

# MEMO

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**To:** CT Department of Environmental Protection  
**From:** Environment Northeast, Clean Water Action, Connecticut Coalition for Environmental Justice, Connecticut Fund for the Environment  
**Date:** November 10, 2005  
**Re:** School Bus Emissions Reduction Straw Proposal

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Through Special Act 05-7, the Connecticut General Assembly directed the Connecticut Department of Environmental Protection to develop a diesel emission reduction plan containing:

*“An implementation strategy, and an estimate regarding the cost and benefits to the state or municipalities of implementing such strategy, to maximize, not later than December 31, 2010, diesel particulate matter emission reductions from school buses and to prevent by said date diesel particulate matter engine emissions from entering the passenger cabin of the buses;”*

To this end, we offer the following policy recommendation to the CT DEP for consideration.

Proposed Policy Summary:

- Establish a minimum “floor” level of emission reductions for all full-sized school buses operating in Connecticut; and
- Create incentives for school districts to go beyond required minimum emission reductions by introducing newer, cleaner engines, advanced diesel retrofit technology, or cleaner fuels.

Element #1 – Requirements<sup>1</sup>:

- By September 1, 2007, no school bus with an engine model year 1993 or older may be used to transport school children in Connecticut;
- By September 1, 2008, all front-engine school bus engines of model year 2006 or older must be retrofit with a closed crankcase filtration system;
- By September 1, 2010, all full-sized school buses transporting children in Connecticut must either:
  - Be equipped with a Level 1, Level 2, or Level 3<sup>2</sup> CARB/EPA verified emission control technology; OR
  - Be equipped with an engine from MY2007 or newer; OR
  - Use an alternative fuel verified by CARB/EPA to reduce particulate matter (PM) emissions by at least 25% (equivalent to a Level 1 emission control technology).
- School districts and school bus owners must permit existing contracts to be re-opened to negotiate compliance with requirements.

Element #2 – Implementation and Outreach:

CT DEP and CT DAS develop state procurement contracts for a) the purchase of new buses compliant with MY2007 emission standards, b) tailpipe emission control retrofits, and c) closed crankcase filtration systems.

- Contracts must be available to municipalities and private school bus operators, provided they can demonstrate that the affected school bus is/will be in service in Connecticut;

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<sup>1</sup> Requirements presume that by late 2006, all on-road diesel fuel will be ULSD (per federal law).

<sup>2</sup> California Air Resources Board, Diesel Emission Control Strategies Verification: Level 1  $\geq$  25% reduction PM, Level 2  $\geq$  50% reduction PM, Level 3  $\geq$  85% reduction PM.

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- Contracts must be available through CT DAS's e-Procurement website, in a category that clearly identifies the product to municipalities and private school bus operators;
- At least one contract must be developed for each CARB emission control device verification level: Level 1, Level 2, and Level 3;
- At least one contract must be developed for a closed crankcase filtration system.
- CT DEP and CT DAS develop an outreach plan and materials for educating school districts and bus companies about the new requirements and paths to compliance.

### Element #3 – Financing and Incentives:

- Effective immediately, the state offers a sales tax on new bus purchases up to \$4,000 per bus, but only for model years 2007-2010, natural gas or diesel. Waiver sunsets September 1, 2010;
- Effective immediately, for school bus model years 1994-2005, the state provides incentive to school bus owners for the purchase and installation of closed crankcase filtration system (CCFS) retrofit device. The per-unit incentive shall not exceed \$250. Incentive sunsets September 1, 2008.
- Effective immediately, for school bus model years 1994-2005 only, the state provides incentive to school bus owners for the purchase and installation of any CARB/EPA-verified emission control retrofit device. In 2006-2007, the per-unit incentive shall not exceed \$1000 for a Level 1 device, \$2000 for a Level 2 device, and \$3000 for a Level 3 device. Incentive levels may be re-evaluated annually, with the goal of maintaining competition in the market for retrofit devices. Incentives sunset September 1, 2010.
- To receive incentive from the state, school bus owners must submit a form to the authorized state agency containing the bus model and year, engine model and year, VIN number, receipt for the retrofit device, and date installed for every eligible bus. Bus owners must also certify that newly purchased or retrofitted buses will operate in the state of Connecticut for a minimum of four years.
- Potential incentive funding streams may include but are not limited to tax credits, appropriations, and Special Transportation Fund revenues and should be available to both private and public school bus owners.

### Element #4 – Reporting, Compliance, and Enforcement:

- Reporting requirements should be amended as a supplemental to existing annual registration requirements due to CT DMV prior to each school year. Documentation of compliance should include bus model and year, engine model and year, type of retrofit, date installed, date and amount of state rebate received. For school buses complying with the use of a clean fuel (at least Level 1 CARB/EPA-verified) documentation must include clean fuel receipts (each delivery);
- Supplement mandatory annual safety inspection with emission control compliance inspection;
- Establish civil penalties for non-compliance and additional penalties for making false claims. Penalty money should be directed into a CT Diesel Risk Mitigation Fund.

### Element #5 – Priority Community Provision:

- When penalty funds, state SEP funds, federal funds, or funds from other state or non-state sources become available, these should be first allocated toward further offsetting costs of achieving “best available” emissions control in “priority communities.”
  - The “best available” standard is attained by all new buses (MY2007 and newer) and by diesel buses retrofit with Level 3-verified diesel particulate filters and closed crankcase filtration systems. A clean alternative fuel (such as natural gas) could also achieve this standard;
  - “Priority communities” (to be identified by the CT DEP) are CT communities that have high levels of ambient air pollution and high incidence of childhood respiratory impacts.

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Estimated Potential Costs and Benefits to State:

- Costs/Benefits depend on the compliance decisions made. The following chart outlines 6 potential scenarios, with varying selection rates of the lowest cost and lowest benefit option (Level 1 DOC + CCFS retrofit) and the highest cost and highest benefit option (new bus, MY2007 and beyond). Costs and benefits of actual implementation scenarios that may include Level 2 and Level 3 retrofit selections will fall within the range below. Assumptions:
  - 5500 full-sized diesel school buses<sup>3</sup>
  - Average annual bus mileage = 18,000 miles<sup>4</sup>
  - Cost to state of Diesel Oxidation Catalyst (DOC) incentive = \$1000
  - Cost to state of Closed Crankcase Filtration System (CCFS) incentive = \$250
  - Cost to state of New Bus incentive = \$4000 (lost state sales tax revenue)
  - Uncontrolled bus PM emission rate = 0.17 g/mi<sup>5</sup>
  - Bus with DOC + CCFS retrofit PM emission rate = 0.1105 g/mi (35% reduction)
  - New bus, MY2007 and beyond, emission rate = 0.017 g/mi (90% reduction)

	L1 retrofit (DOC/CCFS) selection	New bus selection	DOC Cost	CCFS Cost	New Bus Cost	Total Program Cost	Annual PM Benefit (tons/year)
Scenario 1	100%	0%	\$5,500,000	\$1,375,000	\$0	<b>\$6,875,000</b>	<b>6.49</b>
Scenario 2	80%	20%	\$4,400,000	\$1,100,000	\$4,400,000	<b>\$9,900,000</b>	<b>8.53</b>
Scenario 3	60%	40%	\$3,300,000	\$825,000	\$8,800,000	<b>\$12,925,000</b>	<b>10.57</b>
Scenario 4	40%	60%	\$2,200,000	\$550,000	\$13,200,000	<b>\$15,950,000</b>	<b>12.62</b>
Scenario 5	20%	80%	\$1,100,000	\$275,000	\$17,600,000	<b>\$18,975,000</b>	<b>14.66</b>
Scenario 6	0%	100%	\$0	\$0	\$22,000,000	<b>\$22,000,000</b>	<b>16.7</b>

- The primary beneficiaries of this projected 6.49-16.7 ton annual PM reduction would be school children and bus drivers. Several studies have found that fine particulate matter levels inside school buses is significantly higher than outside (5-10 times higher). Cumulatively, Connecticut children spend more than 50 million hours on school buses per year. Expected benefits included avoided health impacts, avoided health care costs, and avoided school absences.<sup>6</sup>

<sup>3</sup> DMV inventory, provided by Ariel Garcia, DEP (9/7/05).

<sup>4</sup> COSTA, *Safety Gram*, ([http://www.epa.gov/ne/eco/diesel/assets/pdfs/costa\\_safetygram.pdf](http://www.epa.gov/ne/eco/diesel/assets/pdfs/costa_safetygram.pdf)). States average daily mileage for Connecticut school buses = about 100 miles. 100 miles per day \* 180 school days per year = 18,000 miles per year. This may underestimate total annual mileage because it does not include summer-time travel.

<sup>5</sup> 0.17 g/mi is the EPA Mobile6 emission factor for 1994 school bus. EPA staff is currently reviewing the accuracy of this emission factor – they believe it underestimates emissions. In NESCAUM’s “School Bus Emission Reductions” analysis, prepared for New Haven school bus retrofits in Dec. 2002, an emission factor of 0.25 g/mi was used. The more conservative number was selected for this analysis. Using the 0.25 g/mi factor would increase benefits to 9.55 tons (Scenario 1) to 24.55 tons (Scenario 6).

<sup>6</sup> EHFI, *Children’s Exposure to Diesel Exhaust on School Buses*, 2002, <http://www.ehfi.org/reports/diesel/>, CATF, *A Multi-City Investigation of the Effectiveness of Retrofit Emissions Controls in Reducing Exposures to Particulate Matter in School Buses*, 2005, <http://www.catf.us/publications/view/82>, also CARB (2003), NRDC (2001).