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Benefits of adopting California medium- and heavy-duty vehicle regulations under Clean Air Act Section 177

BACKGROUND

In recent years, the State of California has adopted key regulations to reduce greenhouse gas and criteria pollutant emissions from medium- and heavy-duty vehicles. The Advanced Clean Trucks (ACT) rule requires the sale of at least 30% zero-emission trucks by 2030; the HDV Omnibus rule requires a 90% reduction in NO_x emissions from Model Year 2027 engines; and the California Phase 2 greenhouse gas rule sets standards to improve the efficiency of tractor-trailers.

Section 177 of the U.S. Clean Air Act (CAA) allows U.S. states to adopt California regulations that meet or exceed federal standards provided two conditions are met: (1) such standards are identical to California standards and (2) the state adopts such standards at least two years before commencement of any model year granted a waiver from federal requirements by the U.S. Environmental Protection Agency Administrator. This year, several Section 177 states have proposed regulations to adopt California's ACT rule.[1] These states are members of a group of fifteen states and the District of Columbia who signed a Memorandum of Understanding in 2020 to adopt market-enabling mechanisms and to consider regulatory approaches to spur the market for zero emission medium- and heavy-duty vehicles. [2]

1 Oregon adopted the ACT and HDV Omnibus rules in November 2021. New York, New Jersey, Washington, and Maine have initiatied rulemakings to adopt the ACT. New York state has also adopted legislation setting a goal of 100% zero emission heavy-duty vehicle sales by 2045. See https://www.governor.ny.gov/news/advance-climate-week-2021-governor-hochul-announces-new-actions-make-new-yorks-transportation.

2 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, 2020. https://www.nescaum.org/documents/multistate-truck-zev-governors-mou-20200714.pdf. In September 2021 the Province of Quebec joined these US states as the first international signatory. https://www.nescaum.org/documents/quebec-statement_9-22-2021.pdf. STI did not model results for California, Hawaii, or Quebec. Results for New York State are available at https://theicct.org/publications/nys-hdv-regulation-benefits-may2021

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To understand the impact these regulations could have on medium- and heavy-duty vehicle emissions in in these states and the District of Colombia, the ICCT commissioned Sonoma Technology, Inc. (STI) to estimate the cumulative avoided nitrogen oxides (NOx), fine particulate matter ($PM_{2.5}$) and well-to-wheel carbon dioxide equivalent (WTW CO_2e) emission reductions beginning in 2025.

KEY FINDINGS

Table 1 estimates the emission reduction benefits of the zero-emission vehicles in the state where they were first sold, whether or not the vehicle remains registered in the state through the end of its life. All sales that comply with ACT requirements are credited to the ACT, regardless of whether those zero-emission vehicles would have been sold without such regulation.

Table 1. Cumulative emissions avoided with 2025 implementation of ACT, HDV Omnibus, and CA Phase II GHG tractor-trailer standards (All EV Scenario)

State	2020–2040			2020–2050		
	NO_x	$PM_{2.5}$	WTW CO_2e	NO_x	$PM_{2.5}$	WTW CO_2e
Colorado	32,600	213	16.24	88,460	546	53.52
Connecticut	7,320	41	3.51	20,410	126	9.91
D.C.	1,640	11	0.37	4,600	34	1.46
Massachusetts	26,950	196	18.63	71,960	549	54.49
Maryland	36,480	233	5.73	99,760	613	13.51
Maine	10,410	66	6.38	28,770	182	18.79
North Carolina	52,780	306	12.29	142,620	790	31.14
New Jersey	45,220	303	32.45	125,380	844	95.95
Oregon	45,910	321	28.98	125,690	829	92.42
Pennsylvania	84,480	479	14.64	231,140	1,328	34.38
Rhode Island	4,740	25	1.96	13,080	76	5.59
Vermont	3,010	16	1.31	8,190	44	3.70
Washington	44,080	285	31.17	122,350	794	93.04

Notes: The 'All EV' scenario counts the emission reduction benefits of all new medium- and heavy-duty electric vehicles purchased in the state and does not count the benefits of electric vehicles operating in the state but purchased out-of-state. CO_2e emissions are given in million metric tons, while PM and NOx emissions are given in short tons. Colorado, Massachusetts, New York, New Jersey, Oregon and Washington results reflect net zero carbon goals for electricity generation.

States wishing to understand how their results compare to California should refer to Table 2. These estimates reflect the methodology applied by Air Resources Board staff in support of the California rulemaking for ACT. As a consequence, these results do not count the emission reduction benefits of zero-emission vehicles when registration transfers out of state. These calculations also do not credit the ACT for vehicles sold in compliance with GHG Phase II emission standards.

Table 2. Cumulative emissions avoided if vehicles remain registered in-state with 2025 implementation of ACT, HDV Omnibus, and CA Phase II GHG tractor-trailer standards (ACT EV Scenario)

State	2020–2040			2020–2050		
	NO_x	$PM_{2.5}$	WTW CO_2e	NO_x	$PM_{2.5}$	WTW CO_2e
Colorado	20,070	71	7.25	53,360	205	23.05
Connecticut	4,450	9	1.63	12,230	48	4.49
D.C.	1,100	3	0.20	3,010	13	0.74
Massachusetts	16,730	71	8.12	44,050	233	24.87
Maryland	22,780	78	4.01	60,620	240	8.78
Maine	6,550	22	2.76	17,650	74	8.17
North Carolina	32,830	100	7.28	86,160	295	17.00
New Jersey	28,470	106	12.85	77,080	333	40.24
Oregon	28,570	110	12.40	76,720	324	39.20
Pennsylvania	52,990	162	10.30	140,770	515	22.37
Rhode Island	3,010	6	0.90	8,030	24	2.51
Vermont	1,930	3	0.61	5,090	18	1.69
Washington	27,260	95	12.84	74,280	312	30.05

Notes: The 'ACT EV Scenario' counts the emission reduction benefits of all new medium- and heavy-duty electric vehicles registered in the state but does not count the benefits of electric vehicles operating in the state but purchased out-of-state, the benefits of electric vehicles sold in compliance with the federal Phase 2 greenhouse gas standard, or the benefits of electric vehicles first sold in the state that migrate out-of-state. CO_2e emissions are given in million metric tons, while PM and NO_x emissions are given in short tons. Colorado, Massachusetts, New York, New Jersey, Oregon and Washington results reflect net zero carbon goals for electricity generation.

PUBLICATION DETAILS

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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.

(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

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communications@theicct.org

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