



**RTC**  
Regional Transportation Council

# MOVES MODEL EXPERIENCES, RESULTS, AND OBSERVATIONS

TECHNICAL WORKING GROUP

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VIVEK THIMMAVAJHALA

North Central Texas Council Of Governments

# OUTLINE

**Model Inputs and Applications**

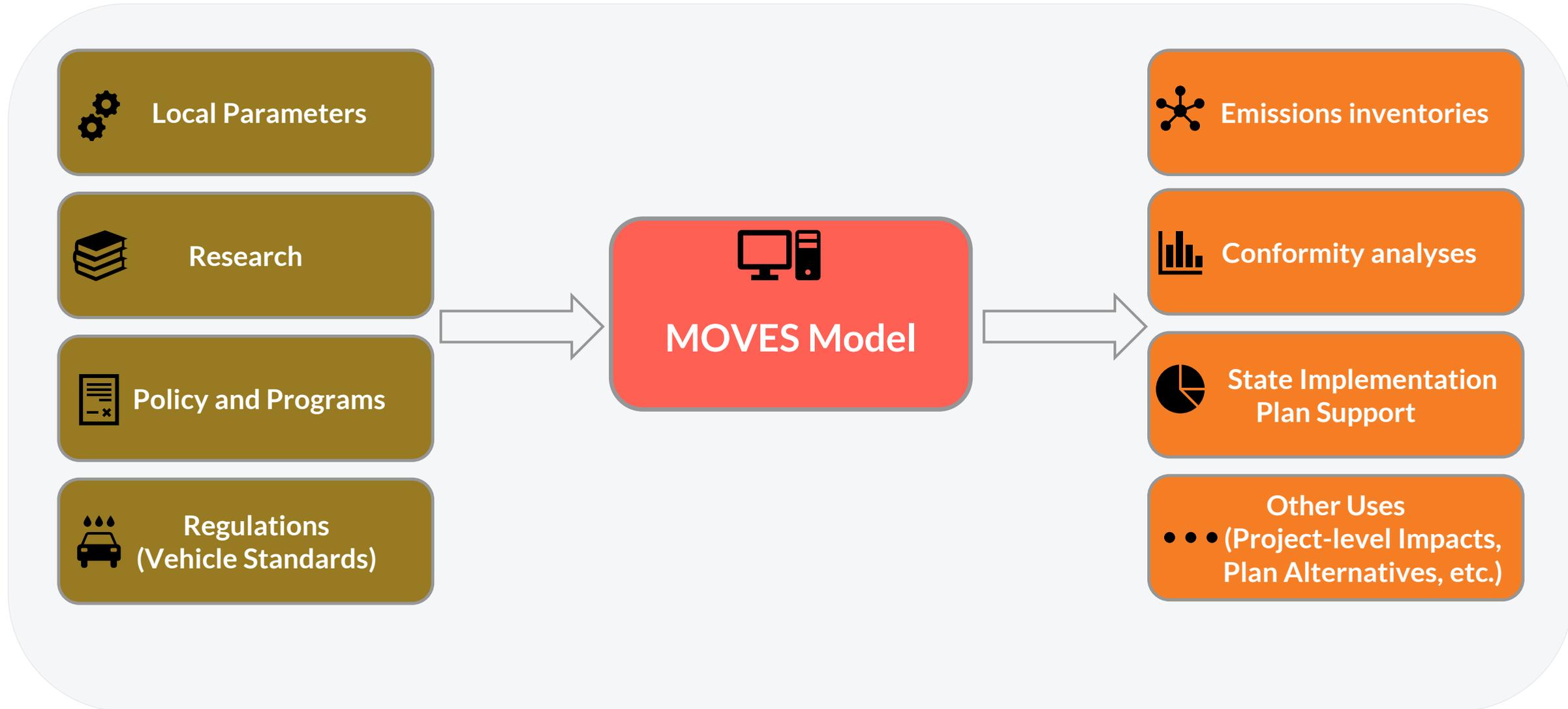
**EPA On-Road Models**

**MOVES3 VS. MOVES4 VS. MOVES5**

**Findings, Observations, and Recommendations**

**Changing Models and Transportation Conformity**

# MODEL INPUT AND APPLICATIONS



# EPA ON-ROAD MODELS: HISTORY

MOBILE1	1978
MOBILE2	1981
MOBILE3	1984
MOBILE4	1989
MOBILE5	1993
MOBILE6	2002
MOBILE6.2	2004
MOVES2010	2010
MOVES2010a	2010
MOVES2010b	2012
MOVES2014	2014
MOVES2014a	2015
MOVES2014b	2018
<b>MOVES3</b>	<b>2021</b>
<b>MOVES4</b>	<b>2023</b>
<b>MOVES5</b>	<b>2024</b>

# MOVES<sub>3</sub> VS. MOVES<sub>4</sub> VS. MOVES<sub>5</sub>

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**MOVES<sub>3</sub> - Introduced key Light- and Heavy-Duty Standards**

**MOVES<sub>4</sub> - Expanded and Updated Standards - ?**

Heavy-Duty Engine and Vehicle Standards (HD2027)

Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards

Heavy-Duty GHG Phase 2 Standards (HDGHG2)

**MOVES<sub>5</sub> - Added New Standards for Additional Regulations**

~~Light- and Medium-Duty Multi-Pollutant Rule (LMDV)~~

~~EPA's Greenhouse Gas Emissions Standards for Heavy-Duty~~

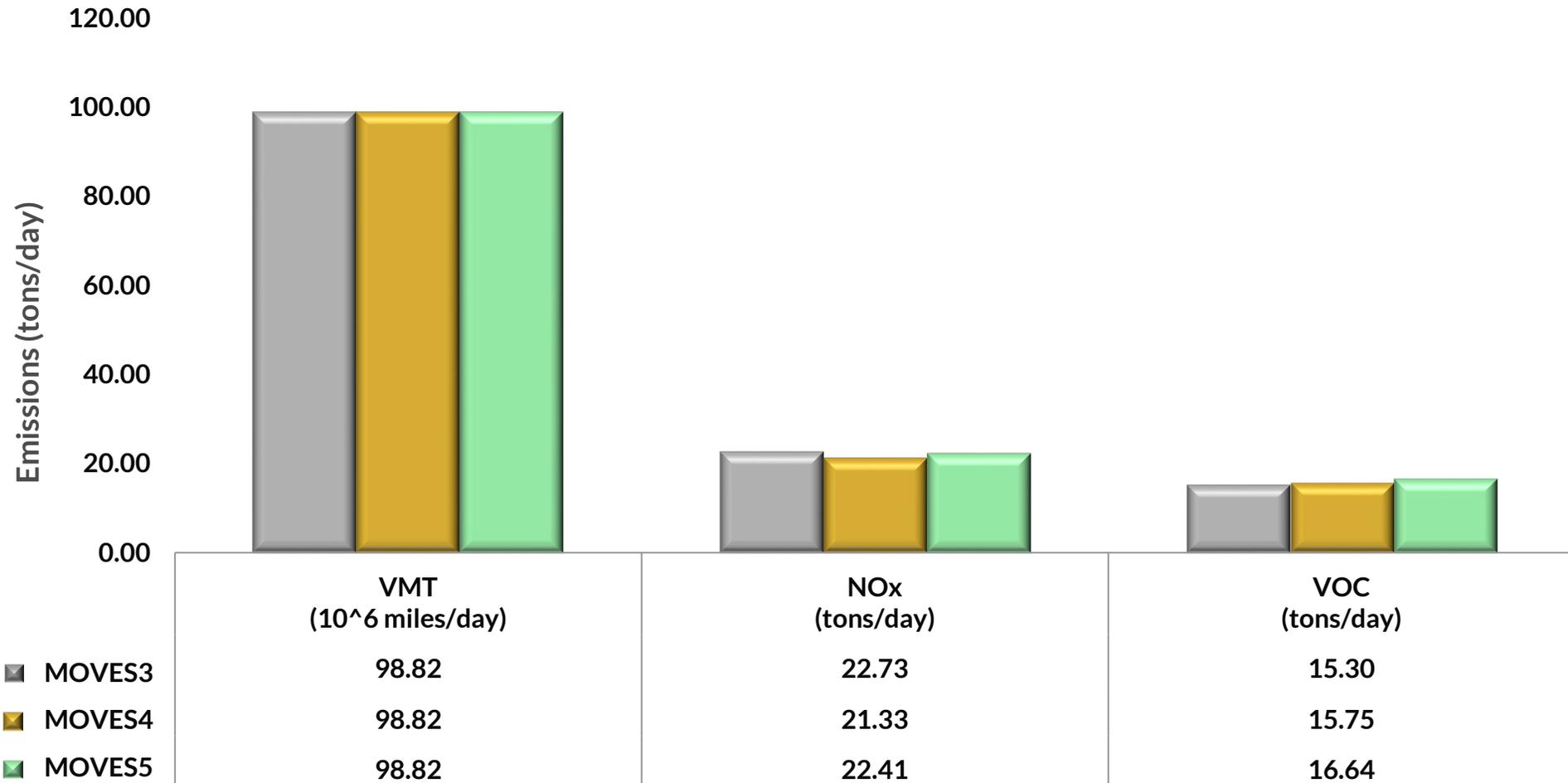
~~Vehicles—Phase 3 (HDP3)~~

**Research/Updated Data vs. Rescission and Practical Challenges**

# MOVES<sub>3</sub> VS. MOVES<sub>4</sub> VS. MOVES<sub>5</sub>

## Analysis Year 2026, Dallas County

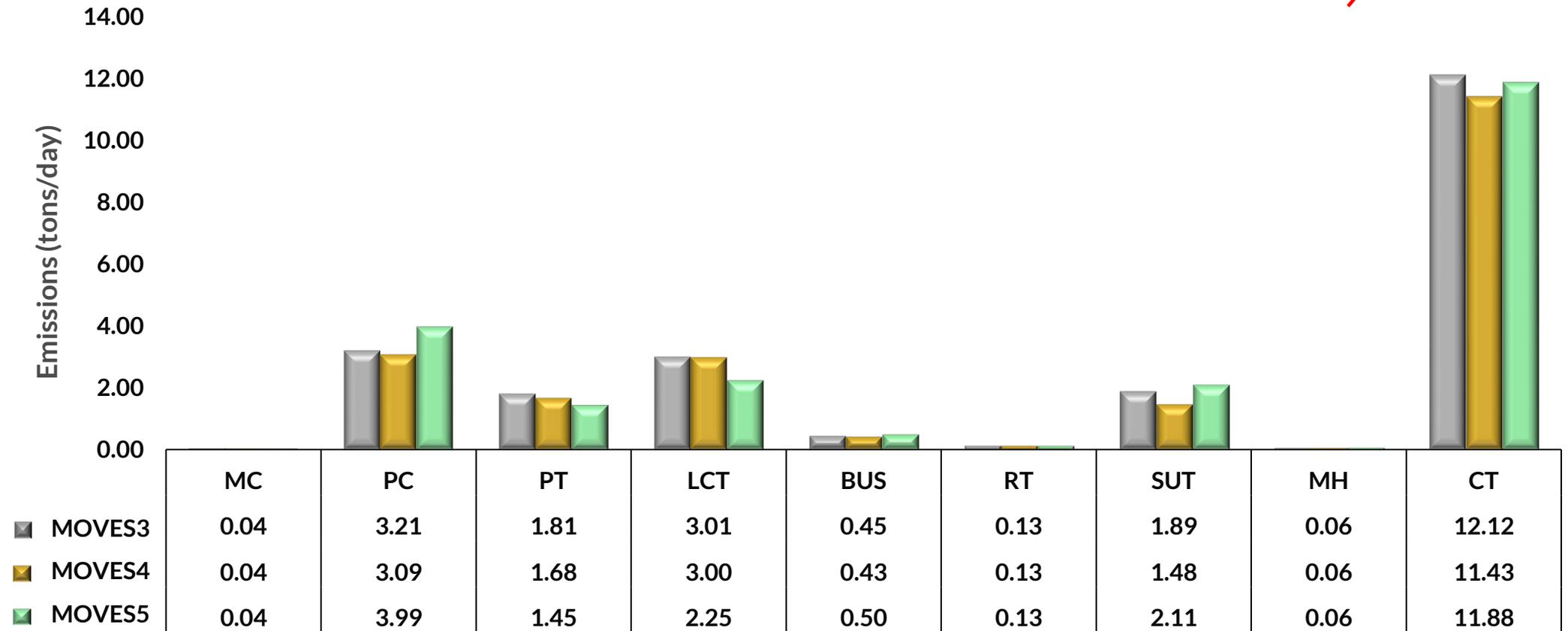
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# MOVES<sub>3</sub> VS. MOVES<sub>4</sub> VS. MOVES<sub>5</sub>

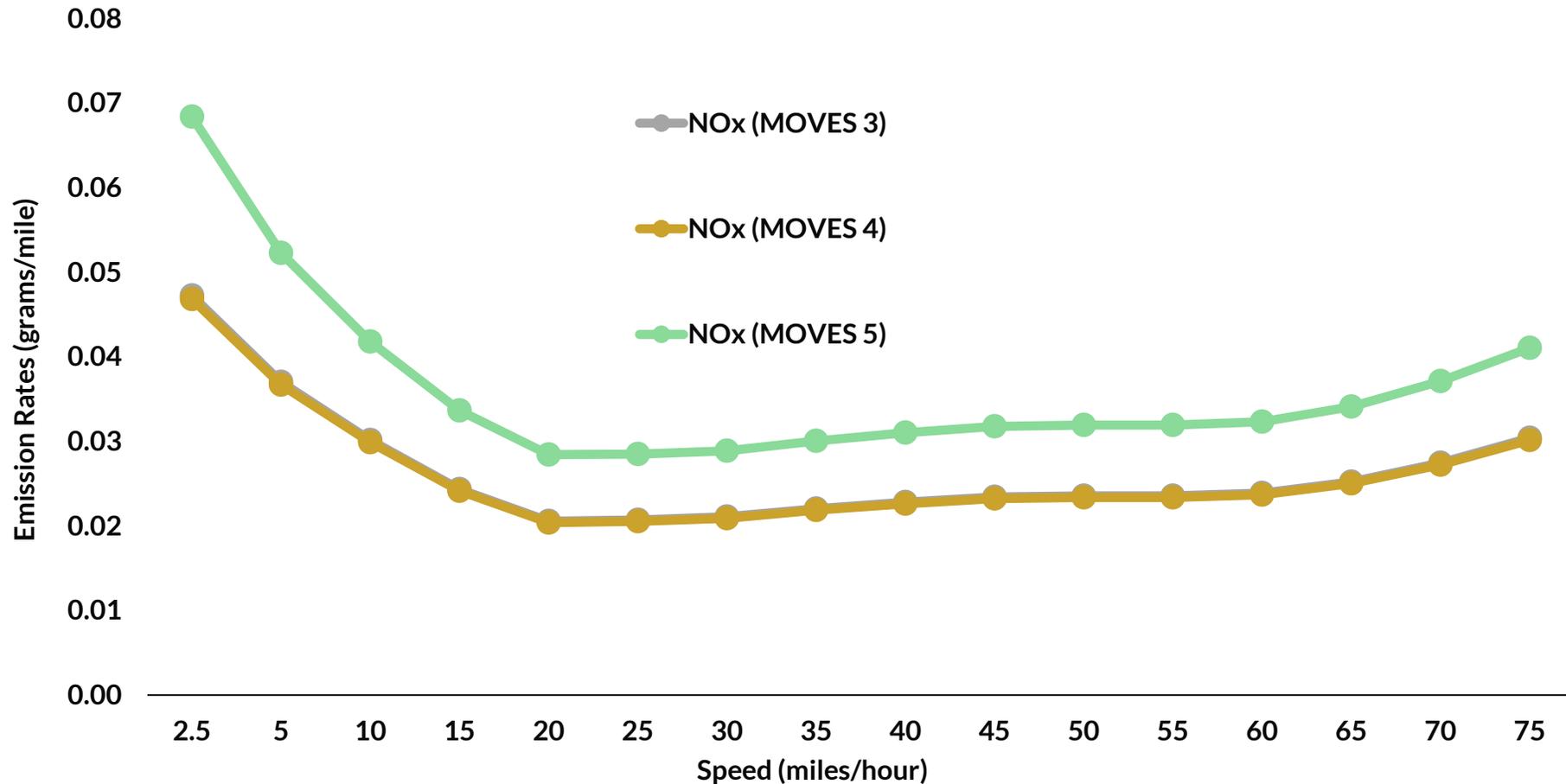
## Analysis Year 2026, Dallas County, Vehicle Types, NOx Emissions

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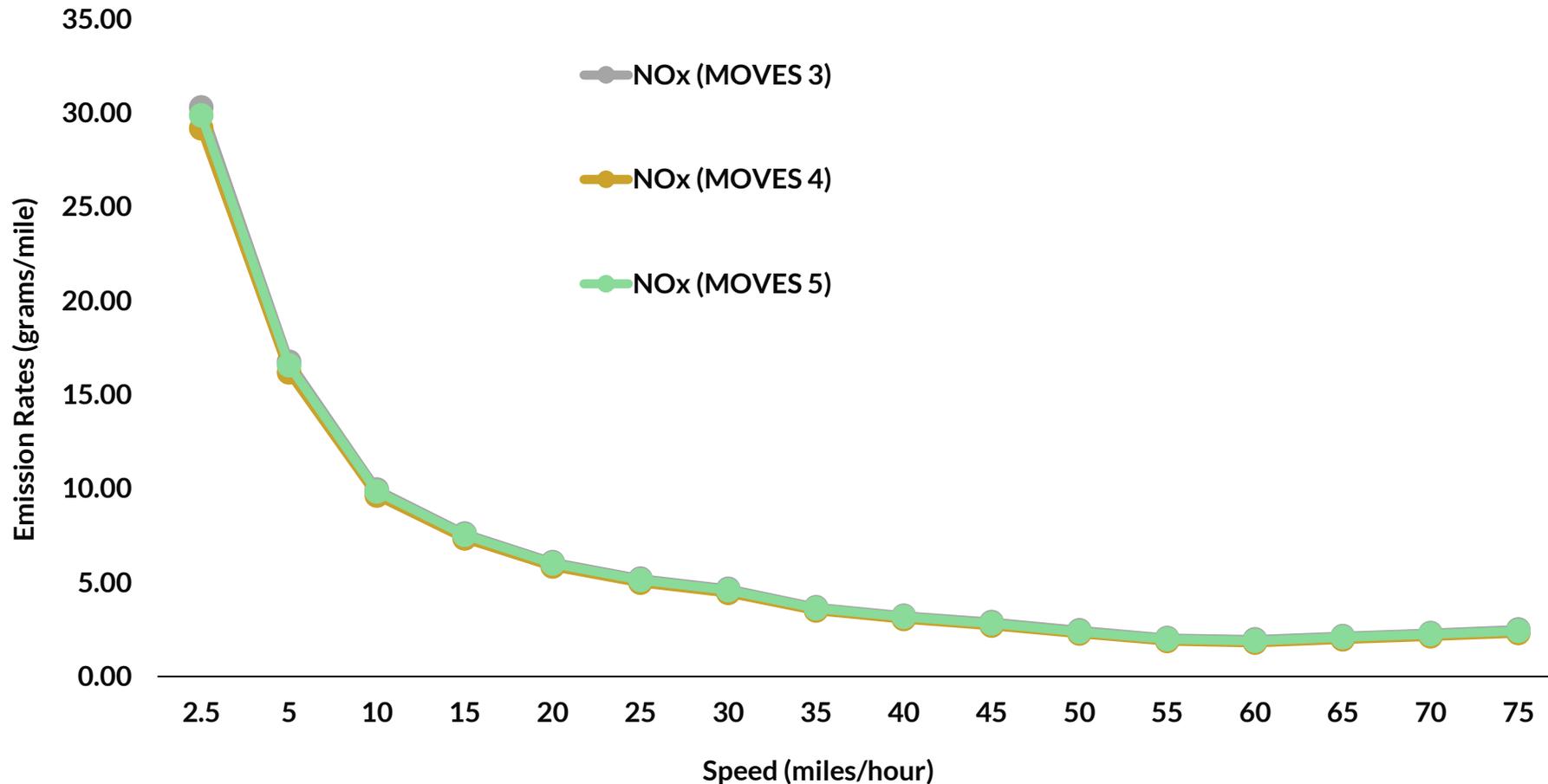
# MOVES<sub>3</sub> VS. MOVES<sub>4</sub> VS. MOVES<sub>5</sub>

Analysis Year 2026, Dallas County, Freeway, PC Gas, Running Exhaust NOx Emission Rates



# MOVES<sub>3</sub> VS. MOVES<sub>4</sub> VS. MOVES<sub>5</sub>

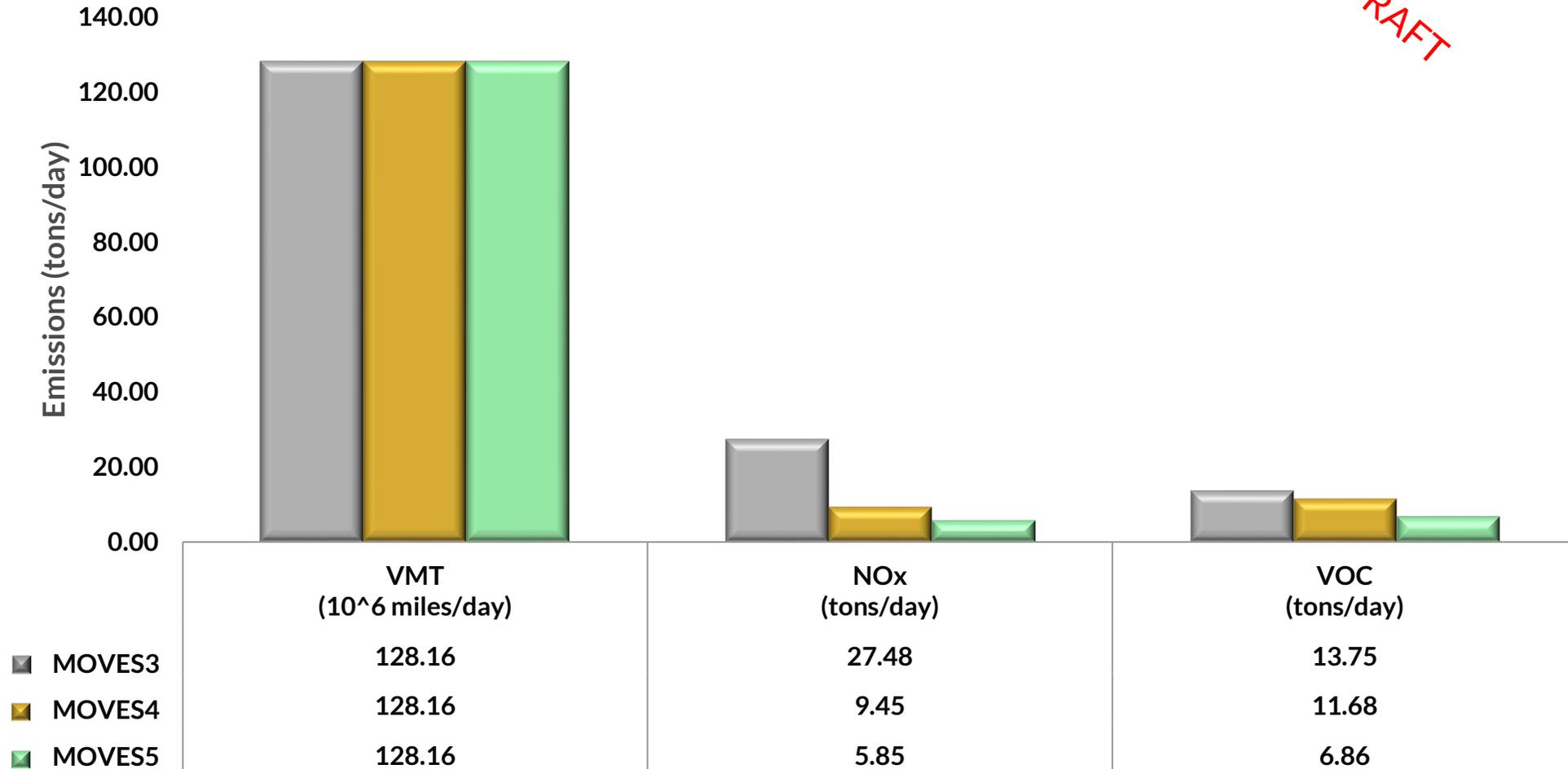
Analysis Year 2026, Dallas County, Freeway, CLHT (Diesel)  
Running Exhaust Emission Rates



# MOVES<sub>3</sub> VS. MOVES<sub>4</sub> VS. MOVES<sub>5</sub>

## Analysis Year 2050, Dallas County

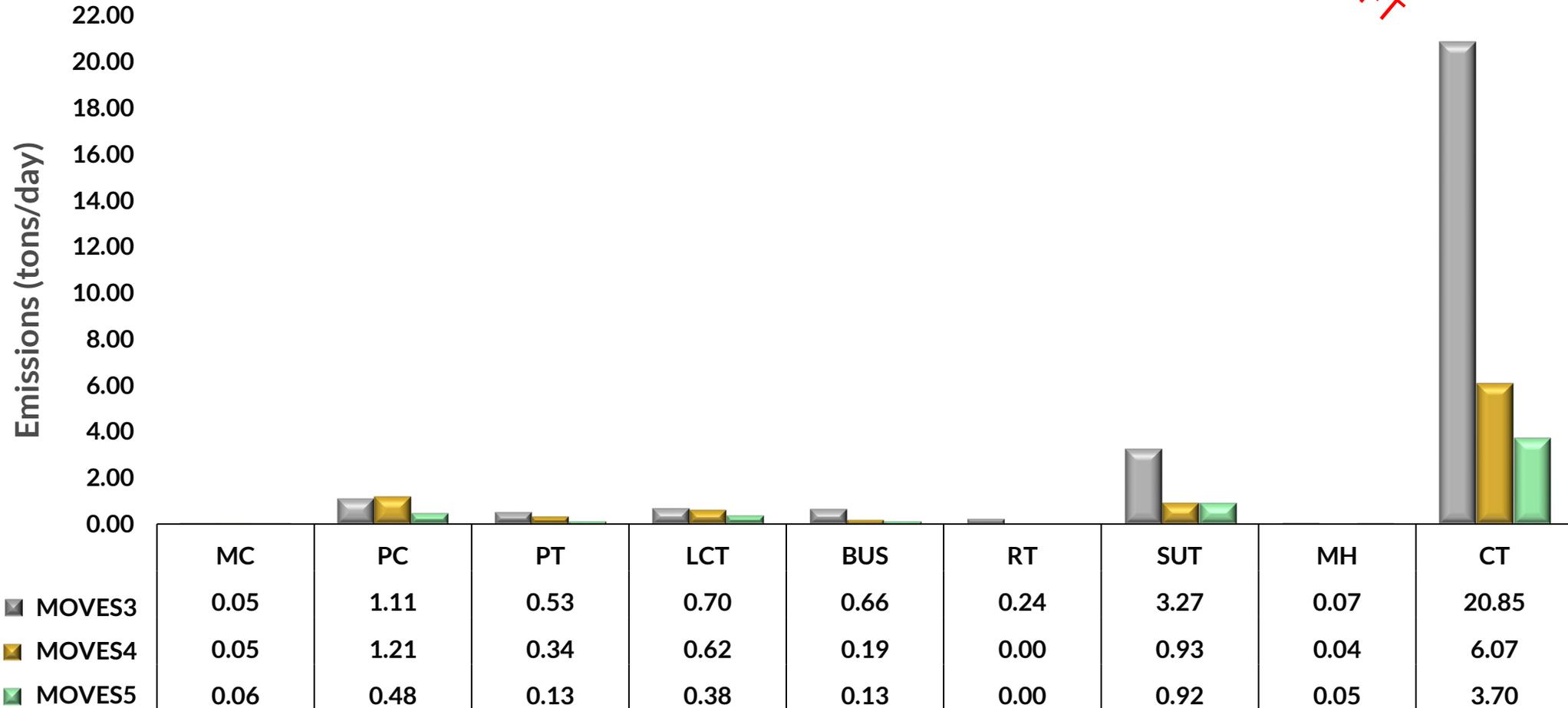
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# MOVES<sub>3</sub> VS. MOVES<sub>4</sub> VS. MOVES<sub>5</sub>

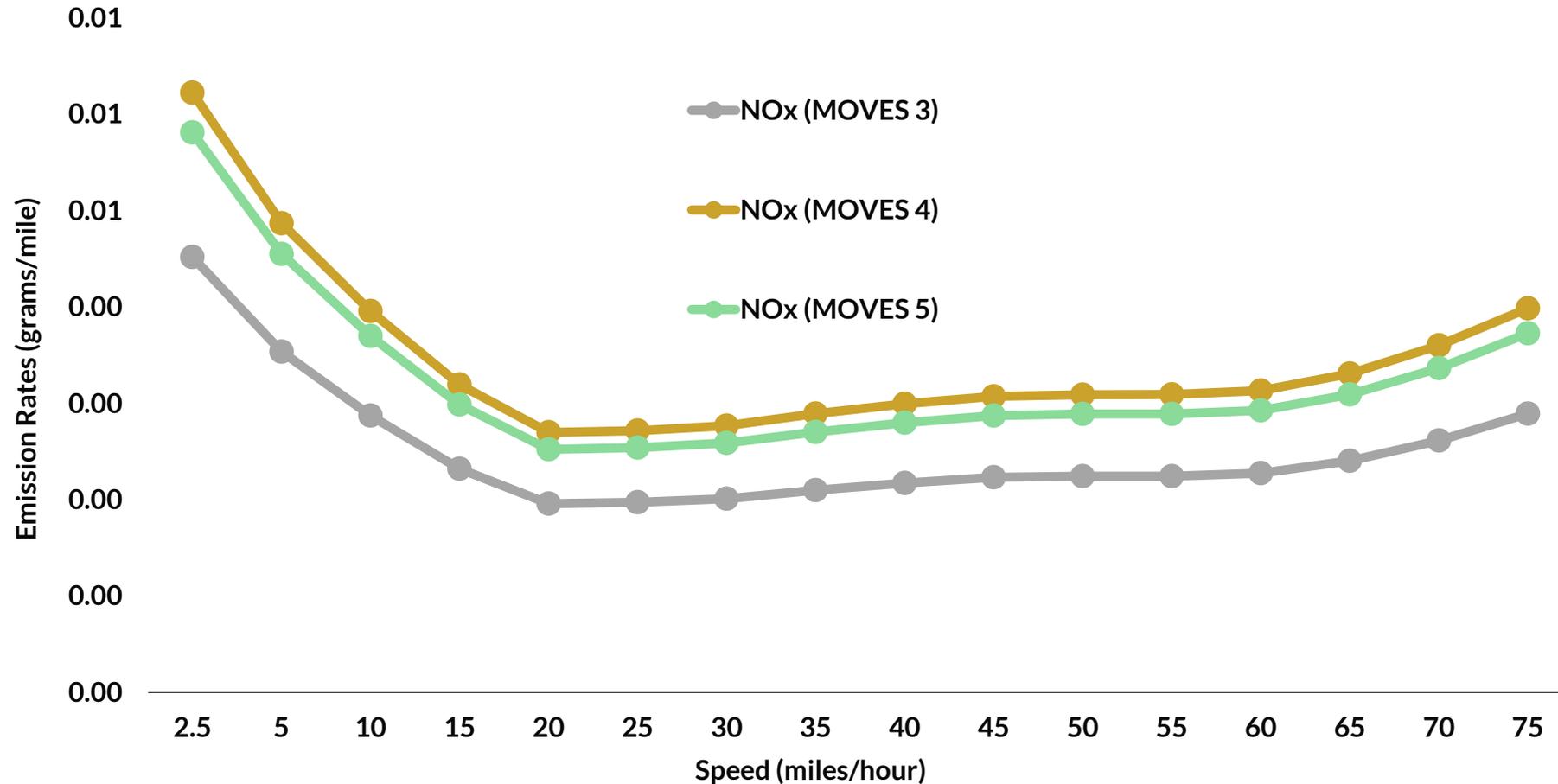
## Analysis Year 2050, Dallas County, Vehicle Types, NOx Emissions

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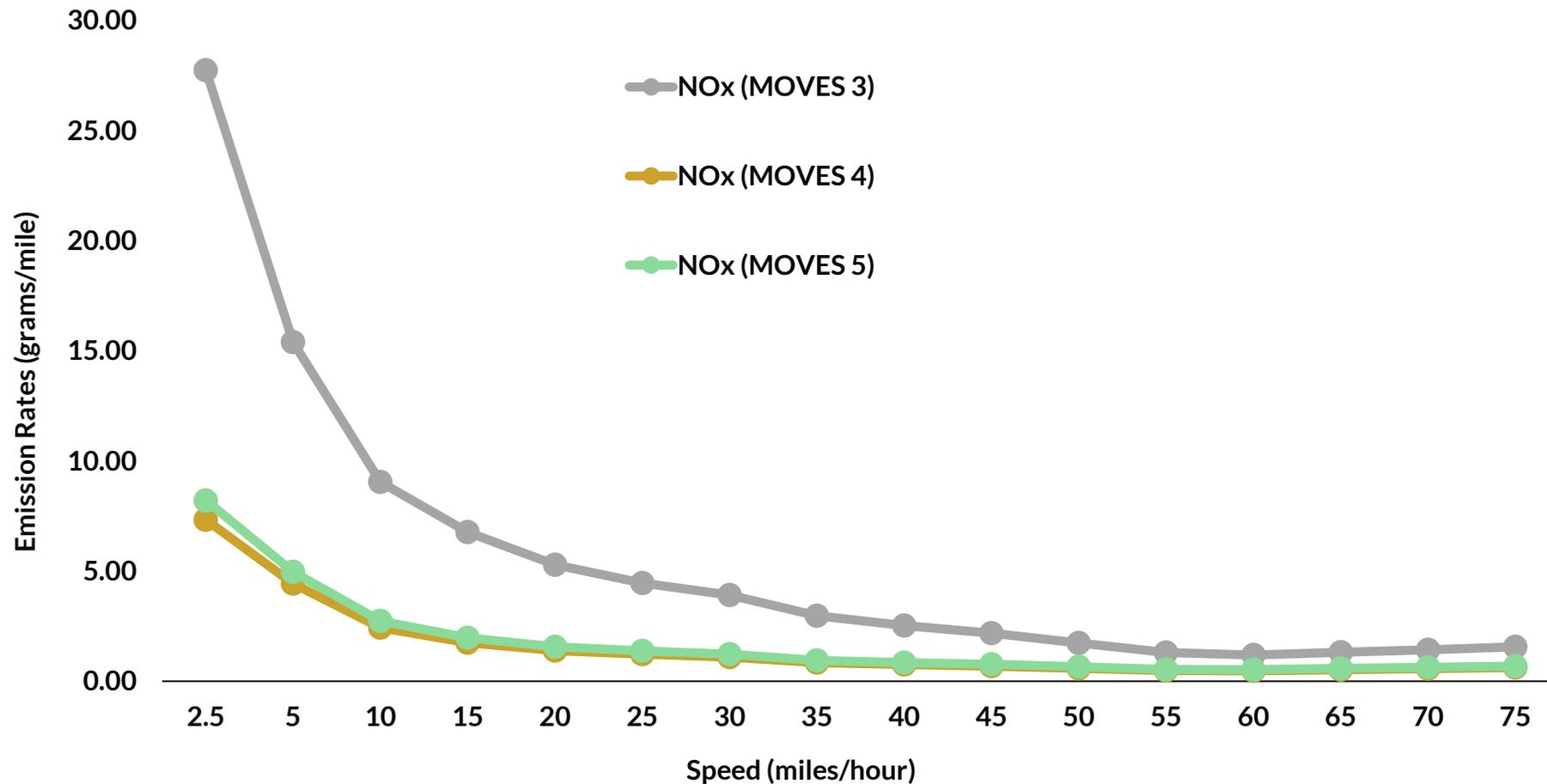
# MOVES<sub>3</sub> VS. MOVES<sub>4</sub> VS. MOVES<sub>5</sub>

Analysis Year 2050, Dallas County, Freeway, PC Gas Running Exhaust NOx Emission Rates



# MOVES<sub>3</sub> VS. MOVES<sub>4</sub> VS. MOVES<sub>5</sub>

Analysis Year 2050, Dallas County, Freeway, CLHT (Diesel)  
Running Exhaust Emission Rates



# FINDINGS (MOVES<sub>3</sub> VS. MOVES<sub>4</sub> VS. MOVES<sub>5</sub>)

## Emissions – Dallas County, Texas

### 2026 Analysis Year

NOx and VOC Emissions – a negligible difference with MOVES<sub>4</sub> and MOVES<sub>5</sub>

### 2050 Analysis Year

NOx Emissions – significantly lower with MOVES<sub>4</sub> and MOVES<sub>5</sub>  
VOC Emissions – slightly lower with MOVES<sub>4</sub> and significantly lower with MOVES<sub>5</sub>

## Running Exhaust NOx Emission Rates – Dallas County, Texas (Freeway Road Type)

### 2050 Analysis Year with MOVES<sub>4</sub> and MOVES<sub>5</sub>

Significantly lower NOx rates for combination trucks

# OBSERVATIONS AND RECOMMENDATIONS

## Observations

Model Transition – Newer Inputs and Outputs, Updated Post-Processing Tools

Outer Years/Horizon Year – Lower NOx Emission Results with MOVES4 and MOVES5

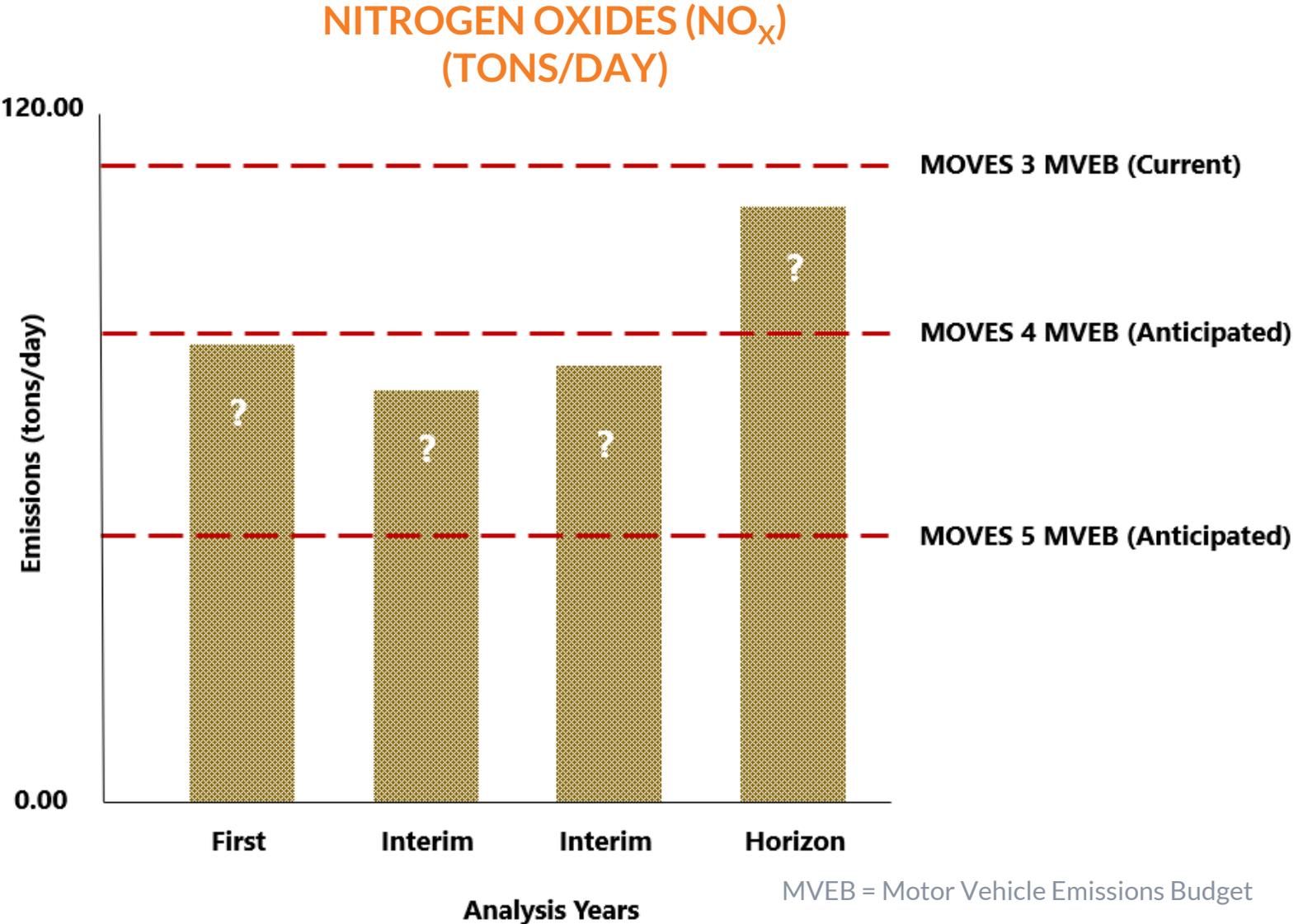
Applicable to Conformity Analysis

## Recommendations

**Consistent Models and Run Modes for Budget Development and Conformities**

Plan for Emission Inventory Development  
Streamline Conformity Process

# CHANGING MODELS AND TRANSPORTATION CONFORMITY



# OTHER THOUGHTS

## MOVES Model Assumptions/Rules and Impacts

The Next Update? MVEB vs. Transportation Conformity

MOVES3 to MOVES4

MOVES4 to MOVES5

MOVES5 to MOVES TBD Version

EPA MOVES Team Very Responsive ([Mobile@epa.gov](mailto:Mobile@epa.gov))

# FOR MORE INFORMATION



Vivek Thimmavajjhala

Senior Transportation System Modeler

[vthimmavajjhala@nctcog.org](mailto:vthimmavajjhala@nctcog.org)

817-704-2504



Chris Klaus

Senior Program Manager

[cklaus@nctcog.org](mailto:cklaus@nctcog.org)

817-695-9286



Jenny Narvaez

Program Manager

[jnarvaez@nctcog.org](mailto:jnarvaez@nctcog.org)

817-608-2342



<https://www.nctcog.org/trans/quality/air/ozone>