

EPA's Light/Medium-Duty Vehicle
Multipollutant Standards for 2027 and Later:
Proposed Rulemaking

EVE IWG Session #61

April 25, 2023

Overview

- **Background**
- **Proposed Standards for GHG and Criteria Pollutants**
- **Projected Impacts**

Timing

- Administrator signed the NPRM on Tuesday, April 11, 2023
- Two days of public hearings scheduled for May 9 and May 10, 2023
 - To register, please send an email to EPA-LD-hearings@epa.gov
- 60-day public comment period
 - Begins with NPRM publication in the Federal Register

Scope of Vehicle Segments Covered by this Proposal

Increasing Vehicle Weight

Light-Duty



Medium-Duty



Heavy-Duty

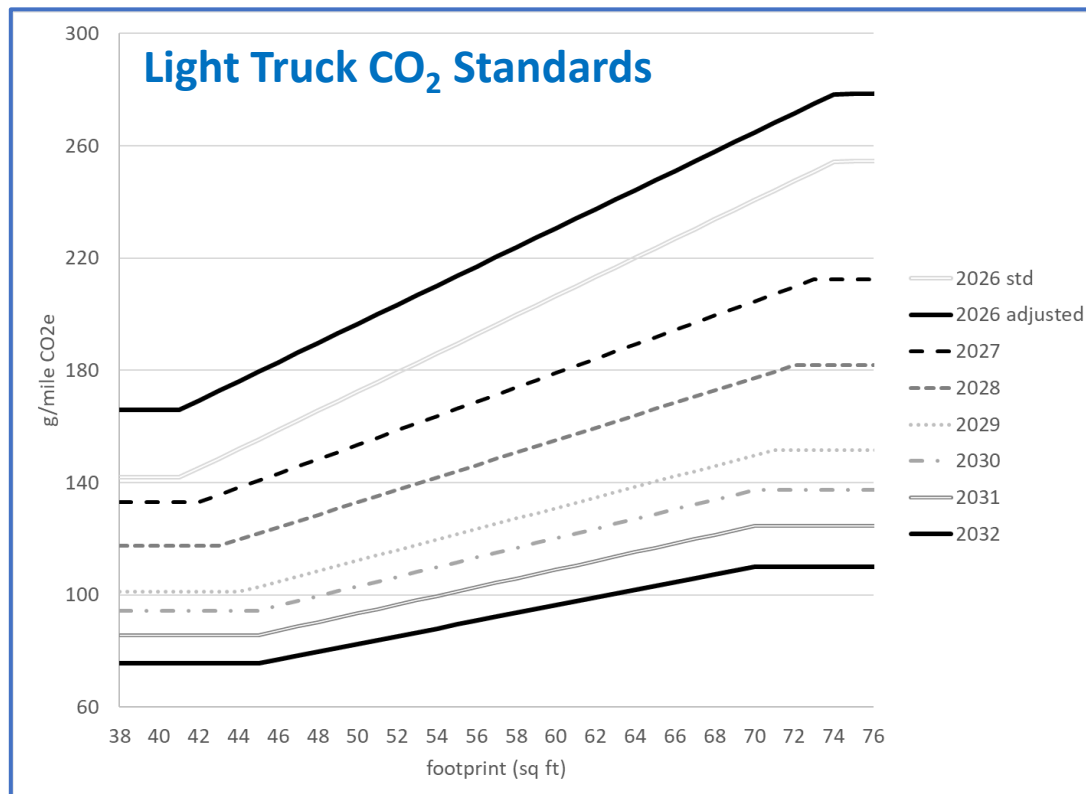
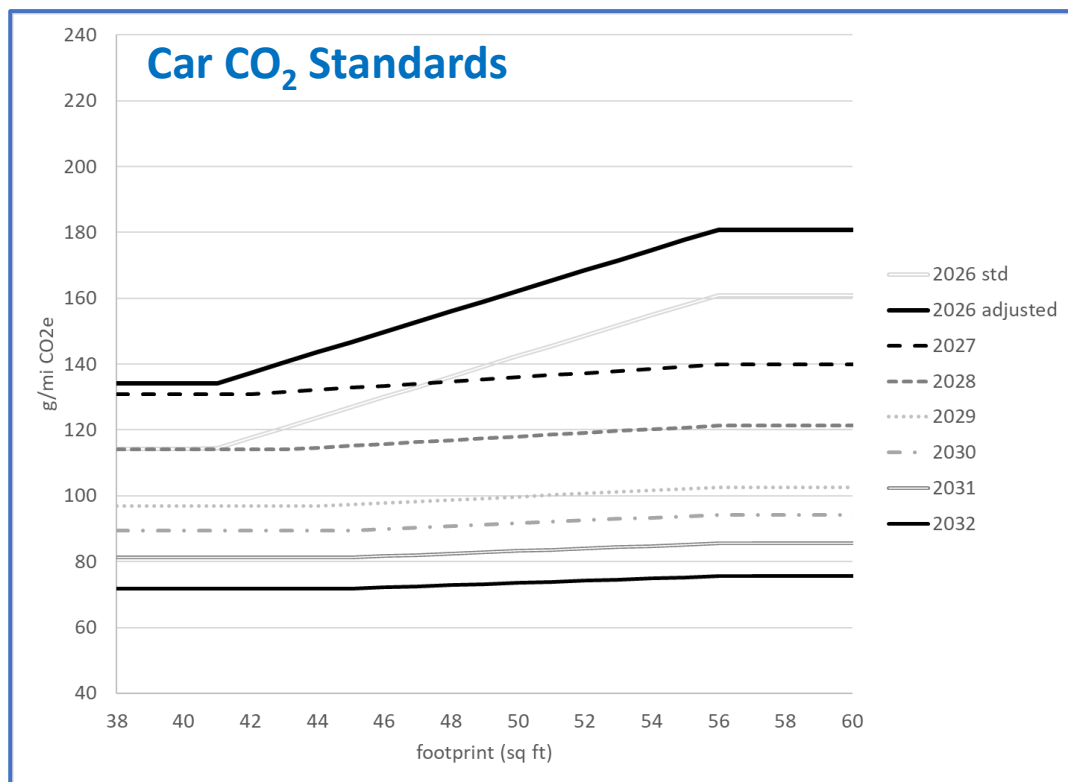


2027+ LMDV NPRM

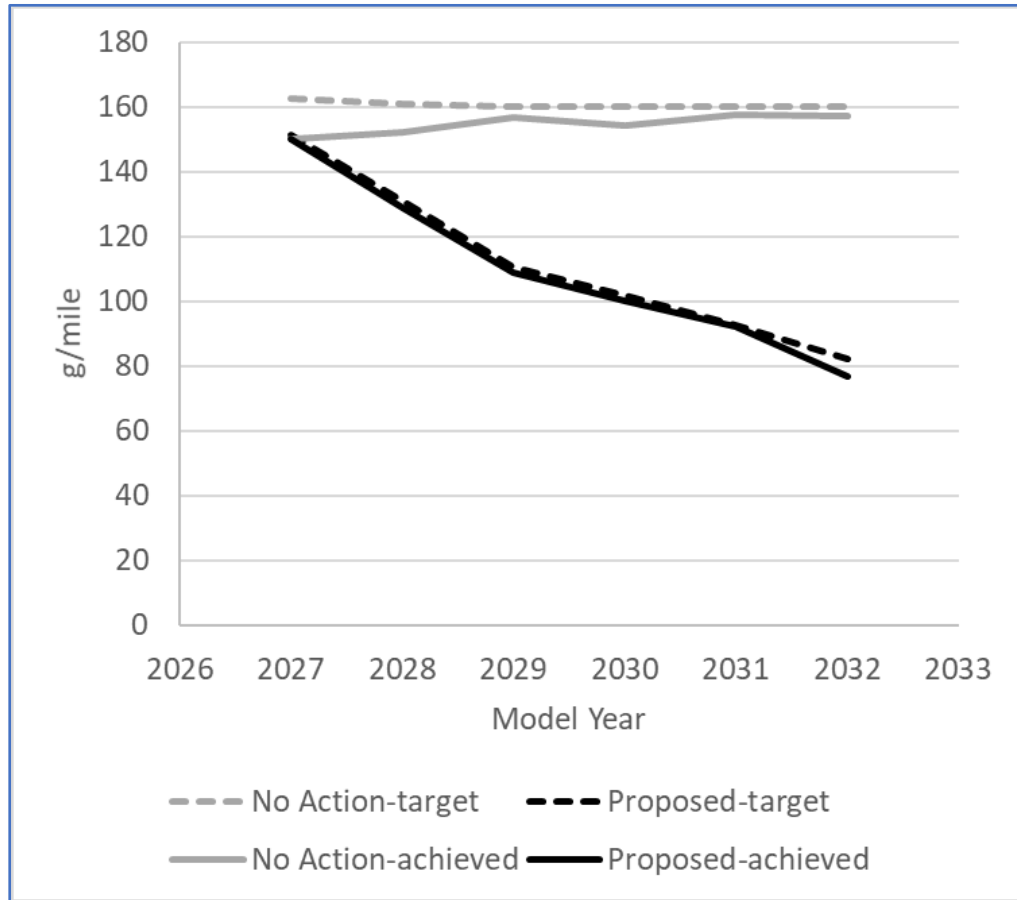
Addressed in EPA's recent HD NOx final rule and recent Phase 3 GHG proposal

Light-duty Proposed CO₂ Standards for 2027-2032

- EPA has updated our assessment of the footprint standards curves to reflect anticipated changes in the vehicle technologies that we project will be used to meet the standards – mainly our projection of BEVs at 0 g/mi compliance value.
- EPA also has assessed ways to ensure future fleet mix changes do not inadvertently provide an incentive for manufacturers to change the size or regulatory class of vehicles as a compliance strategy.
- EPA is proposing to revise the footprint standards curves to flatten the slope of each curve and to narrow the numerical stringency difference between the car and truck curves to address concerns observed within the current program (i.e., shifts from cars to truck class and potential for upsizing of vehicles)
- Note: as discussed on a future slide, EPA is proposing changes to the air conditioning and off-cycle credit programs which affect the transition from 2026 to 2027 standards – as represented by the “2026 adjusted” curves shown here



Light-duty Projected Fleetwide CO₂ Targets, 2027-2032



Model Year	Cars CO ₂ (g/mile)	Trucks CO ₂ (g/mile)	Fleet CO ₂ (g/mile)
2026 <i>adjusted*</i> (base year)	152	207	186
2027	134	163	151
2028	116	141	131
2029	99	119	111
2030	91	110	102
2031	82	100	93
2032 and later	73	89	82

*explained on slide 11

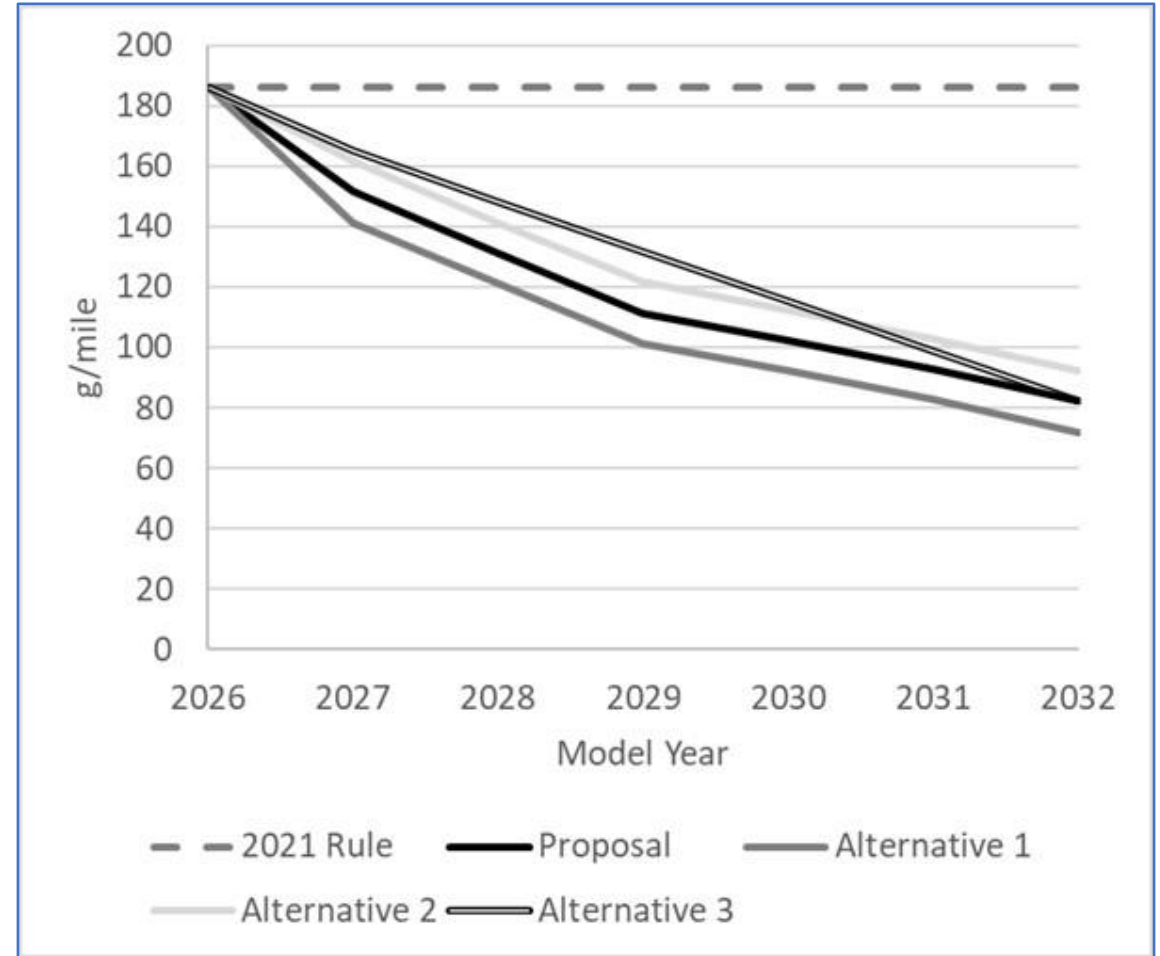
- MY 2032 projected fleet target represents **56 percent reduction overall** from MY 2026 targets
- Annual average projected targets decrease **~13 percent per year** from 2026 through 2032
- EPA is seeking comment on extending standards through MY 2035, for both LDV and MDVs

Alternatives

- EPA is requesting comments on 3 alternative CO₂ standards stringencies
 - Alt. 1 is more stringent
 - Alt. 2 is less stringent
 - Alt. 3 is less stringent during the phase in years

LDVs: Projected Fleet Targets for Proposed Standards and Alternatives (combined fleet)

Model Year	Proposed Stds CO ₂ (g/mile)	Alternative 1 CO ₂ (g/mile)	Alternative 2 CO ₂ (g/mile)	Alternative 3 CO ₂ (g/mile)
2026 (adjusted)	186	186	186	186
2027	152	141	162	165
2028	131	121	141	148
2029	111	101	122	132
2030	102	92	112	115
2031	93	83	103	99
2032 and later	82	72	92	82
% reduction vs. 2026	56%	61%	50%	56%



Light-Duty Projected BEV Penetration under Proposed Standards

Total Fleet

	2027 BEVs	2032 BEVs
No-Action	27%	39%
Proposal	36%	67%

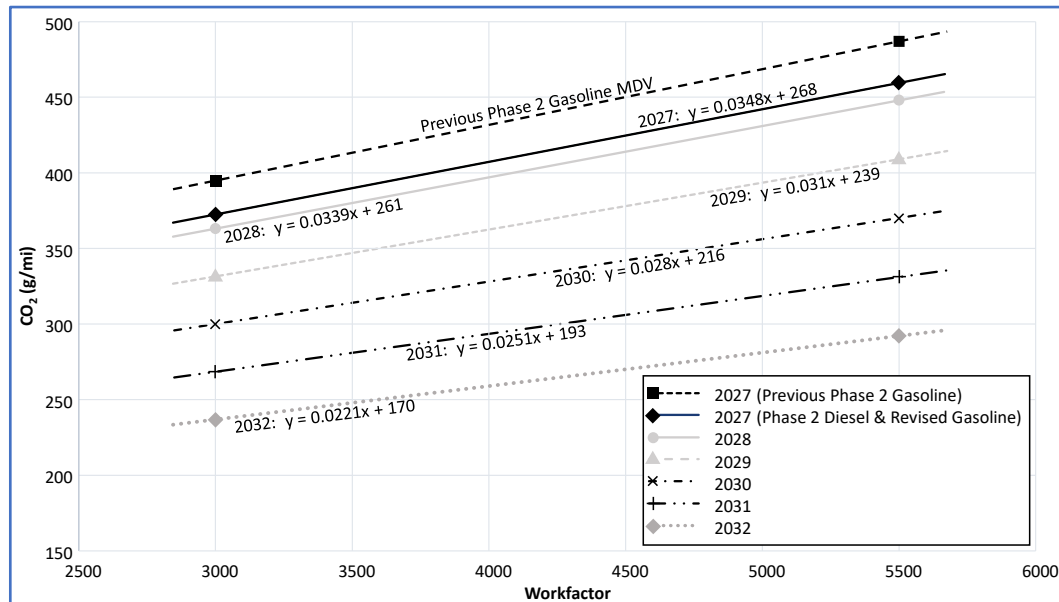
By Body Style, in response to EPA Proposal

	2027 BEVs	2032 BEVs
Sedan	45%	78%
CUV/SUV	38%	62%
Pickups	11%	68%

- Under the proposed performance-based standards, manufacturers can choose any mix of technologies to meet the standards; these are EPA’s projections based on our modeling assumptions of a low-cost pathway
- EPA did not explicitly model Plug-in Hybrid Electric Vehicles (PHEVs) for the proposal, though we expect to do so for the final rule
- Note: While the BEV penetration in 2026 was projected to be 17% under the EPA 2021 final rule, this level has grown to 27% in 2027 under the current No-Action case, largely attributed to the impact of the IRA

Medium-Duty Vehicle (MDV) CO₂ Standards

MDV Work Factor-Based Standards for MYs 2027-2032



Projected CO₂ Targets for Proposed MDV Standards

Model Year	Vans CO ₂ (g/mile)	Pickups CO ₂ (g/mile)	Combined CO ₂ (g/mile)
2027	399	509	471
2028	370	472	437
2029	341	436	403
2030	312	399	369
2031	284	363	336
2032 and later	256	328	303

- EPA proposes to continue a “work factor” attribute for MDVs (8,501 to 14,000 GVWR) as best suited to commercially-oriented vehicles, accounting for a combination of payload, towing and 4-wheel drive capability
- Proposing increasingly stringent WF-based standards year over year from MY 2027 to MY 2032
 - Same standard applies for both gasoline and diesel
- MY 2032 standards represent a **37 percent reduction** compared to the current MY 2026 standards

Medium-Duty Projected BEV Penetration under Proposed Standards

	2027	2028	2029	2030	2031	2032
Vans	35%	55%	73%	92%	97%	98%
Pickups	7%	1%	3%	4%	15%	19%
Total	17%	20%	28%	34%	43%	46%

- EPA projects **~46% BEV penetration in 2032**
 - Commercial vans projected to be **98% BEVs** by 2032
- As with light-duty, we did not explicitly model PHEVs for the proposal but expect to do so for the final rule

Proposed Changes to Optional GHG Credit Provisions

- **Off-cycle CO₂ credits**
 - This program has largely served its intended purpose, and going forward EPA intends to phase out this credit generation option
 - Reduce the menu cap each year with final phase-out in 2031 (i.e., 10/8/6/3/0 g/mi from 2027-2031)
 - Menu credits available to internal combustion engine (ICE) vehicles only (not ZEVs)
 - Eliminate other two pathways (5-cycle based and public process) beginning in 2027 as these pathways have seen little use and have a small impact
- **Air conditioning leakage credits**
 - In December 2022, in response to the American Innovation in Manufacturing (AIM) Act, EPA proposed to restrict the use of high GWP refrigerants such as HFCs in vehicle applications. The new restriction on refrigerant use, if finalized as proposed, would be effective in MY 2025 for LDVs and MY 2026 for MDVs
 - Therefore, in this vehicle standards proposal, beginning in MY 2027 EPA is proposing to sunset the existing AC leakage credits for LDVs and the existing leakage standard for MDVs
 - In our assessment of standards stringency, we have adjusted for the elimination of the AC leakage credits, as well as for the phase-down of the off-cycle credits menu.
- **Air conditioning efficiency credits**
 - Continue existing menu-based credits, but for ICE vehicles only (not BEVs)
- **Other Key Notes:**
 - No proposed changes to existing CO₂ averaging, banking and trading provisions (e.g., 5-year credit carry-forward, and 3-year deficit carry-forward remain in effect).
 - We are not including incentive multipliers for any technologies.
 - Consistent with the 2023 – 2026 program, for compliance determinations no upstream emissions considered for BEVs, PHEVs, FCVs.

Criteria Pollutant Proposed Standards

- Non-methane organic gases (NMOG) plus nitrogen oxides (NO_x) fleet-average standards
 - Proposing standards that phase-in through 2032
 - Light-duty: 60% reduction in current standard by 2032
 - Medium-duty: 66-76% reduction in current standard by 2032
 - Cold temp (-7°C) NMOG+NO_x standards ensure emissions control over broad range of operating conditions
- Particulate matter (PM) per-vehicle standards
 - For both light-duty and medium-duty vehicles, proposing to phase-in a 0.5 mg/mi PM standard for three test cycles, including a cold temperature (-7°C) test
 - Projected to reduce tailpipe PM from ICE vehicles by over 95%, primarily through application of gasoline particulate filters
- Other Proposed Criteria Pollutant Specific Program Provisions
 - Elimination of commanded enrichment for power and component protection
 - Light-duty vehicle NMOG+NO_x provisions aligned with CARB Advanced Clean Cars II program
 - Revised CO and HCHO per-vehicle standards, including at cold temperature (-7°C)
 - High GCWR vehicles comply with HD engine criteria pollutant standards instead of LD chassis standards
 - Medium-duty incomplete vehicle refueling requirements same as for complete vehicles

Other Proposed Provisions

- **PHEV utility factor (UF)**
 - Proposing to reduce the UF used to weight electric vs. gasoline operation (charge depleting vs. charge sustaining modes) in a manufacturer's compliance calculation, based on recent real-world data of PHEV operation
- **Battery durability and warranty**
 - Proposing new durability requirements for BEVs and PHEVs
 - Proposing to include batteries under existing emission warranty provisions
- **Small volume manufacturer (SVM) provisions (annual sales of <5,000 vehicles)**
 - Proposing to phase-out the current SVM alternative standards such that SVMs comply with the primary program standards by 2032
- **Small businesses**
 - Proposing to continue exemption for small entities from GHG standards and battery durability/warranty; proposing to reduce vehicle limits for independent commercial importers
 - Proposing limited exemptions to testing requirements from criteria emissions standards

Per-Vehicle Costs (Relative to the No Action Case, 2020 dollars)

Light-Duty Vehicles

	2027	2028	2029	2030	2031	2032
Cars	\$249	\$102	\$32	\$100	\$527	\$844
Light-duty Trucks	\$891	\$767	\$653	\$821	\$1,100	\$1,385
Total	\$633	\$497	\$401	\$526	\$866	\$1,164

Medium-Duty Vehicles

	2027	2028	2029	2030	2031	2032
Vans	\$322	\$658	\$711	\$1,184	\$1,592	\$1,939
Pickups	\$386	\$31	\$67	\$374	\$603	\$1,706
Total	\$364	\$249	\$290	\$654	\$944	\$1,784

- Total average per-vehicle costs in MY 2032 (compared to no-action case):
 - \$1,200 for LDV
 - \$1,800 for MDV
- This cost represents the cost to the manufacturer – it does not represent the projected vehicle price for the consumer and thus does not reflect IRA EV purchase incentives

Costs, Benefits, and Net Benefits

Present Values in 2027 for Calendar Years 2027 through 2055 (Billions of 2020 dollars) – GHG and Criteria Pollutants

	3%	7%
	Discount Rate	Discount Rate
Vehicle Technology	280	180
Repair & Maintenance Savings	580	280
Fuel Savings less EVSE Port Costs	770	380
Benefits*	570	370
Net Benefits	1,600	850

* EPA estimates annualized net benefits to be in the range of \$60 to \$85 billion. Climate benefits included here use the SC-GHG at 3% discount rate.

Impacts on Emissions

- This proposal would result in **7.3 billion metric tons of CO₂ emissions reductions** considering both upstream and downstream through 2055
- Criteria pollutant emission reductions in 2055 (relative to No Action Case, and considering both upstream and downstream emissions):

Pollutant	Tons Reduced	Percent Reduction
PM2.5	15,000	35%
NOx	66,000	41%
VOC	220,000	50%
SOx	12,000	42%

- In addition, the proposal would reduce vehicle emissions of air toxics

Links to Rulemaking

Overall Rulemaking:

<https://www.epa.gov/regulations-emissions-vehicles-and-engines/proposed-rule-multi-pollutant-emissions-standards-model>

OMEGA Modeling:

<https://www.epa.gov/regulations-emissions-vehicles-and-engines/optimization-model-reducing-emissions-greenhouse-gases#omega-2.1.0>