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Regulatory Updates on Mobile Sources

U.S. EPA Office of Transportation and Air Quality

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Overview

- Background
- Regulatory Updates
  - Light- and Medium-Duty Vehicle Multipollutant Rule
  - Heavy-Duty GHG Rule (Phase 3)
- Future Work and Research Interests

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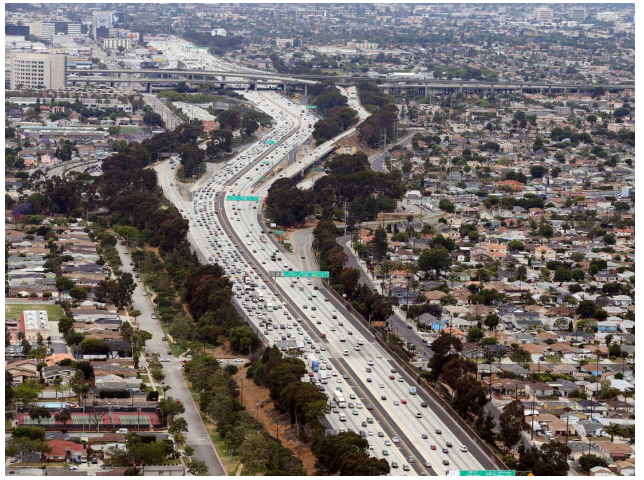
Background

- Populations that live near major roads are burdened by elevated exposures to localized emissions such as directly-emitted PM, NO_2 and mobile source air toxics
- In the U.S., over 72 million people estimated to live within 200 meters of a large highway, and those people are more likely to be people of color, lower income, and living in a metropolitan county
- Almost 17,000 schools in the U.S. are estimated to be within 250 meters of a heavily-traveled road
- People living, working and going to school near highways and large transportation facilities face increased health risks



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Background

- Emissions from motor vehicles also contribute to regional pollution that is geographically widespread, such as ozone and secondarily-formed $PM_{2.5}$
- Greenhouse gases (GHGs) emitted by motor vehicles contribute to adverse climate-related impacts
- Two recent OTAQ rules will reduce GHGs and other pollutants from motor vehicles, leading to improvements in air quality at both local and regional scales and reducing the impacts of climate change

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Recent OTAQ Rules

Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles

April18, 2024

Greenhouse Gas Emissions Standards for Heavy-Duty Vehicles—Phase 3

April 22, 2024

Key Take Aways…

1. Which vehicles are affected?
2. How will emissions be reduced?
3. What are the benefits to air quality?

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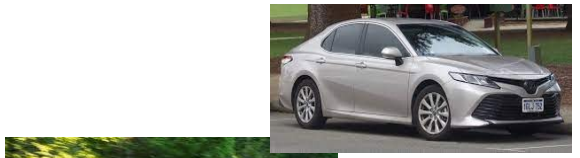
Light- & Medium-Duty Vehicle Rule

Which vehicles (and pollutants) are affected?



Vehicles

- **Light-duty** (passenger cars & light trucks)
  - Nearly a 50% reduction from the current GHG and Criteria Pollutant (NMOG, NOx, PM) Standards

- **Medium-duty** (largest pickups & commercial vans)

  A 44% reduction from current GHG standards and up to 70% of the criteria pollutant standards

Light- & Medium-Duty Vehicle Rule

How will emissions be reduced?

Key points

- The standards are performance-based emissions standards in the form of grams of pollutant per mile

- Manufacturers decide what technologies are used to meet the standards

- For GHGs, we expect manufacturers to employ a range of technologies including advanced gasoline vehicles, hybrids, plug-in hybrid electric, and electric vehicles.

- For PM, we anticipate that manufacturers will choose to widely employ gasoline particulate filters

Timeframe

Standards phase-in beginning in model year (MY) **2027 through 2032** and beyond

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Light- & Medium-Duty Vehicle Rule

What are the benefits to air quality?

- CO_2 *reductions* of 7.2 billion metric tons through 2055

(a 21% reduction from the no-action scenario)

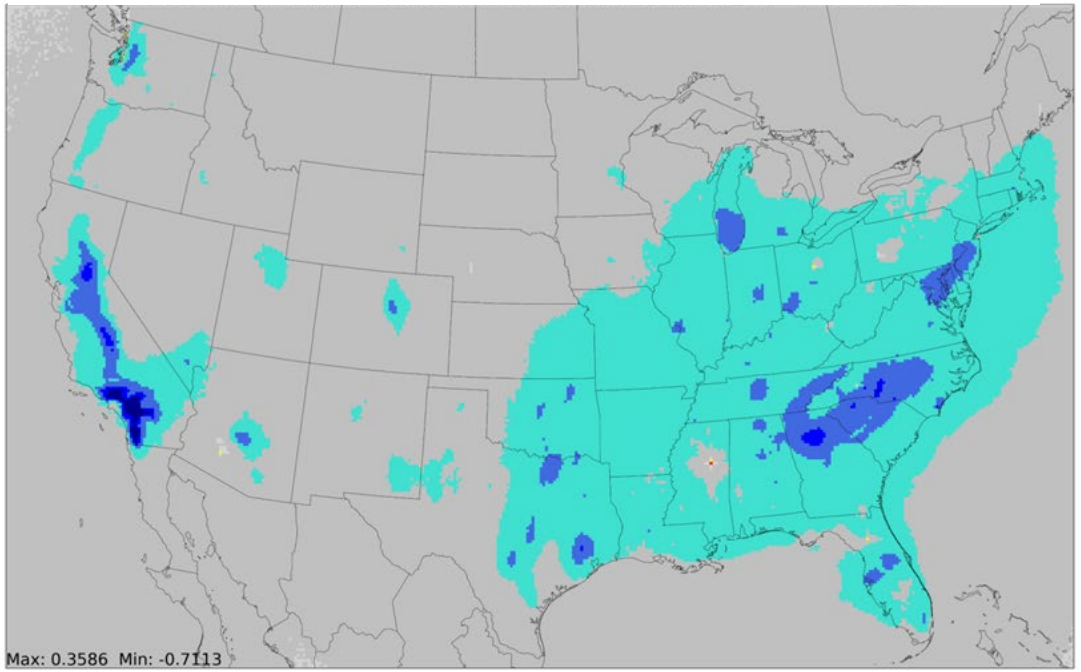
- Net Emissions Reductions in 2055 (with the rule vs. no-action)
  - $PM_{2.5}$: 8,700 tons (-22%)
  - NOx: 36,000 tons (-25%)
  - VOC: 150,000 tons (-46%)

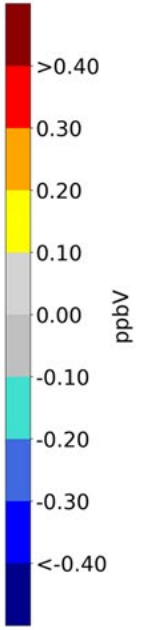
- Net benefits of nearly $100 billion through 2055 (2% discount rate)

Light- & Medium-Duty Vehicle Rule

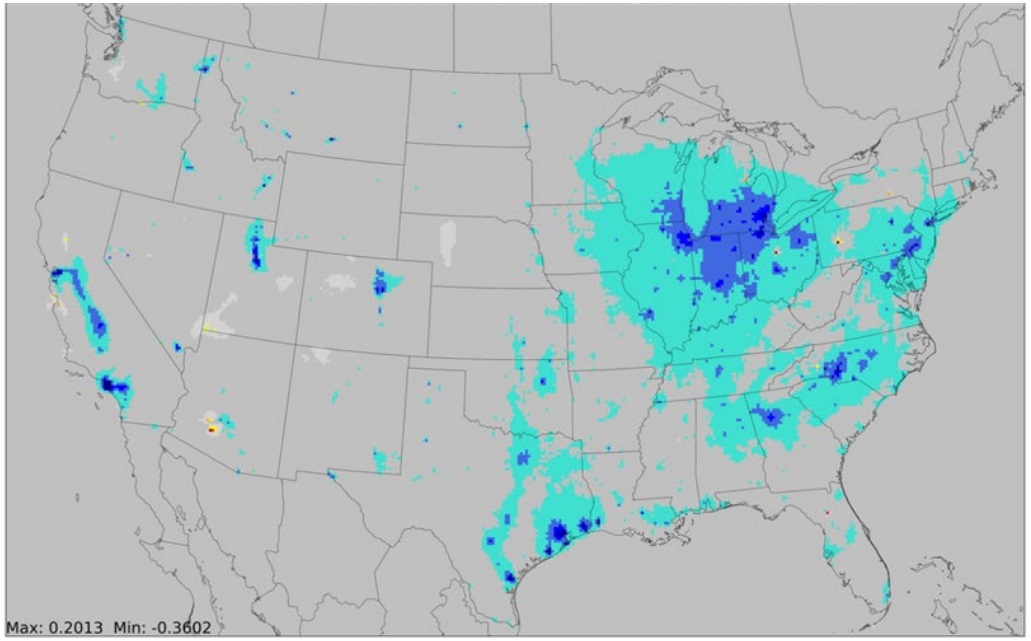
What are the benefits to air quality?

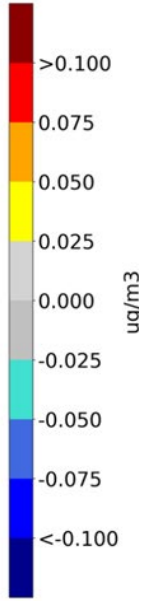
Ozone





PM2.5





- LMDV Rule will reduce ambient PM and ozone across a wide range of geographic areas and with impacts at various scales (near-source, community-level, and regional)
- Overall, this rule will prevent up to 2,500 deaths in 2055 from both PM and Ozone reductions

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Heavy-Duty GHG Vehicle Rule
Which vehicles are affected?



Three Major Vehicle Categories

- Vocational vehicles (-30-60%)
- Day cab tractors (-40%)
- Sleeper cab tractors (-25%)

Air Pollutants

- Performance-based emissions standards for **Greenhouse gases** (GHGs)
- Note: Criteria air pollutants are addressed in the 2023 EPA HD rule; however, additional reductions are anticipated from this rule

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Heavy-Duty GHG Vehicle Rule
How will emissions be reduced?

Non-prescriptive, Technology-neutral, Performance-based Standards

- Manufacturers can meet the standards with a **variety of technologies:**
  - Advanced internal combustion engine vehicles
  - Hybrid vehicles
  - Plug-in hybrid vehicles
  - Battery electric vehicles
  - Hydrogen fuel cell vehicles

- Standards phase-in beginning in 2027 through 2032 and apply to the sales of new heavy-duty vehicles

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Heavy-Duty GHG Vehicle Rule
What are the benefits to air quality?

- Will deliver one billion metric tons of net CO_2 emission reductions between 2027 and 2055 (13% reduction over a no-action scenario)
- Project an increased use of cleaner technologies will decrease criteria pollutants and air toxics from vehicles and refineries
- $13 billion in annualized net benefits to society from climate and public health benefits and savings for truck owners and operators

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Future Work & Research Interests

- Local-Scale Health Benefits*
- Aircraft Plume Rise*
- Proximity Analyses
- Aircraft Lead
- Brake and Tire Wear
- Roadside Vegetation
- Ports Initiative Grants
- Diesel Vehicle Tampering

Local-Scale Health Benefits

Wider-Scale AERMOD Modeling

- Currently looking at the Dallas-Forth Worth area (NCTCOG)
- Traffic activity modeled and run through AERMOD at a very fine spatial resolution
- Evaluating the impacts that capturing the local-scale impacts on air quality will have on health benefits analysis
- Next step will evaluate at other metropolitan areas, then nationally

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Aircraft Plume Rise

AERMOD Modeling Evaluation

- OTAQ, in collaboration with OAQPS and ORD, is planning a monitoring study to evaluate applications of AERMOD near airports:
  - Quantify emissions from landing and takeoff
  - Evaluate model formulations with existing options
  - Inform new model formations related to plume rise
- OTAQ is working with a contractor to identify potential airport, develop the study design, and conduct monitoring (2024-2025)

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Questions?

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