



2008 Thomas Update



Florida Association for Pupil Transportation Conference



Discussion Items



1. New Chassis Features
2. New Body Features
3. Engine Offerings – Features
4. Engines Looking Ahead to 2010



New Features - Chassis

Right Side Mounted Fuel Tank



- FL-206-185
- 65 gal steel rectangular tank
- Steel protective cage
- Restrictions:
 - N/A 158" or 179" wb
 - N/A 199" wb with front lift location
 - N/A center lift locations
 - Luggage restrictions



Air Dryer / Webasto Locations



- Improved locations for both Bendix dryer and Webasto heater
- Frame mounted
- Located aft of battery box and out of wheel splash
- Shorter Webasto exhaust pipe



Allison 5-Year ETC Coverage



- TBB standard – 5 years unlimited miles
- Includes Transynd fluid – must maintain TES-295 lubricant to maintain warranty
- MY 2009 Changes on the way -
 - “Prognostics”





New Features - Body

AG2 Entrance Door



- Improved reliability
- Additional seat spacing
4" to 8"
- Robotically welded
aluminum frame
- 4 piece bonded glass
- New air and electric
actuators
- Improved vandallocks
- SOP 5/14/07



AG2 Vandalock



- D3039-11-000
- Mechanically key operated
- “Pin” Locks door at the top at bottom of the door frame
- Available both air or electric doors



Replaceable LED's Warning Lamps



- Individually replaceable LED's
- Available through TBB service parts. 12 LED's per kit



Improved Passenger Windows



Design Changes

- Non bonded glass – easy replacement
- Serviceable thumb latches
- Dual latch points for PO window
- No exterior caulking
- SOP January, 2008



Driver's Switch Cabinet



- Improved fit/finish
- Improved access to park brake release
- Includes driver's storage
- In Production, Since November, 2007
- Upper compartments next up







Engine Offerings – Features

EPA07 Engine Offerings



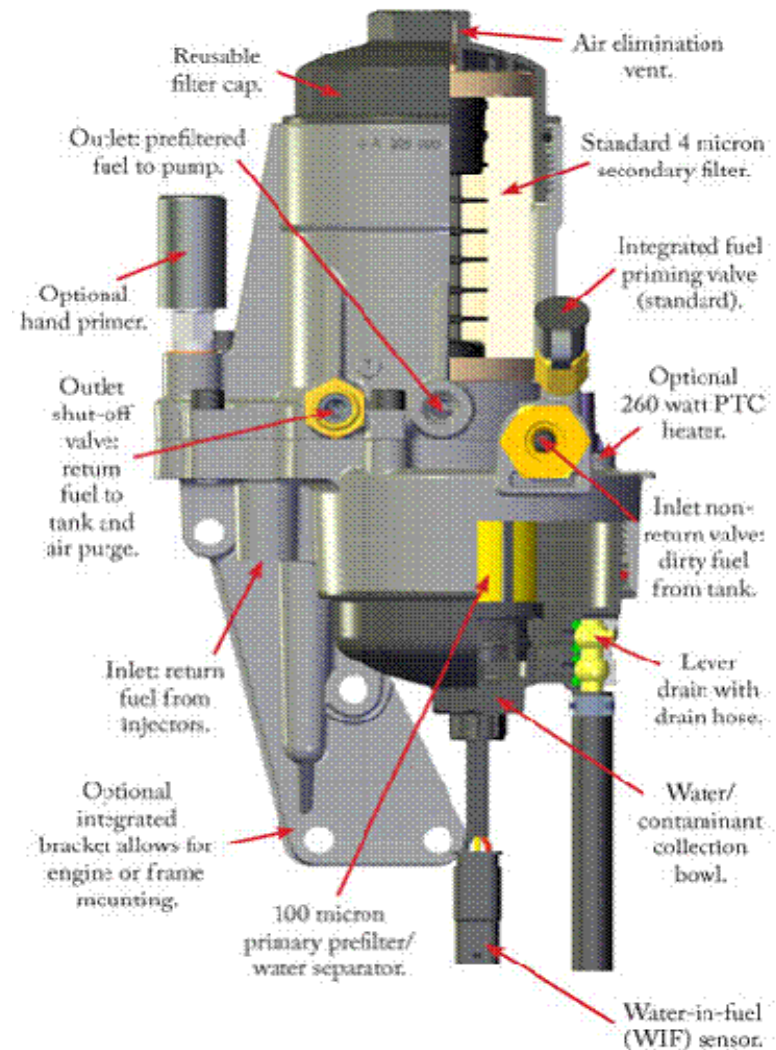
	 MBE 906/926	 Cummins ISB	 Cummins ISC
Products Offered	C2, HDX	C2, EF, HDX	HDX
Horsepower Ratings	190 – 250hp	200 – 300hp	260 – 300hp
Torque Ratings	520 – 660 lb. ft.	520 – 800 lb. ft.	800 lb. ft.
Displacement	7.2 liter	6.7 liter	8.3 liter
Configuration	Inline 6	Inline 6	Inline 6
Weight (lbs.)	1,310 lbs.	1,150 lbs.	1,530 lbs.
Cylinder Design	Parent Bore	Parent Bore	Wet Sleeve
Engine Brake	Yes, Exhaust Brake & Compression	Yes, Exhaust Brake	Yes, Exhaust Brake
NOx Emission Control	Cooled EGR	Cooled EGR	Cooled EGR



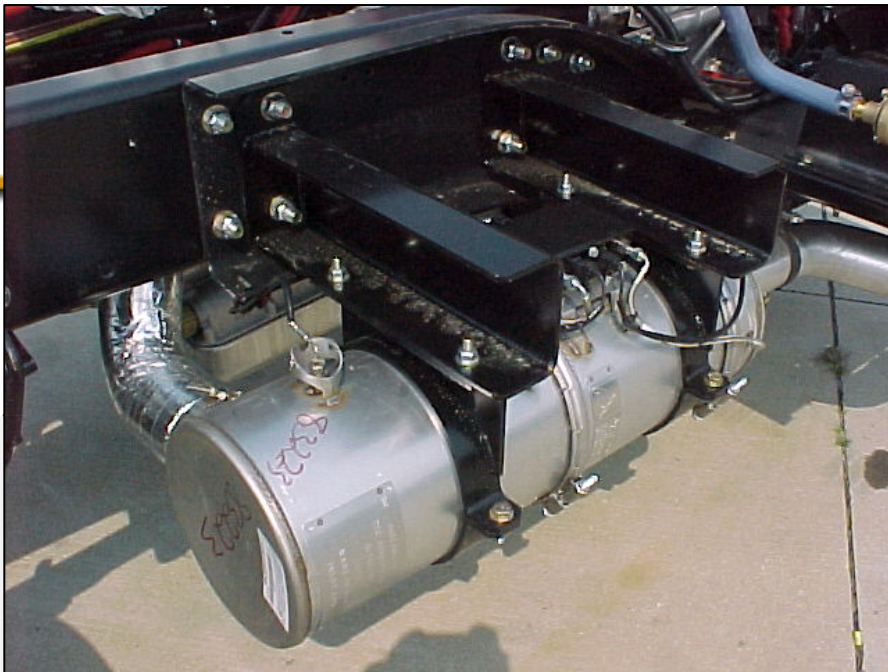
BE Multifunction Fuel Water Separator



- FL-110-063
- Primary & Secondary filtration
- Water in fuel sensor with dash light
- Heater
- Hand priming pump
- Drop in filter
- Eliminates need for secondary filter
- Manufactured by Racor
- N/A with TBB supplied A/C

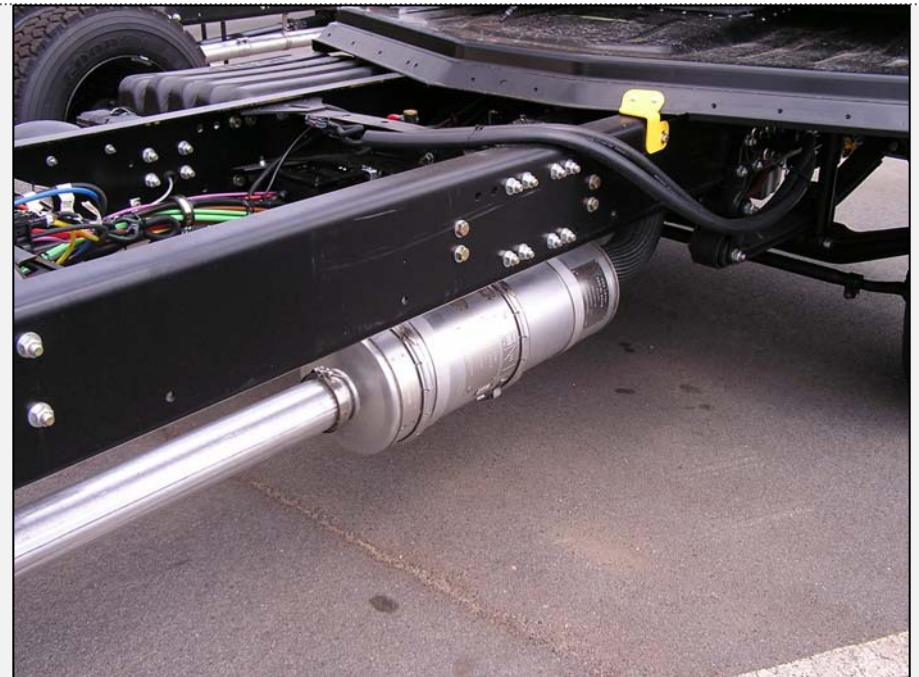


Aftertreatment Device (ATD)



Rear Engine School Bus

Conventional and FE Transit





Exhaust Mitigator Pictures



Standard Equipment

Helps dissipate hot exhaust during regeneration.



Liquid Cleaning of Aftertreatment Device



Cleaning required at 240,000 km or 4,000 hours

reliabilt[®]

- **Filter is cleaned with a proprietary liquid solution only available with DDC filters**
- **Most efficient method, 90-98% efficient**
- **Process will be performed at DDC Remanufacturing Centers**
- **Exchange program will be available**
- **45 minutes of labor time**
- **A process only available with DDC filters**



Engines – Looking ahead to 2010

A THREE PRONGED APPROACH

"Yellow & Black IS Green!"

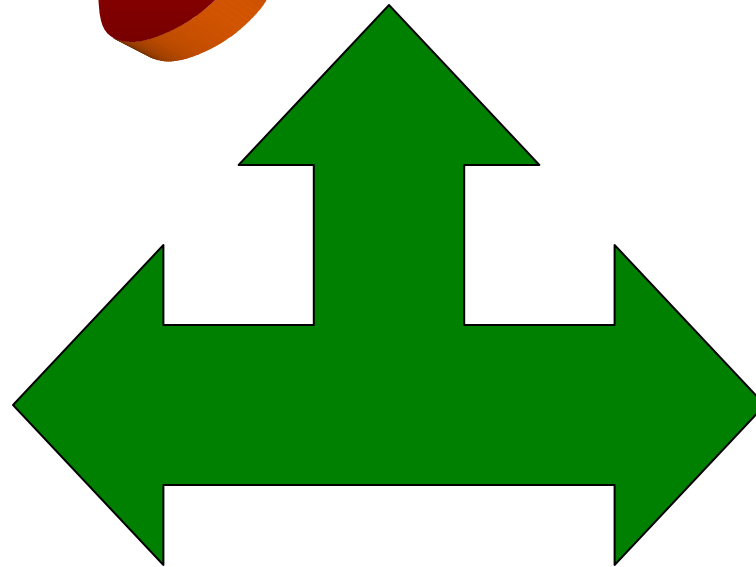
Engines – Looking ahead to 2010



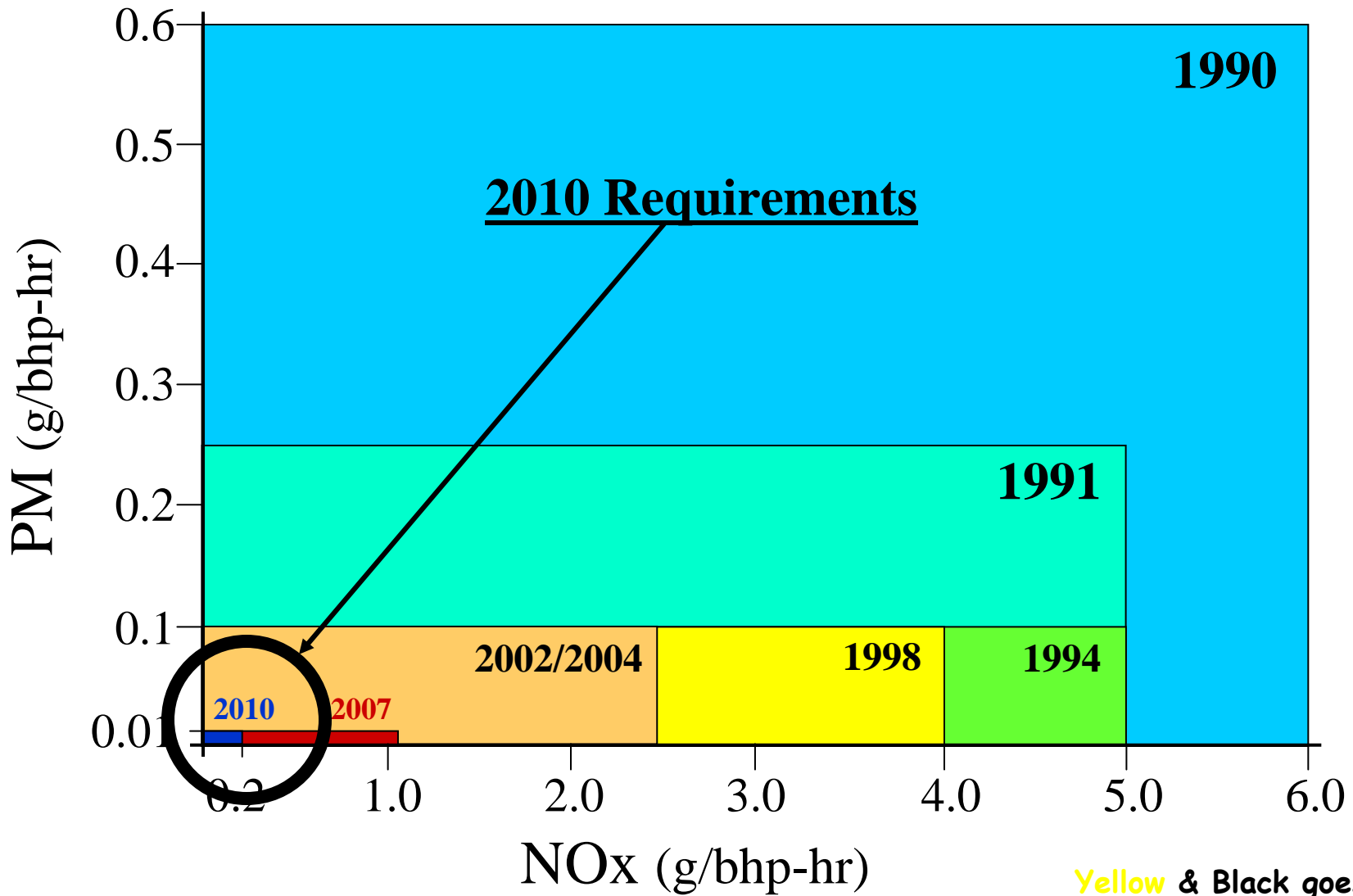
SCR



CNG



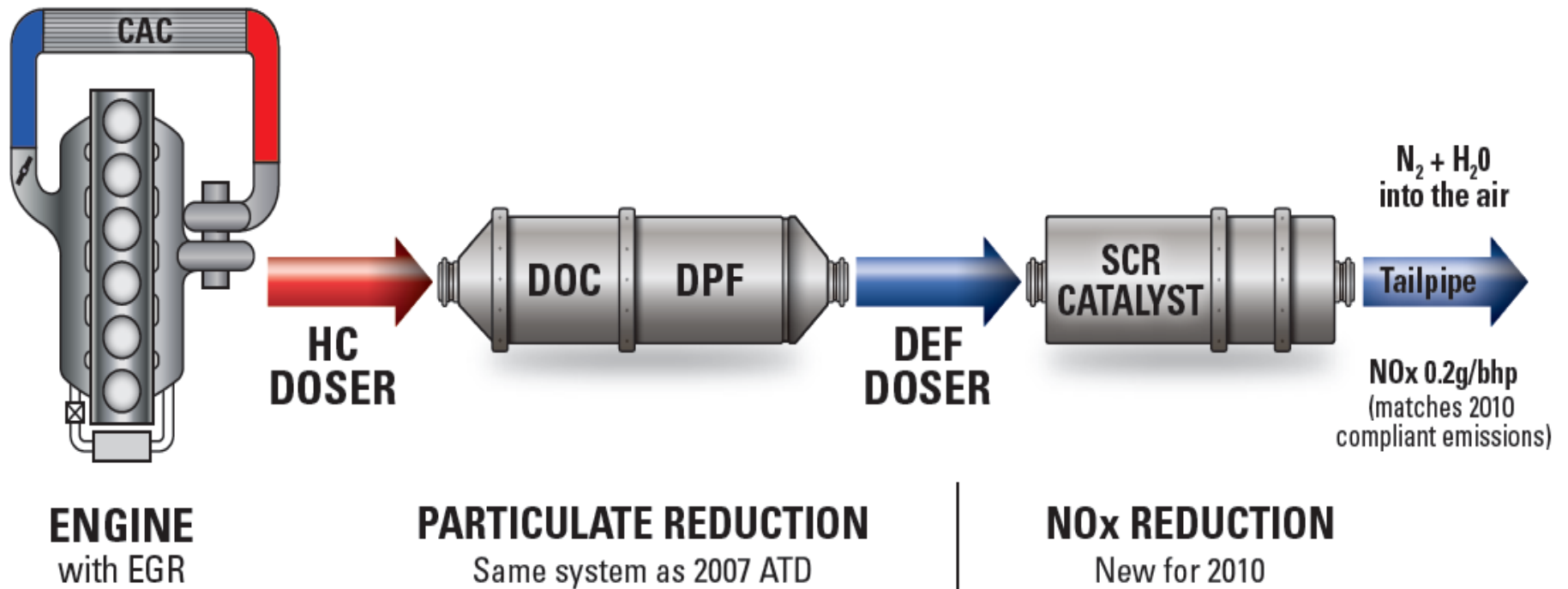
2010 Emission Requirements



EPA'10 – Selective Catalytic Reduction



What is SCR and How Does it Work?



Yellow & Black IS Green!

2010 Diesel Technology Path



- Why have we chosen the SCR path?
- Treats exhaust downstream with Diesel Exhaust Fluid that breaks down into Nitrogen and Water
- SCR is proven technology used for 3 years in Europe. Used in 2008 in a number of U.S. automobile offerings.
- DEF (32.5% Urea) is widely available for Agricultural and Industrial purposes.



Yellow & Black goes Green

Hybrid Technology



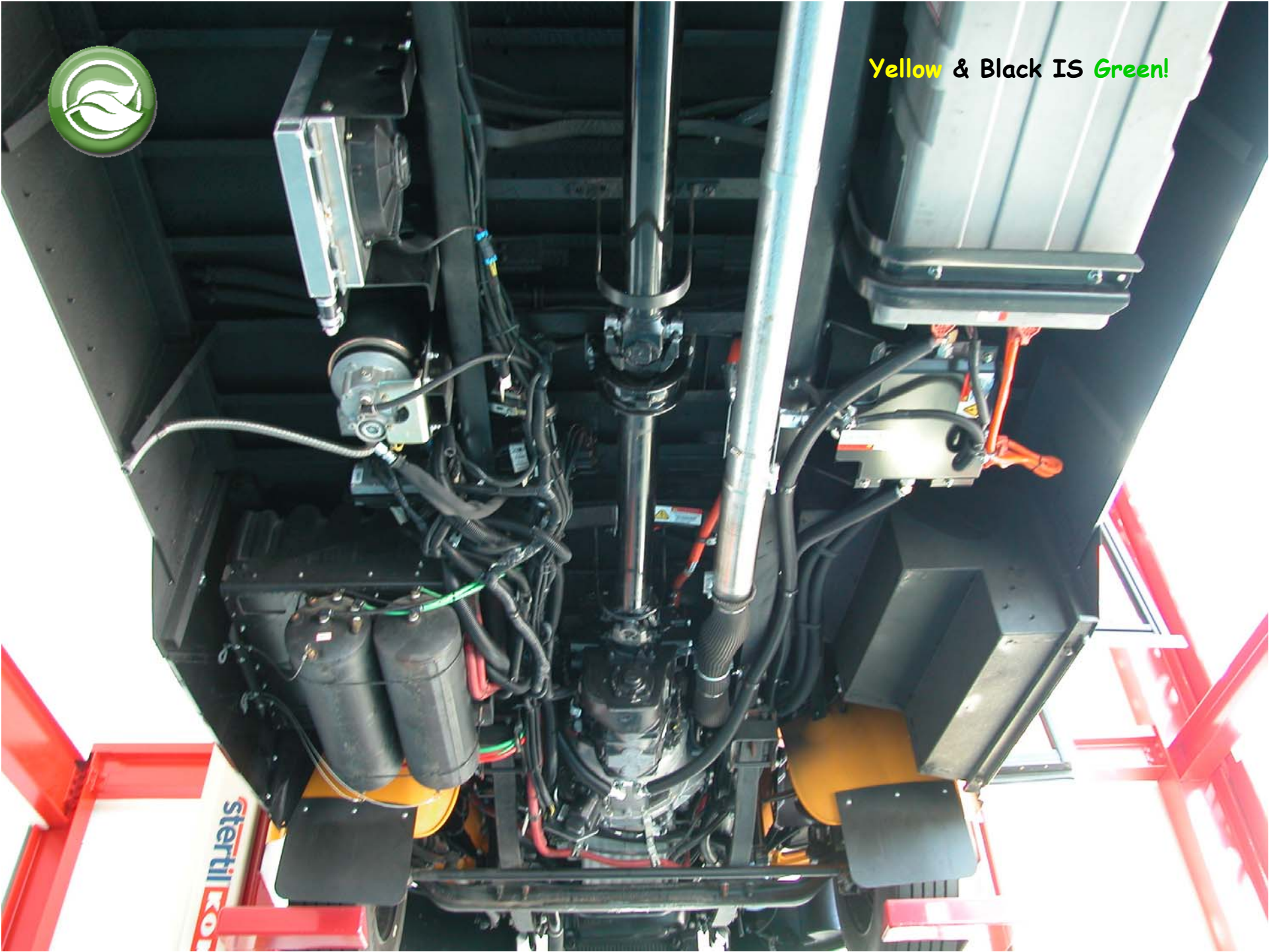
April 2, 2008

THOMAS BUILT DEVELOPS HYBRID SCHOOL BUS - HIGH POINT MANUFACTURER TESTING HYBRID ENGINE TECHNOLOGY

- The prototype bus is powered by a Mercedes Benz diesel engine, an Eaton transmission, and an electric motor
- The powertrain used in the hybrid bus has been refined for more than two years in a delivery van application developed by Freightliner Custom Chassis and Eaton
- Completing testing and looking to roll out for sale in 2009



Yellow & Black goes Green



Yellow & Black IS Green!



stertill

Diesel/CNG Pathways to 2010



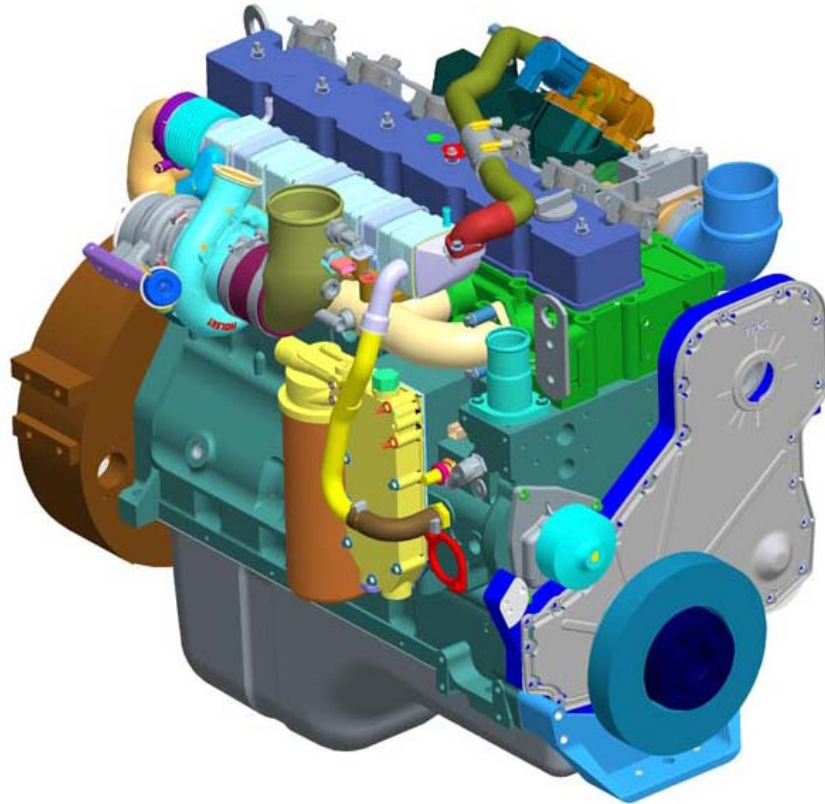
DIESEL

- ULSD
- Diesel Particulate Traps
- EGR
- NOx Absorber and/or SCR
- SCR more efficient
- Lube Oil – EPA07
- Different oil filters
- Crank Case ventilation absorbed in '07 - Sensor impact

NATURAL GAS

- EGR
- TWC (3-Way Catalyst)

Natural Gas Technology – 2010 Today



- **Stoichiometric Cooled Exhaust Gas Recirculation (EGR)** – Uses high EGR rates in combustion process in place of excess air (Lean Burn). Creates an oxygen free exhaust allowing for the use of a three way catalyst.
- **Cummins Cooled EGR** – lowers in cylinder temperature and reduces oxygen concentration.
- **New Electronic Control Module** – provides full monitoring and control of engine sensors, fuel system and ignition system.
- **Three Way Catalyst** – simple passive device, highly effective hydrocarbon, CO, and NO_x control.
 -
- **Low installed weight** – highest power to weight ratio in its class.
- **Meets EPA and CARB 2010 emissions standards.**

*0.2 NO_x in 2007
vs. 1.2 Phase in
Provision*

Yellow School Bus



Yearly Mileage¹	12,000
Days²	180
Avg Daily Mileage	66.67
Children Passengers (Avg. per Bus)³	54
Fuel Mileage (MPG)⁴	7.00
Local Price of Diesel⁵	\$ 3.86
Gallons/bus/day	9.52
Gallons/bus/year	1,714
Yearly Fuel Expense	\$ 6,612.69

Automobile

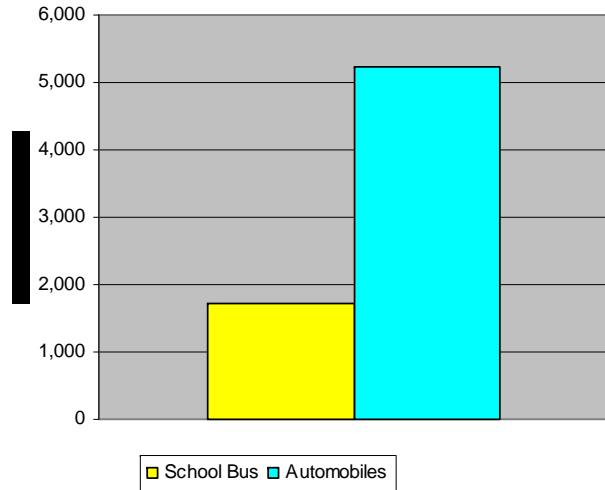


Avg. Daily Miles (2 rd trips)⁶	16
Children Passengers (Avg. per Car)³	1.5
Fuel Mileage (MPG)⁴	19.8
Local Retail Price of Gas⁵	\$ 3.98
Gallons/car/day	0.81
Gallons/car/school yr	145.5
Number of Autos to = 1 School Bus	36
Gallons Used per day to equal 1 school bus	29.1
Gallons Used per year to equal 1 school bus	5,236
Yearly Fuel Expense (All Autos = to 1 S.Bus)	\$ 20,840.73

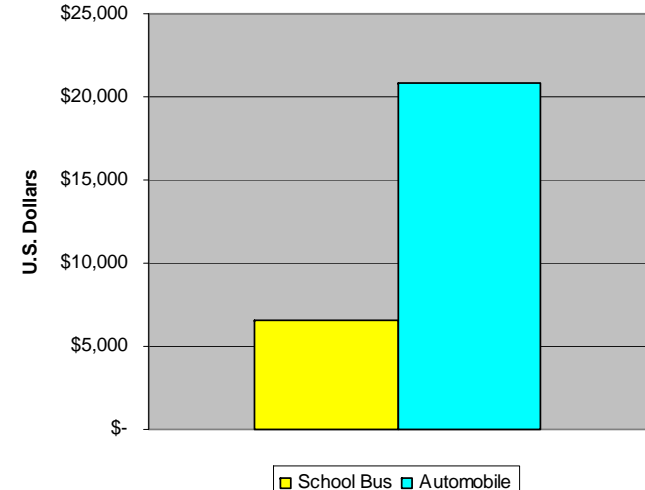
"Yellow & Black IS Green!"



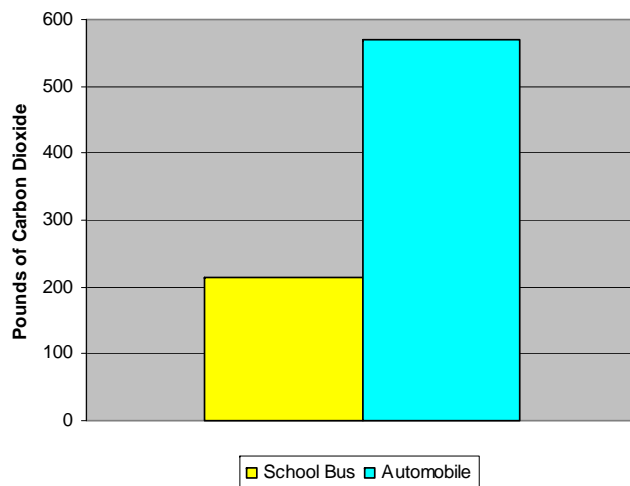
Fuel Used per Year



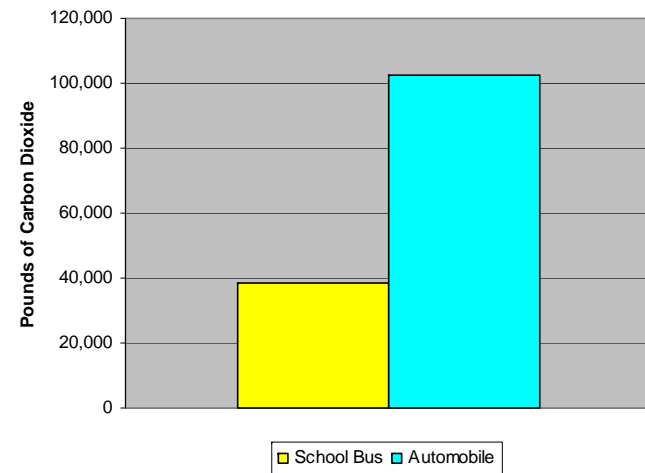
Yearly Expenditures for Fuel



Daily Greenhouse Gas Emissions



Yearly Greenhouse Gas Emissions





Thank You
