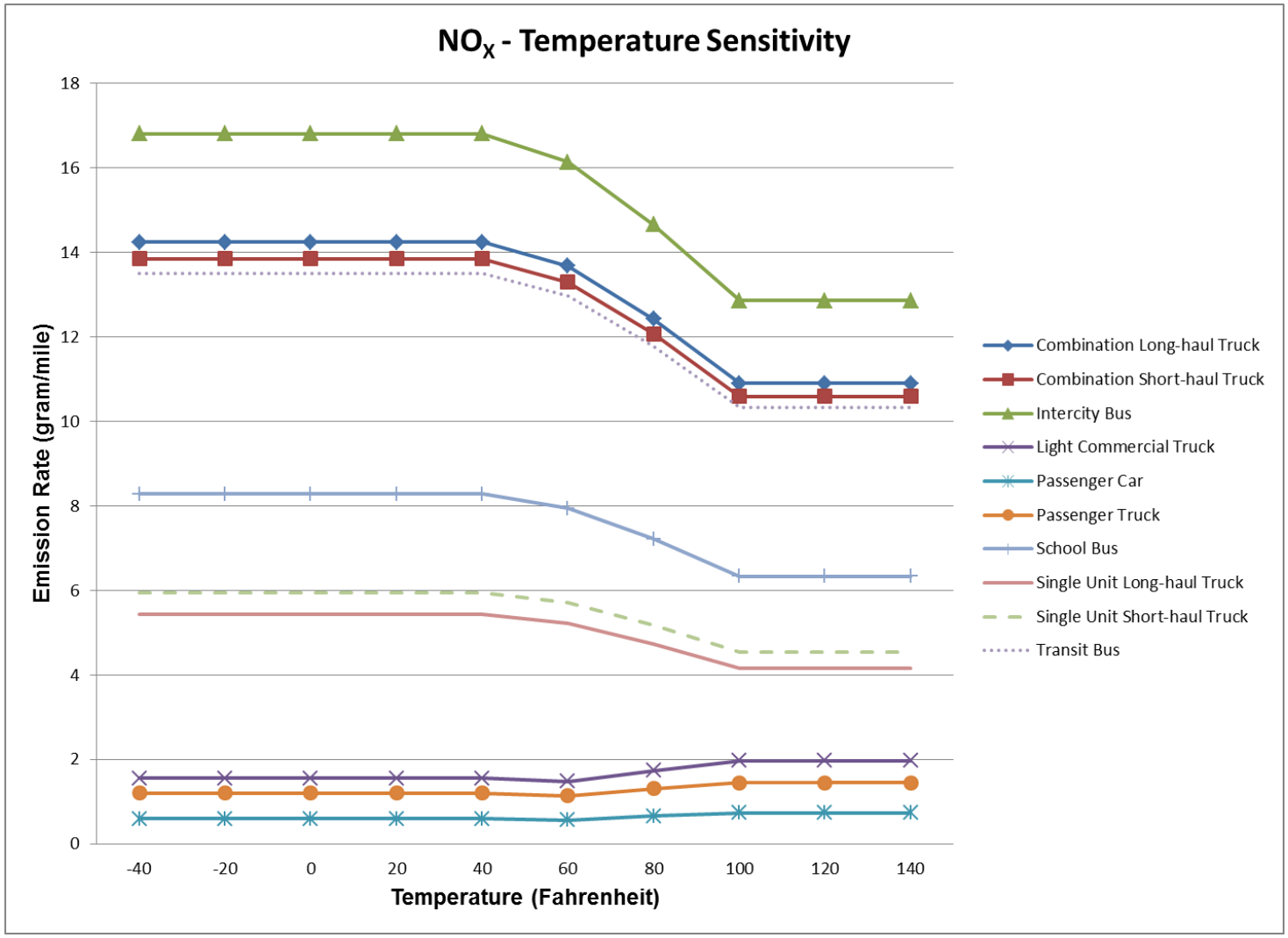
U.S. Department of Transportation
Research and Innovative Technology Administration
John A. Volpe National Transportation Systems Center

EVALUATION PARAMETERS

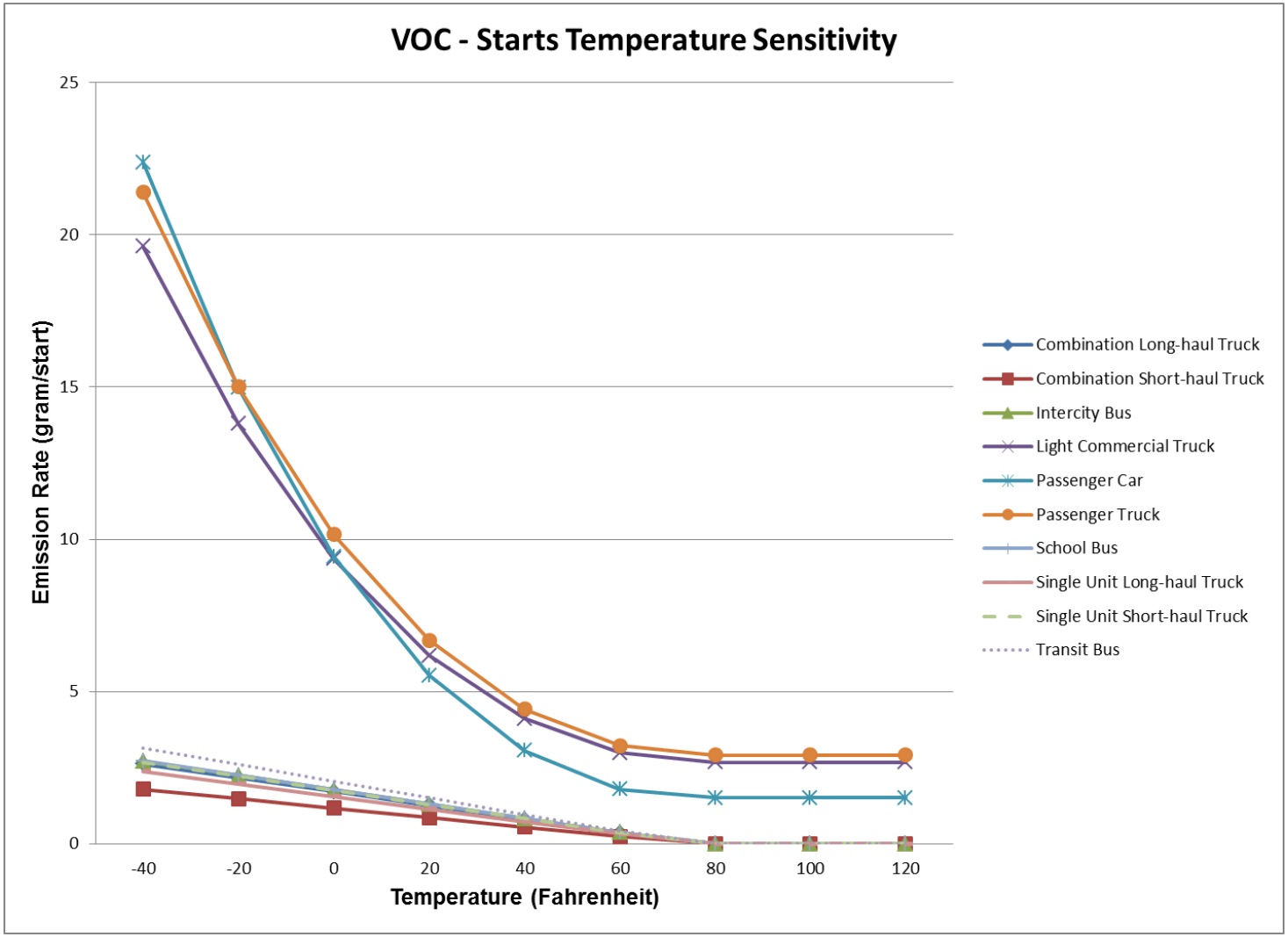
- Sensitivity Analysis of MOVES
  - Conducted for Regional/County Scale
  - Focused on the running emissions process for CO, $PM_{2.5}$, NO_X, and VOCs
  - Temperature effects for Start and Evaporative emissions also included
  - Analysis results report the sensitivity of selected input parameters of predicted emissions rates by MOVES source type.

- MOVES Input Parameters Evaluated
  - Temperature
  - Humidity
  - Ramp Fraction
  - Age Distribution
  - Average Speed Distribution

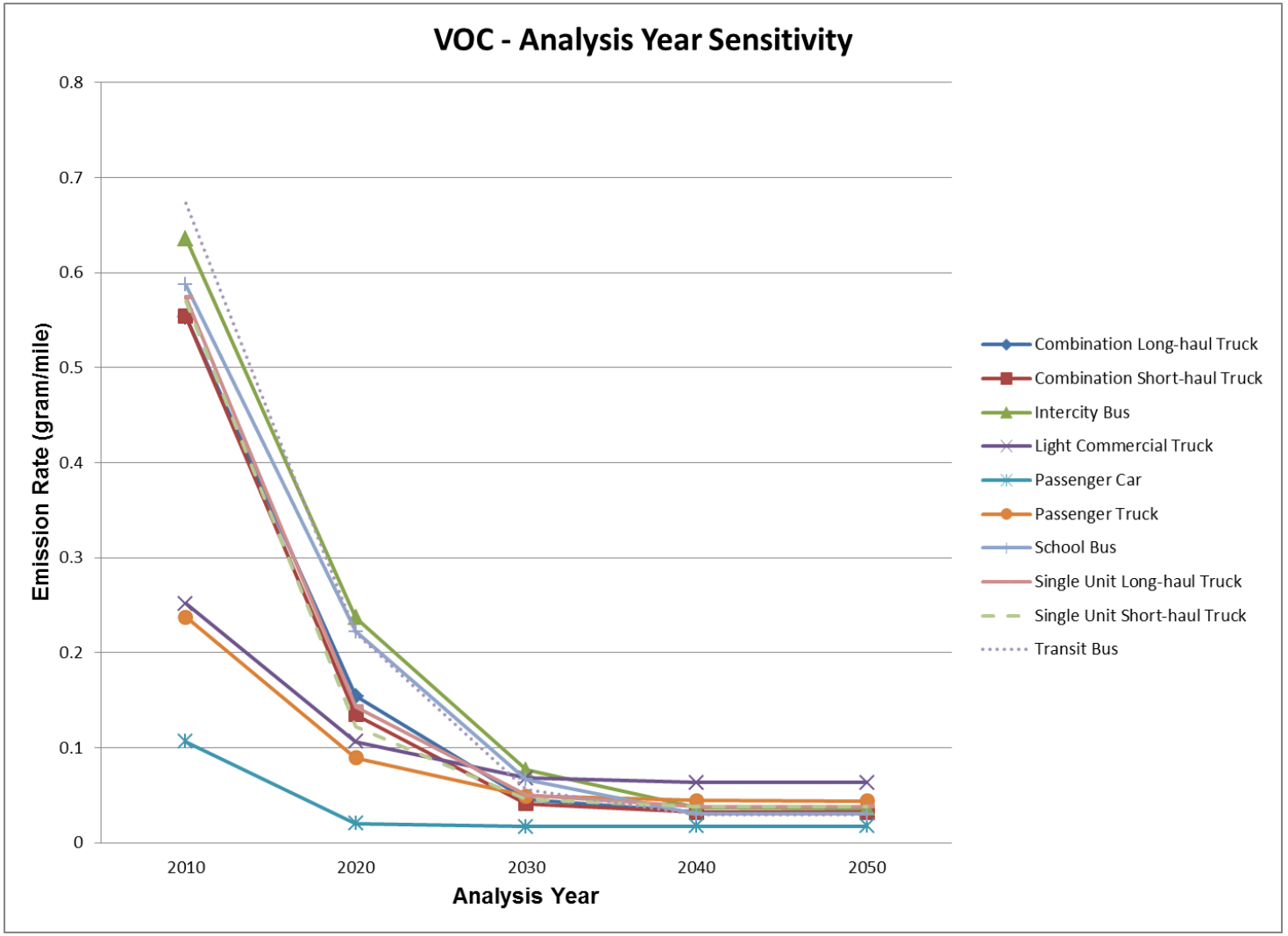
NO_X Temperature Sensitivity



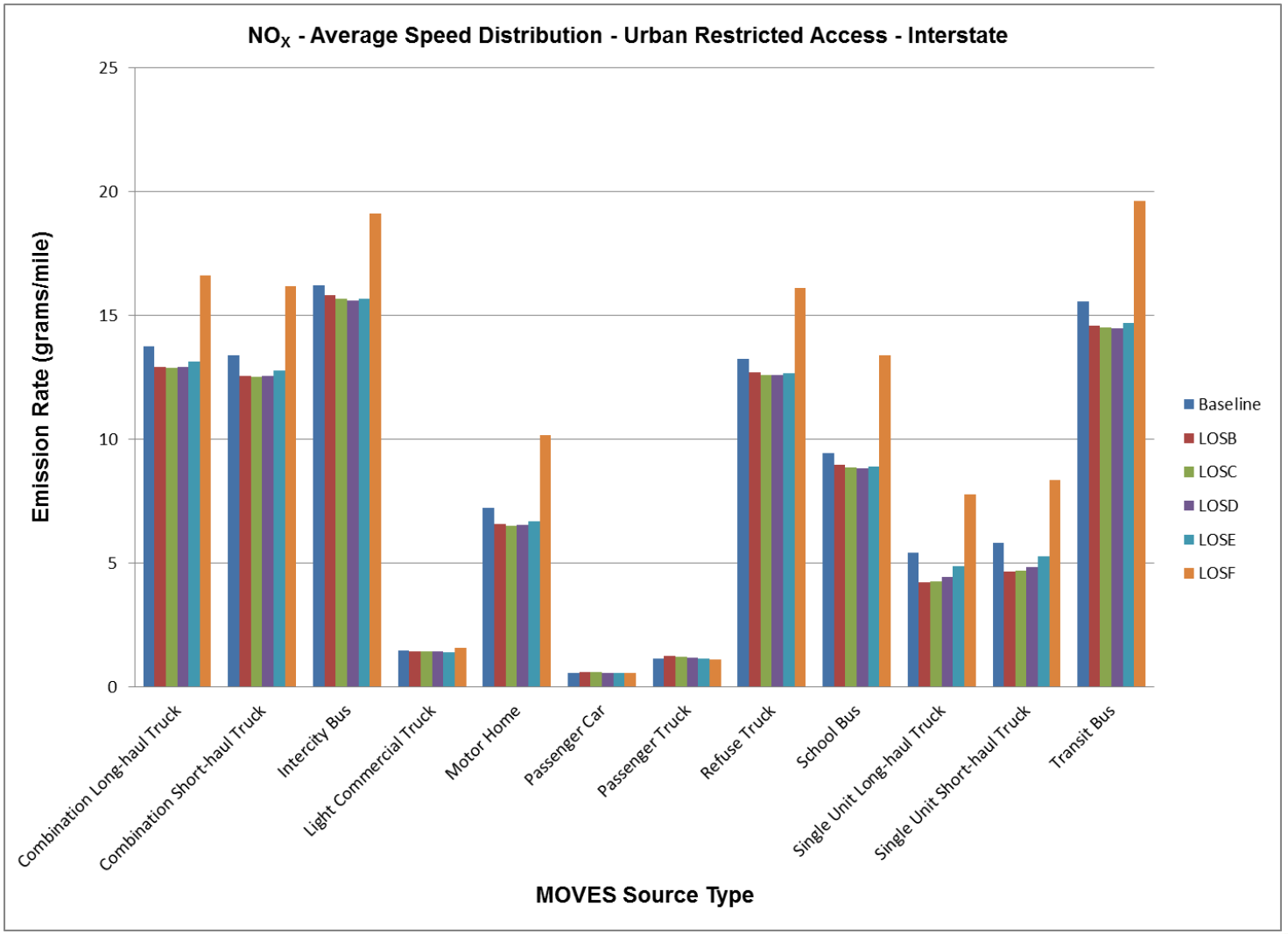
VOC Temperature Sensitivity - Starts



VOC Analysis Year Sensitivity



NOX Average Speed Distribution Sensitivity



Summary

- Key Regional Level Sensitivities
  - Average Speed Distribution for Arterials
  - Age Distribution
  - Ramp Fraction
  - Average Speed Distribution for Interstates and Freeways

- Final Report Released December 2012
  - Report available at the National Transportation Library website
  - http://ntl.bts.gov/lib/46000/46500/46598/DOT-VNTSC-FHWA-12-05.pdf

Sensitivity Analysis Overview

Input Parameter	Parameter Values/Description
Temperature (Fahrenheit) includes starts and evaporative	-40º, -20º, 0º, 20º, 40º, 60º, 80º, 100º, 120º F
Humidity	0%, 20%, 40%, 50%, 60%, 80%, 100% (60º F and 80º F)
Ramp Fraction	0, 0.02, 0.04, 0.06, 0.10, 0.12 0.16, 0.20
Analysis Year	2010, 2020, 2030, 2040, 2050
Age Distribution	Group 1 = 0-10 years old Group 2 = 11-20 years old Group 3 = 21-30 years old
Average Speed Distribution - Urban Restricted Access - FC 11 Urban Interstate	LOS B,C,D,E,F
Average Speed Distribution - Urban Unrestricted Access - FC 12 Urban Principal Arterial Freeway	LOS C,D,E
Average Speed Distribution - Urban Unrestricted Access - FC 14 Urban Principal Arterial Other	LOS B,C,F

Ramp fraction has linear affect on rates