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THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Benefits of adopting California's Heavy-Duty Vehicle Omnibus Standards and GHG Phase II trailer standards in New York State

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In July 2020, fifteen states and the District of Columbia, who together represent roughly 35% of the U.S. medium- and heavy-duty (M/HD) market, signed a Memorandum of Understanding (MOU), committing themselves "to work together to foster a self-sustaining market for zero-emission medium- and heavy-duty vehicles."[1] The signatories of this Multi-State MOU share a goal of 30% M/HD zero-emission vehicle (ZEV) sales by 2030 and 100% ZEV sales no later than 2050. The MOU further recognizes the importance of "low-NOx heavy-duty trucks to reduce harmful emissions of NOx, particulate matter, and toxic air contaminants that adversely impact public health." Taken together, the combined actions of these signatories have the potential to accelerate the national transition toward the cleanest combustion engines and to rapidly expand the fleet of zero-emission M/HD vehicles.

The State of California has adopted three regulations that are cornerstones in the state's effort to reduce emissions from heavy-duty vehicles and meet the targets of the M/HD ZEV MOU. If adopted by other signatories, these regulations could assist states in achieving the goals of the M/HD ZEV MOU: the Advanced Clean Trucks (ACT) rule, which requires the sale of at least 30% zero-emission trucks by 2030; the Greenhouse Gas Phase II (GHG Phase II) rule, which requires reductions in GHG emissions from heavy-duty vehicles and trailers; and the Heavy-Duty Vehicle Omnibus rule, which requires a 90% reduction in NOx emissions from model year 2027 engines.

The ICCT commissioned Sonoma Technology, Inc. (STI) in 2022 to estimate the cumulative avoided nitrogen oxides (NO_x), fine particulate matter ($PM_{2.5}$) and well-to-wheel carbon dioxide equivalent (WTW CO_2e) emission reductions expected from implementation of these rules beginning in 2026 in New York. These results update estimates first published in 2021.[2] This revised analysis includes lower estimates of vehicle electricity consumption to account for the fact that ZEVs are more efficient on a

[1] The signatories are California, Colorado, Connecticut, Hawaii, Maine, Maryland, Massachusetts, New Jersey, New York, North Carolina, Oregon, Pennsylvania, Rhode Island, Vermont, Washington, and the District of Columbia, "Multi-State Medium- and Heavy-Duty Zero Emission Vehicle Memorandum of Understanding," (2020, July 14), https://www.nescaum.org/documents/multistate-truck-zev-governors-mou-20200714.pdf. Additional signatories since 2020 are Virginia, Nevada, and Quebec. STI did not model results for California or Hawaii, but did model results for non-signatories including Delaware, New Mexico, and Illinois.

[2] Jeff Houk, Joey Huang, Shih Ying Chang, and Doug Eisinger, "Benefits of state-level adoption of California medium- and heavy-duty vehicle regulations," (Washington, DC: ICCT, 2021), https://theicct.org/publications/state-level-hdv-emissions-reg-oct21

tank-to-wheel basis than conventional vehicles, updates to upstream emission factors taken from GREET2021, and adjustments to account for energy transmission losses from EVSE equipment. The full spreadsheet analysis with detailed emissions and vehicle population projections is available on the ICCT website.[3] New York has already adopted the ACT program, and it is now reflected in the business as usual (BAU) case. New York's BAU case also includes the benefits of state-specific ZEV goals, including 1) 100% M/HD ZEV sales beginning in 2045, 2) 100% ZEV school bus sales beginning in 2027 (with 100% in-use ZEV school buses by 2035), and 3) goals to reach 100% ZEV transit buses between 2035 and 2040 for six major NYS transit agencies. From this baseline, this updated analysis presents the benefits of the Omnibus rule and the GHG Phase II trailer requirements.

Table 1 presents the estimated M/HD truck and bus population in New York by powertrain type, conventional or electric, between 2025 and 2050. These projections include all ZEVs, regardless of whether they are produced to meet the requirements of the ACT program, the GHG Phase II program, or New York's specific programs. The summary spreadsheet prepared for this project includes additional projections reflecting the ACT program individually, and also provides more detailed projections by vehicle weight class.

Table 1. Effect of New York adoption of the Advanced Clean Trucks Program and a 2045 100% ZEV sales requirement on M/HD vehicle population, by fuel type, 2025–2050

Year	M/HD vehicle population		
	Internal combustion engine vehicles	Zero emission vehicles	Total
2025	649,752	20,858	670,610
2030	659,278	51,062	710,340
2035	635,815	120,505	756,320
2040	609,296	193,034	802,330
2045	561,500	286,800	848,300
2050	346,802	547,488	894,290

Note: The M/HD vehicle category includes all vehicles with a Gross Vehicle Weight Rating of 8500 pounds or higher. In accordance with state law, these estimates reflect 100% zero-emission sales of new medium- and heavy-duty trucks as of 2045.

Table 2 shows the estimated cumulative emissions avoided between 2020 and 2050 in New York compared to the Business as Usual (BAU) emissions scenario. These results reflect the benefits of all M/HD ZEVs following California's approach to estimating in-use fleet penetration under the ACT program without adjustments to account for vehicles purchased out-of-state, ZEVs that may migrate out-of-state over time, or ZEVs that would have been produced to meet other requirements like the federal GHG Phase II standards. For estimates with these adjustments, which enable direct comparisons to California Air Resources Board ACT benefits estimates, please refer to the spreadsheet estimates published in 2021.

[3] Available at https://theicct.org/benefits-ca-multi-state-reg-data/

Table 2. Cumulative M/HD emissions benefits in New York compared to BAU, 2020–2050

Program	Cumulative emissions reduction	
	NO_x (U.S. tons)	CO_2e (MMT*)
HDV omnibus	(72,840)	N/A
GHG Phase II trailers	N/A	(9.96)
HDV omnibus + GHG Phase II trailers	(72,840)	(9.96)

*million metric tons

Note: Benefits are not estimated for $PM_{2.5}$ because the Omnibus and GHG Phase II trailer programs do not impact that pollutant.

Figures 1 and 2 illustrate the emissions trends in New York over the timeframe of the analysis.

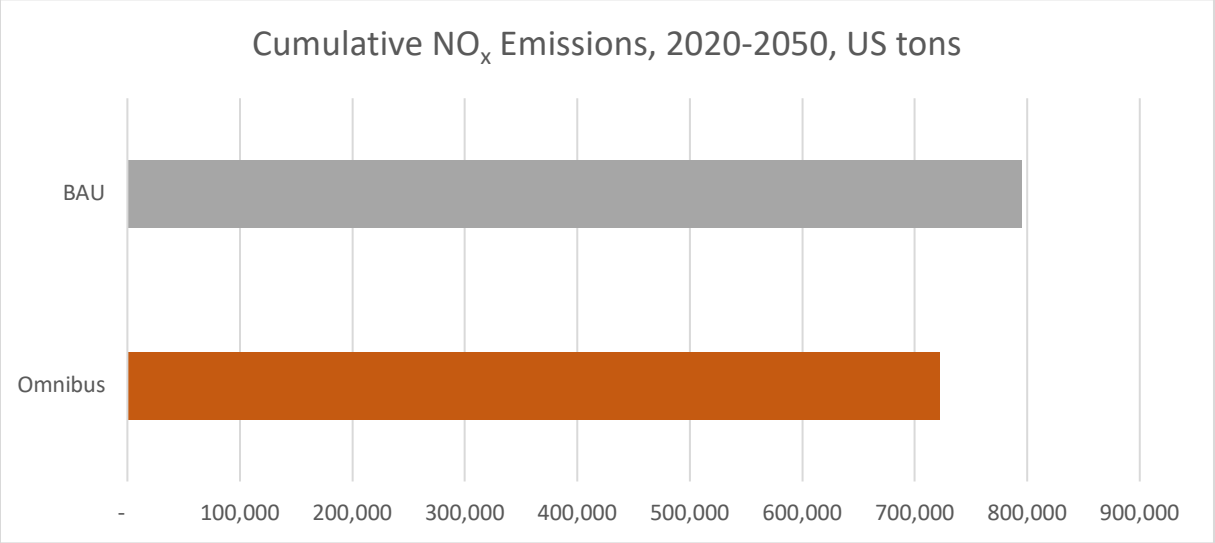

Figure 1. Tank-to-wheel HDV NOx emissions by scenario 2020–2050

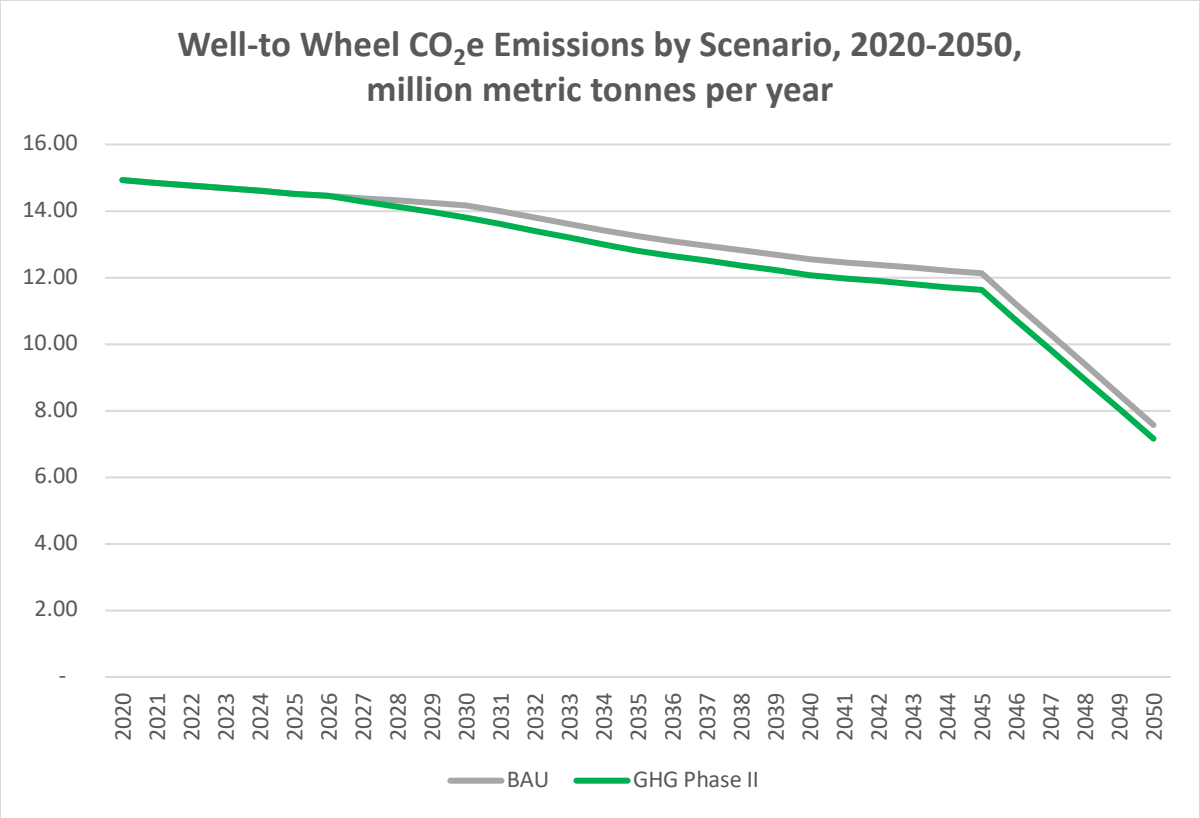

Figure 2. Well-to-wheel HDV CO2 emissions by scenario 2020–2050

Related Publications

Title: Benefits of state-level adoption of California medium- and heavy-duty vehicle regulations
Authors: Jeff Houk, Joey Huang, Shih Ying Chang, and Doug Eisinger for Sonoma Technology
Download: https://theicct.org/publications/state-level-hdv-emissions-reg-oct21

Title: Update: Benefits of adopting California medium- and heavy-duty vehicle regulations under Clean Air Act Section 177
Authors: Ray Minjares
Download: https://theicct.org/publication/state-level-hdv-emissions-reg-fs-dec21/

Supporting files and detailed estimates are available, by state, year, rule, vehicle category, and pollutant are also posted here: https://theicct.org/benefits-ca-multi-state-reg-data/

Contact: Ray Minjares, ray@theicct.org