

DAIMLER

Heavy Duty Diesels – The Road Ahead

Elmar Boeckenhoff
Senior Vice President
Truck Powertrain Engineering
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Daimler Truck NAFTA

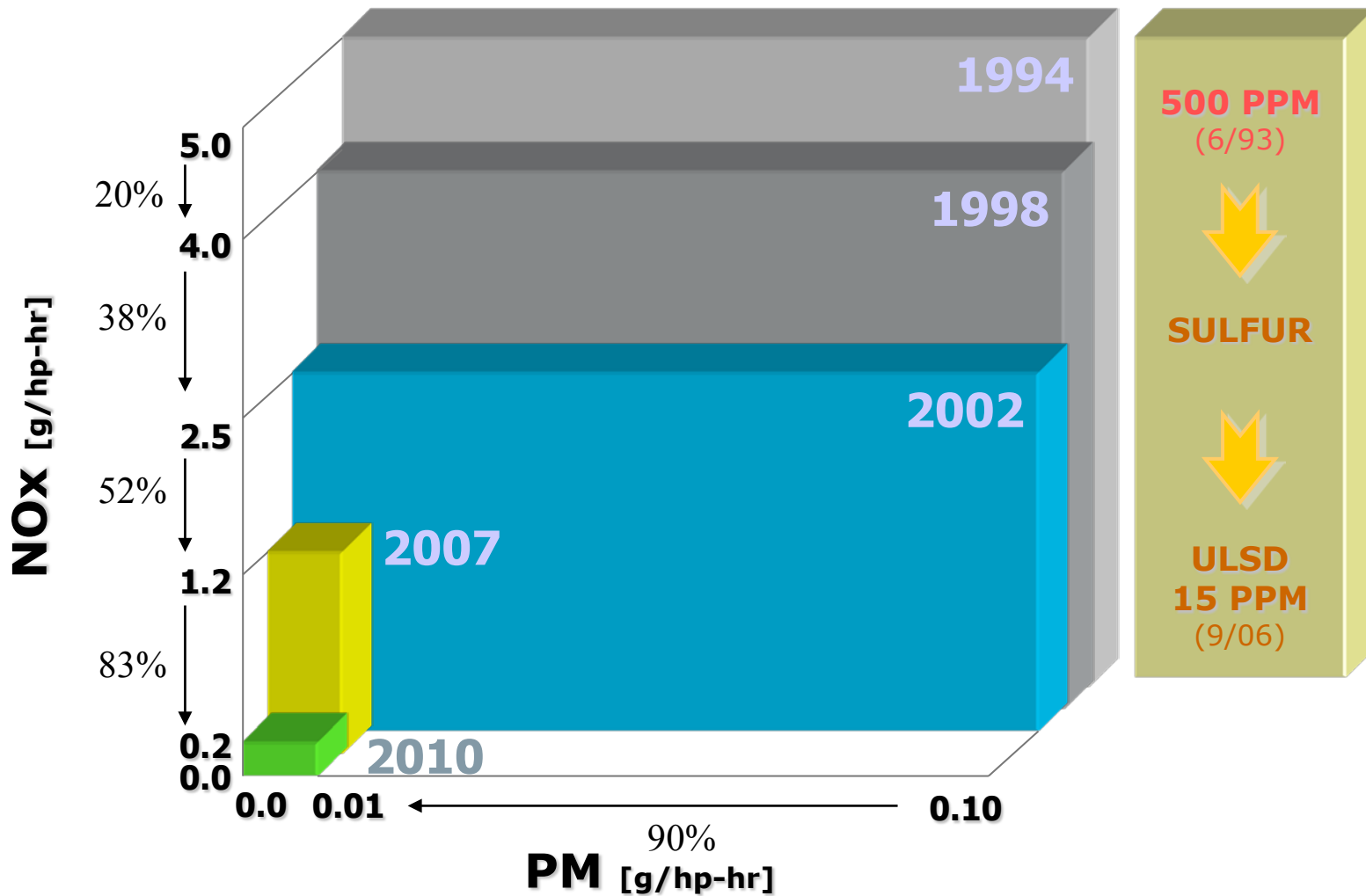


Mercedes-Benz

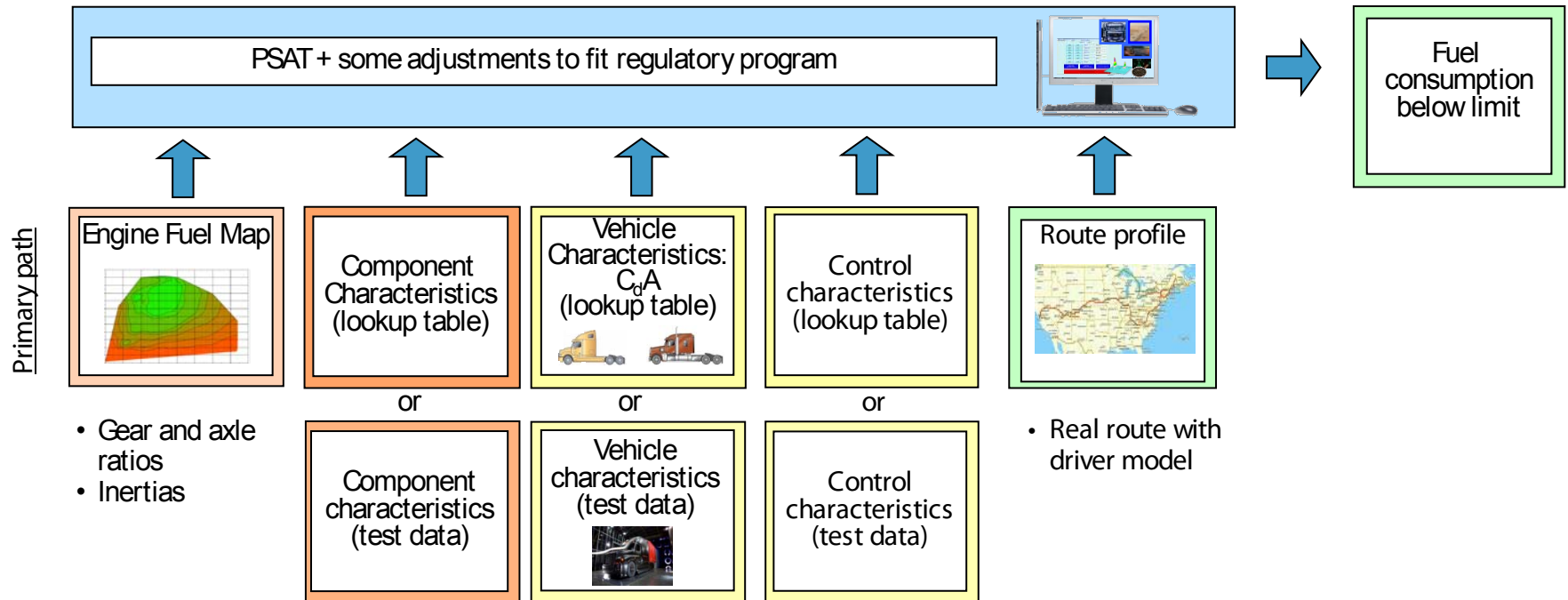


DTNA

Emissions – The Road Ahead is CO2



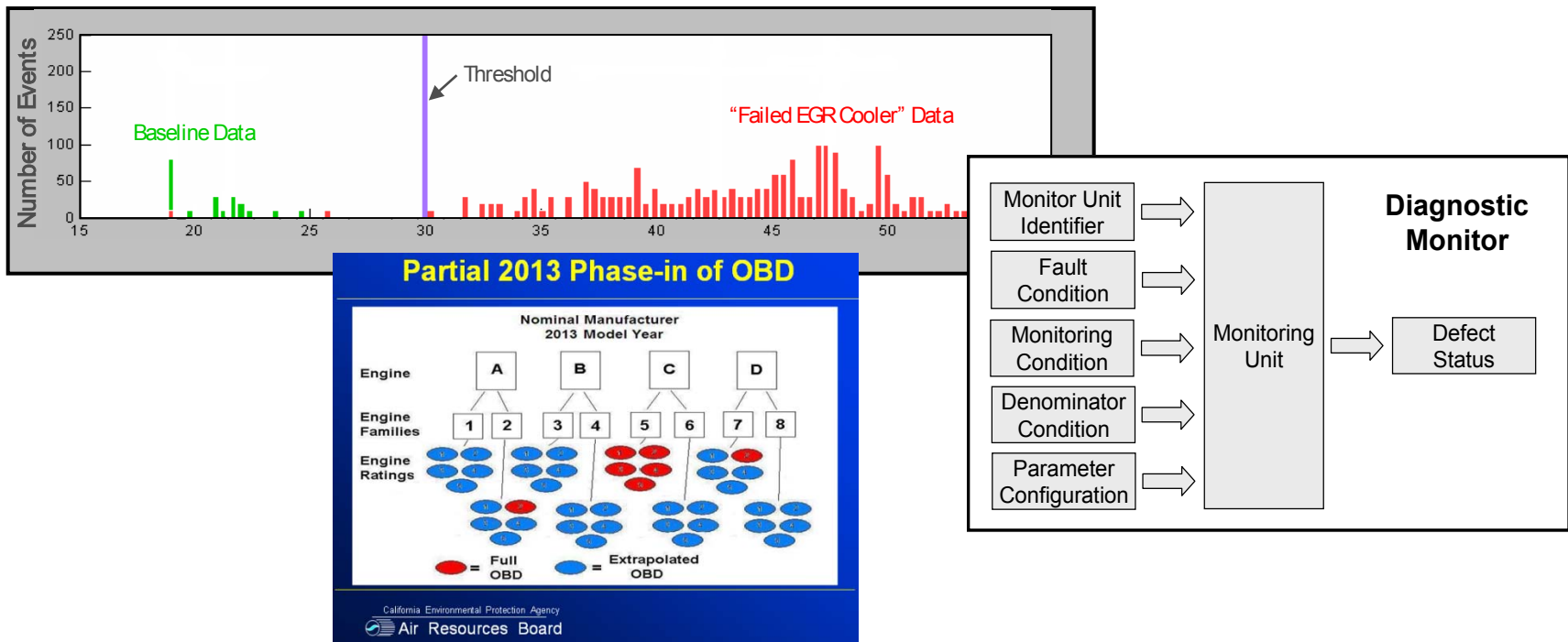
Legislative Challenge – CO2



- Given large number of vehicle variations, certification via simulation is logical
- For CO2, the engine is just one component
 - Certifying the engine for CO2 would be like certifying injectors for PM
- Entire chain: engine–drivetrain-truck/ trailer-driver-environment-logistics

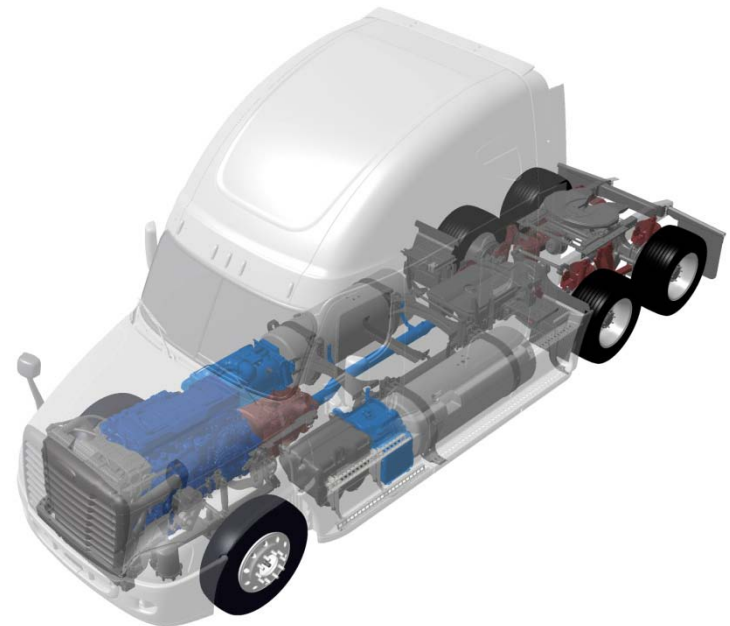
OBD Ties It All Together

- The first electronic engines in the late 80's brought smart diagnostics.
- In 2010 this matured to certified on board diagnostics (OBD)
- The operator's role in recognizing problems has been significantly reduced

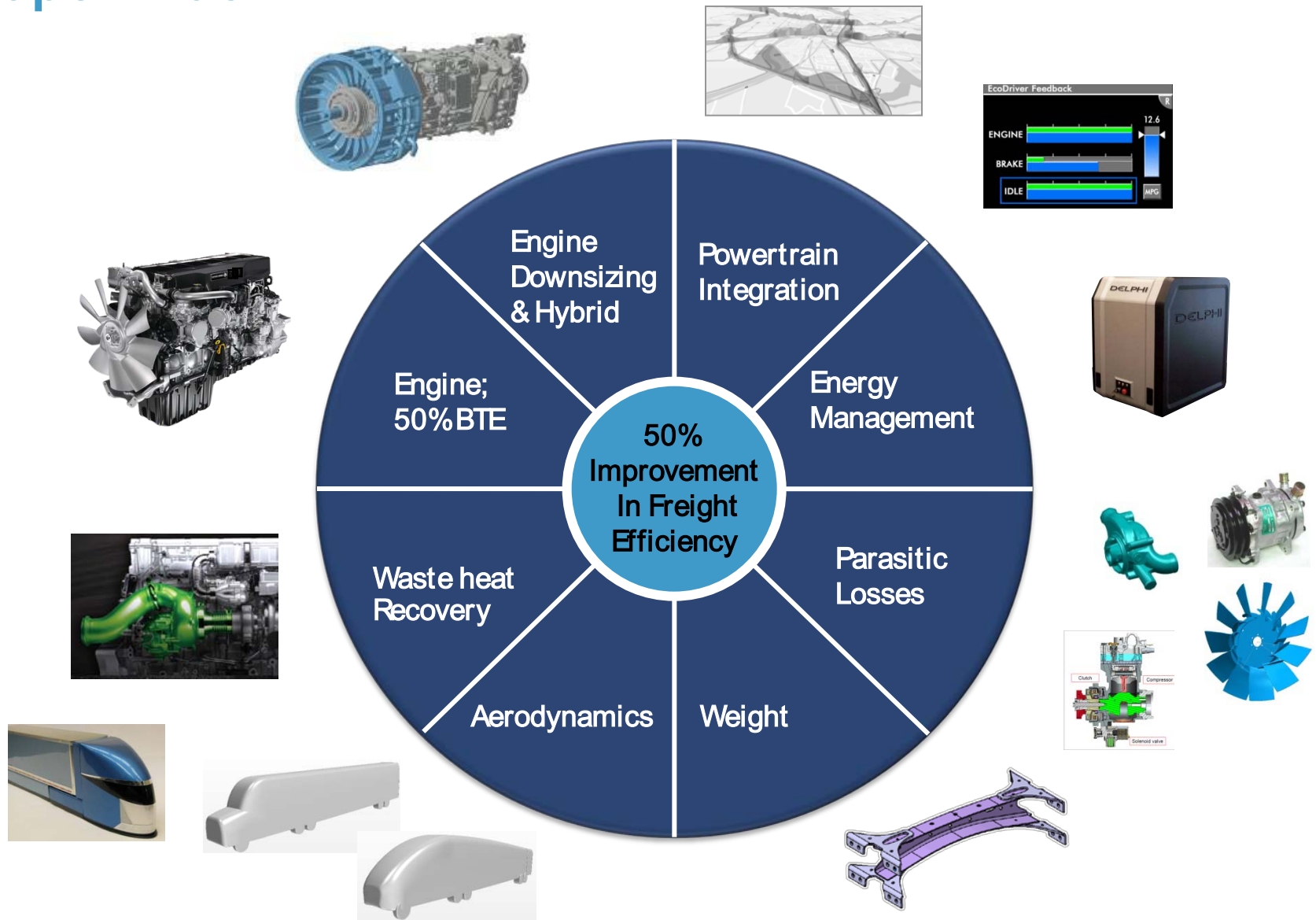


World Test Cycle Harmonization for CO2?

- GLOBAL Greenhouse gases
- CO2 regulations are new; a unique opportunity
 - Standardized urban and on-highway drive cycles
 - Local CO2 standards and urban/ highway weight factors
- Can we take integration to the next level; a global test cycle and perhaps a long term goal of a global standard?

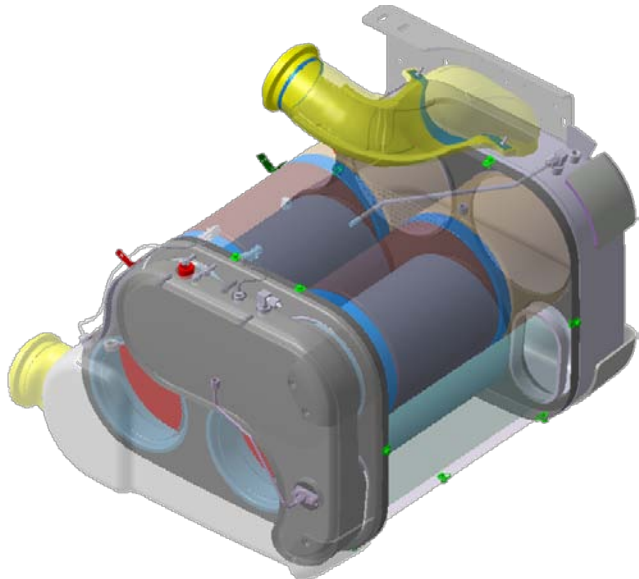


Super Truck



Aftertreatment technology

- SCR allows to control tailpipe out emissions.
 - A 95% efficient SCR means engine out NOx can be 2.0 g/ hphr with safety margin against a 0.2 g/ hphr standard
 - => better fuel efficiency
- Fuel economy savings vs. cost of SCR + DEF vs. cost of high EGR shows significant ROI in favor of SCR
- Proven technology



DETROIT DIESEL
DEMAND PERFORMANCE

DIESEL EXHAUST FLUID (DEF) INDICATOR LAMPS

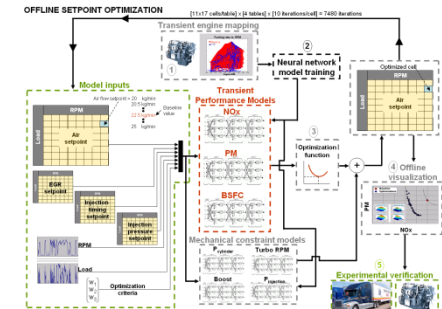
- The light bar indicates the level of fluid in the DEF tank.
- Low DEF levels will trigger a decrease in engine performance.
- The use of improper fluid will trigger a decrease in engine performance.
- In the empty and ignored state, if the diesel tank is refilled without filling the DEF tank, vehicle speed will be limited to 5 mph until DEF is detected in the tank.

DEF Level / State	Indicator Lamps	Vehicle Action
DEF level is less than 10%	Solid yellow DEF icon, light bar 1-2 lit	None
DEF level is less than 5%	Flashing yellow DEF icon, light bar 1-2 lit, CHECK ENGINE lamp	Vehicle speed limited to 55 mph / engine derated
DEF level is EMPTY	Flashing yellow DEF icon, light bar 1-2 lit, CHECK ENGINE lamp	Vehicle speed limited to 55 mph / engine derated
DEF level is EMPTY and IGNORED	Flashing yellow DEF icon, light bar 1-2 lit, CHECK ENGINE and STOP ENGINE lamps	Vehicle speed limited to 5 mph / engine derated

BLUETEC
DEFINING TECHNOLOGY

Moving Forward

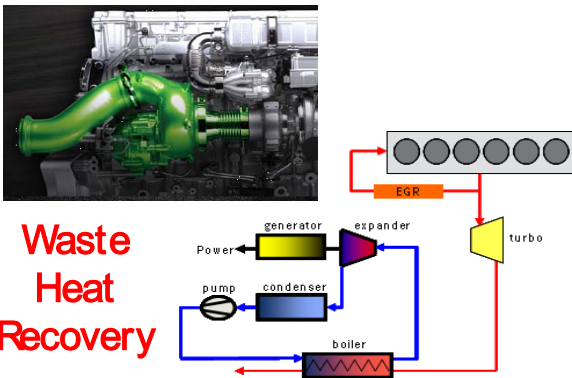
- CO2 legislation will significantly impact R&D moving forward
 - Super Truck is an excellent example
- This technology must make sense for the operators
- There is a lot of work to be done



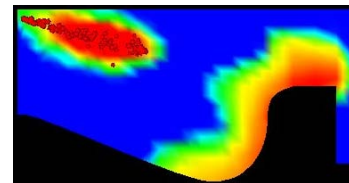
Engine & Vehicle Controls



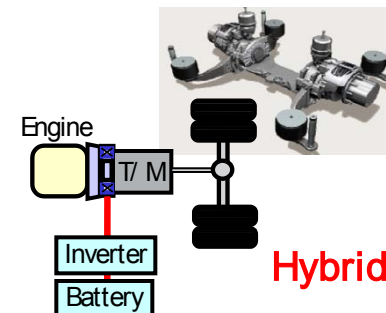
Aerodynamics



Waste Heat Recovery



Combustion



Hybrid

Thank You

