

Public Workshop to Discuss Clean School Bus Update

Sacramento, California
November 4, 2016

California Environmental Protection Agency

 **Air Resources Board**

Workshop Agenda

Time	Topic
9:30 am – 9:45 am	Introduction and Background
9:45 am – 10:15 am	Update on School Bus Population in California
10:15 am – 11:15 am	Funding Sources Available
11:15 am – 11:30 am	15 Minute Break
11:30 am- 12:30 pm	Prioritization of School Bus Cleanup

Background

- Board directed staff to provide an update on ‘dirty’ school buses and funding available
 - Refine inventory
 - Define funding sources
 - Align inventory & funding
 - Coordinate with partners
 - Public workshop
- Board update scheduled for December 2016/January 2017

Impact of Diesel PM on California

Health Effects

- Premature death (1,400/yr)*
- Cancer Risk (620/M Population)**
- Decreased lung function in children
- Chronic bronchitis
- Increased hospitalizations
- Aggravated asthma
- Increased respiratory symptoms
- Lost work days

Environmental Effects

- Reduction in visibility (10-75% of total)
- Potent greenhouse gas

*<https://www.arb.ca.gov/regact/2010/truckbus10/correctedappj.pdf>

**Propper, et al., *Environ. Sci. Technol.*, 2015, 49 (19), pp 11329–11339

Exposures in School Buses - Factors

- Diesel bus > trap diesel > CNG
- Older buses worse (leakier, engine age)
- Tail pipe and crankcase locations (engine under bus shell worse for crankcase)
- Window position mixed results: typically closed worse for self-pollution, open worse (up to 8-11X) for higher on-road levels
- Other (speed, vehicles followed, traffic density, etc.)

Update on School Bus Population in California

Data Sources

- 2014 CHP School Bus Inspections
- 2016 School Bus Fleet Survey
- Prop 1B Retrofits & Replacements (2008-2014)
- SJVAPCD CMM Replacements (2015-2016)
- 2014 Carl Moyer Funding
- 2016 TRUCRS
- Local Air District Funding

2016 School Bus Fleet Survey

- CHP Inspection data set does not have all necessary information
 - i.e. retrofit information and annual mileage
- August 2016
 - ARB, CASTO, & School Transportation Coalition
 - Distributed to school districts and school bus fleets

2016 School Bus Fleet Survey — Results

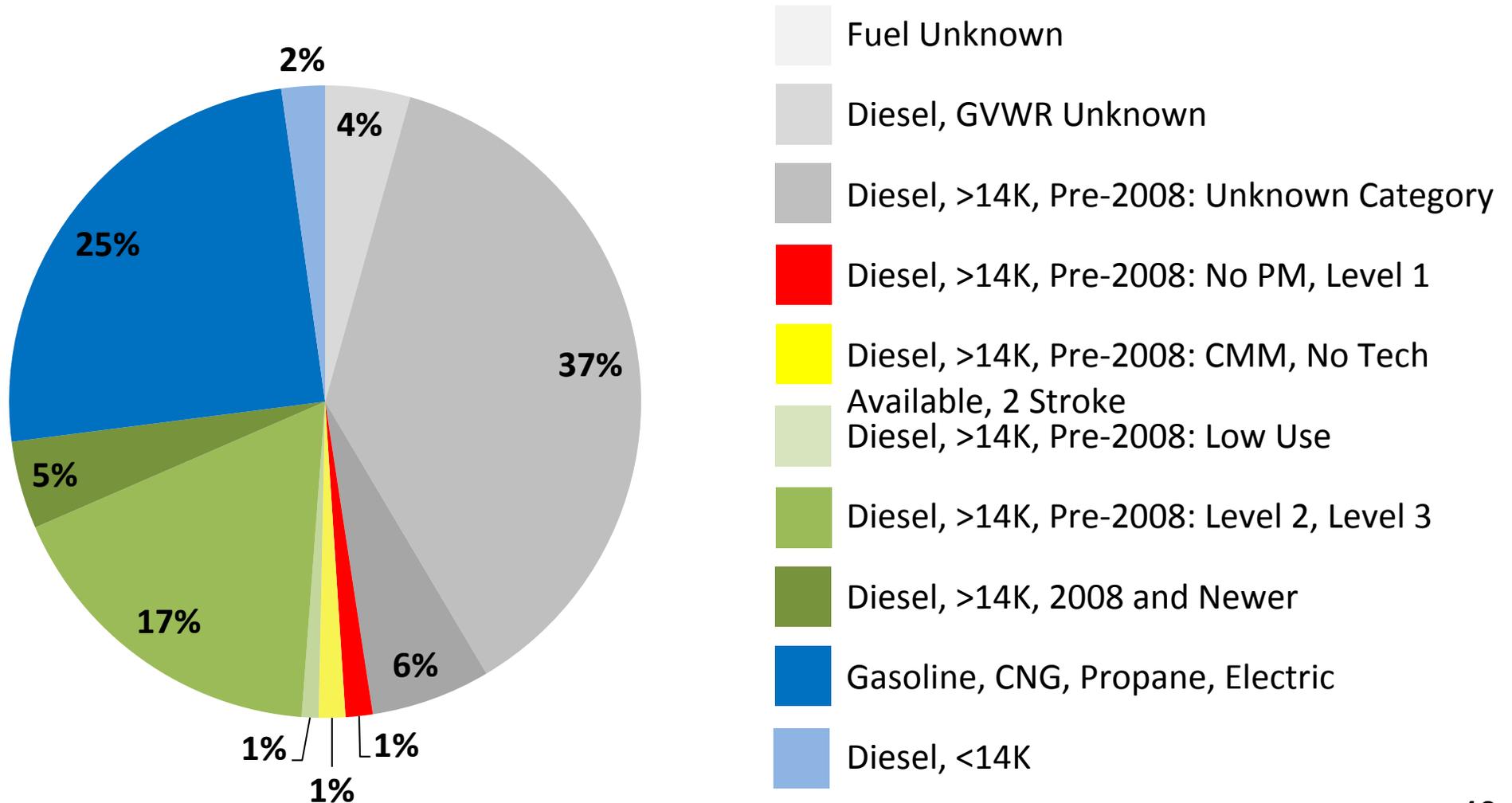
- To increase response rate, ARB staff made approx. 600 individual calls requesting survey response
- Emailed school superintendents requesting survey prioritization
- 195 surveys completed totaling approx. 5,870 school buses

CA School Bus Population

- Total population approx. 26,500 school buses
 - Categorized by fuel type, GVWR, and school bus age
 - Subcategories for diesel >14K GVWR
 - Retrofit Level (1, 2, 3 & CMM), no PM filter
 - Annual mileage
 - No technology available, 2 stroke

CA School Bus Population

Approx. 26,500 School Buses



CA School Bus Population — Discussion

- How can we encourage remaining school districts and school bus fleets to complete the survey?
- What other data sources can be used to help define the CA school bus population?

Funding Sources Available for School Buses

Existing Funding Sources for School Buses

Funding Source	Funding Amount	Retrofits and/or Replacements	Advanced Technology*	Primarily for School Bus Projects
School Bus Supplemental Environmental Project (SEP) Funding	~\$4 M**	X		X
Carl Moyer Program	~\$69 M	X	X	
Local District Funding (<i>AB 923, AB 2766, etc.</i>)	Varies by Air District	X	X	
LCTI - Rural School Bus Pilot Project	\$10 M	X	X	X
LCTI - Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP)	\$18 M		X	
LCTI - Zero-Emission Bus Pilot Commercial Deployment Project (<i>Sacramento Regional Zero-Emission School Bus Deployment Project</i>)	\$7.5 M		X	X
Other Federal & State Funds (<i>DERA, CEC, etc.</i>)		X	X	

* Zero-Emission, Hybrid, or Low NOx

** Total SEP funds collected since 2012

Estimated School Bus Project Costs

Category	Approx. price per bus
Retrofit PM Filter	\$20,000
Propane Conventional - Type C 75 Passenger	\$130,000
Diesel Rear Engine - Type D 81 Passenger	\$165,000
CNG Rear Engine - Type D 81 Passenger	\$185,000
Battery Electric Zero-Emission	\$225,000 - \$400,000

Funding Sources for School Buses— Discussion

- What other funding sources may be available for school bus cleanup?
- What other opportunities for partnership might be available?
- Have you experienced any barriers to the current funding sources available?

Prioritization of School Bus Cleanup

School Bus Cleanup Priority — Concepts

- Truck and Bus Regulation Requirements
 - In general, all school buses are required to have a PM exhaust filter
 - Low use buses operate less than 1,000 miles per year
 - No technology available extension
- Potential for further reduction

School Bus Cleanup Priority - Considerations

- Age of school bus (engine emission standard)
- PM filter
- Annual mileage
- Cumulative mileage
- Duration of route
- Disadvantaged communities
- GVWR
- Encouraging cleanest technologies

School Bus Cleanup Priority — Discussion

- What other factors should be taken into account when prioritizing school bus cleanup?
- What do you think the top priority should be?

Next Steps

- Comments to Danielle Chambers by Friday, November 11, 2016:

danielle.chambers@arb.ca.gov

916.323.0027

- Continuing stakeholder discussions
- Board update December 2016/January 2017

Resources

Diesel Health Effects and Background on Particulate Matter

- www.arb.ca.gov/research/diesel/diesel-health.htm
- www.arb.ca.gov/research/aaqs/pm/pm.htm

Health Studies

- Reducing Air Pollution Exposure in Passenger Vehicles and School Buses (2015):
www.arb.ca.gov/research/single-project.php?row_id=65061
- Children's School Bus Exposure Study (2003):
www.arb.ca.gov/research/schoolbus/schoolbus.htm

2016 School Bus Fleet Survey

- www.surveymonkey.com/r/Schoolbusfleet

Resources - Continued

Funding Websites

- Supplemental Environmental Project (SEP) Fund: www.arb.ca.gov/enf/seppolicy.htm
- Carl Moyer Program: www.arb.ca.gov/msprog/moyer/moyer.htm
- Low Carbon Transportation and Fuels Investments:
www.arb.ca.gov/msprog/aqip/aqip.htm
- U.S. EPA Clean Diesel and DERA funding: www.epa.gov/cleandiesel