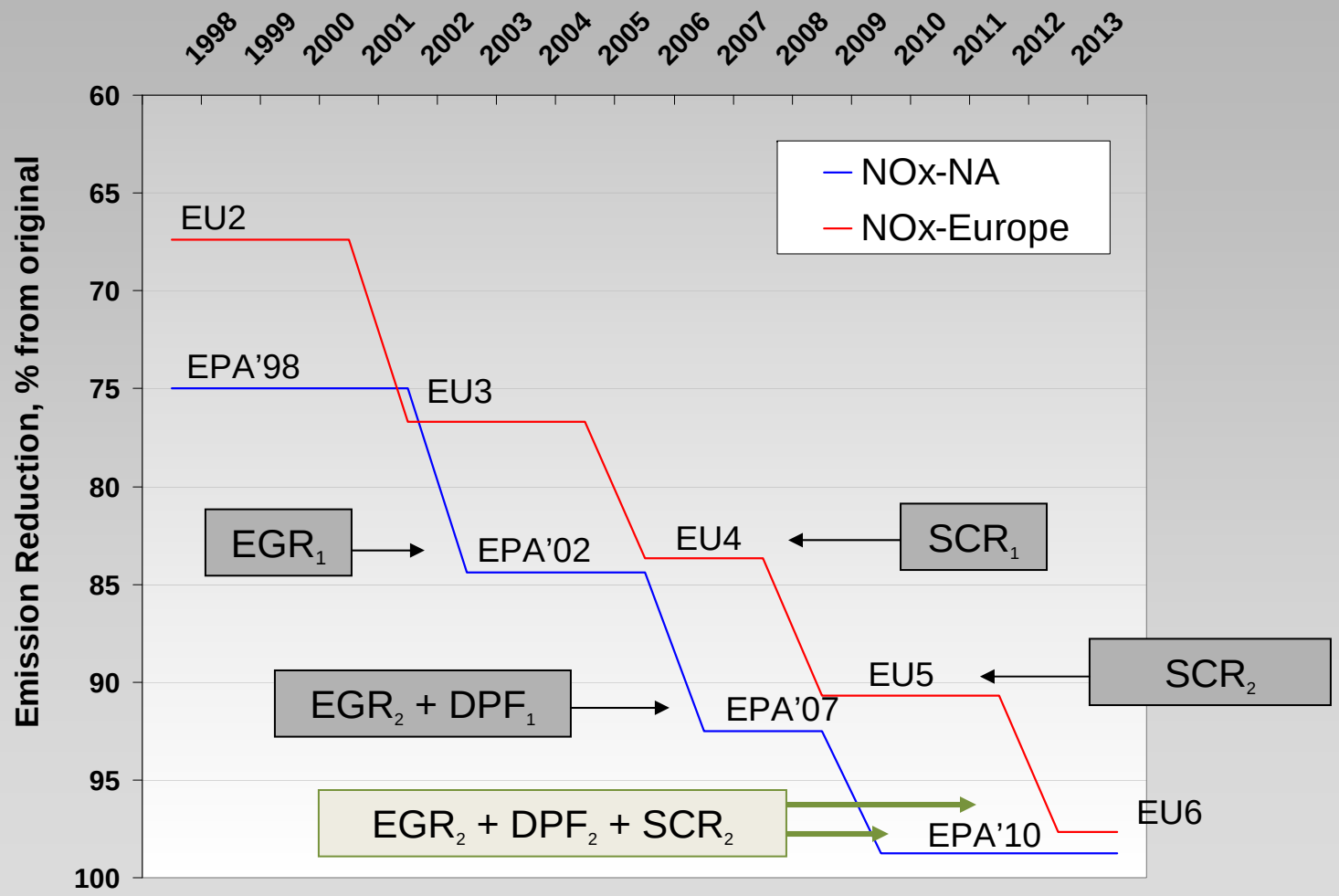
CHAD PARKER
MARKETING PRODUCT MANAGER – POWERTRAIN
VOLVO TRUCKS NORTH AMERICA, LLC

WHAT DO CUSTOMERS WANT?

(After the last 10 years of emissions changes)

- Confidence
- Reliability
- Savings

NOX REDUCTION, N.A. AND EUROPE



STARTING EARLY…

- EARLY Demonstration Concept
- 23 units
- Volvo D12 with SCR/DPF
- Not EPA'10
- 9,000,000+ miles

EXTREME WEATHER SCR TESTING

- **Winter - Northern Canada, Sweden, -36°F, bobtail**
  - **(light loading maximizes exhaust after-treatment system issues)**
- **Summer/Altitude - Colorado, Arizona, 100°F, 11,000 ft.**

TESTING SUMMARY

- **Volvo invested heavily in testing and validation**
  - 146 vehicles, 67 rigs, 46 million equivalent miles
- Unparalled development testing has proven our product performance, durability and reliability
- Initial production vehicle (CSVs) performance in the field has validated this commitment and investment
- Fuel economy savings AND clean air are delivered
- Following our vision, VOLVO was first to receive EPA and CARB 2010 emissions certification

SCR ENGINE SOLUTION

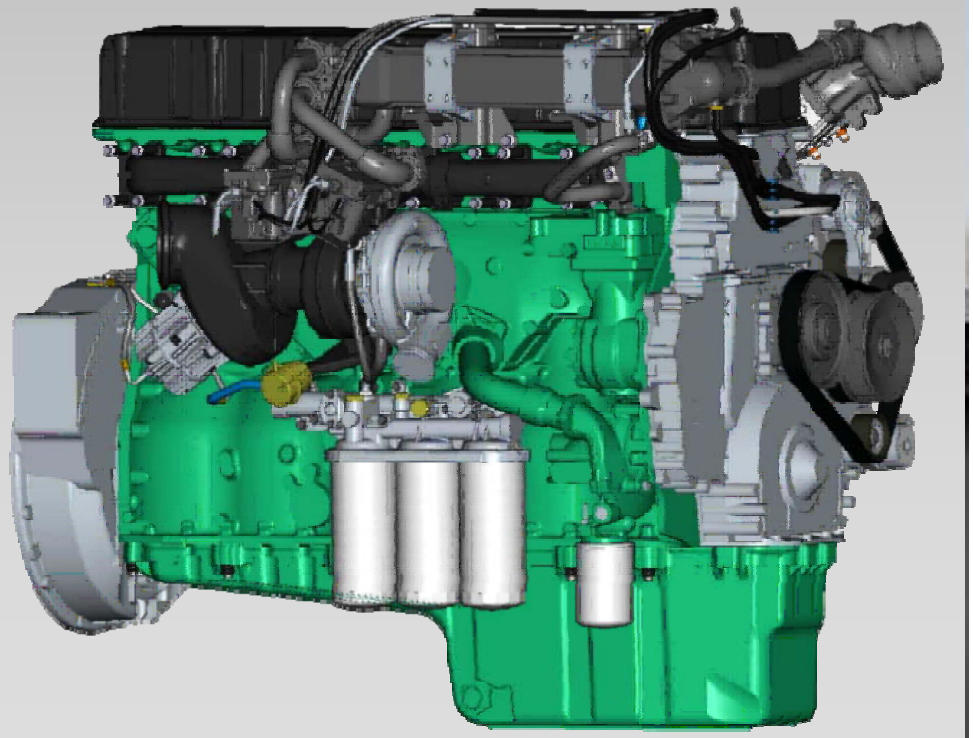
EMISSION SYSTEM DEVELOPMENT

EGR – Exhaust Gas Recirculation

- EPA ’02 → Light EGR → Up to 10%
- EPA ’07 → Heavy EGR → 10% - 35%
- EPA ’10 → Massive EGR → 35% - 50%

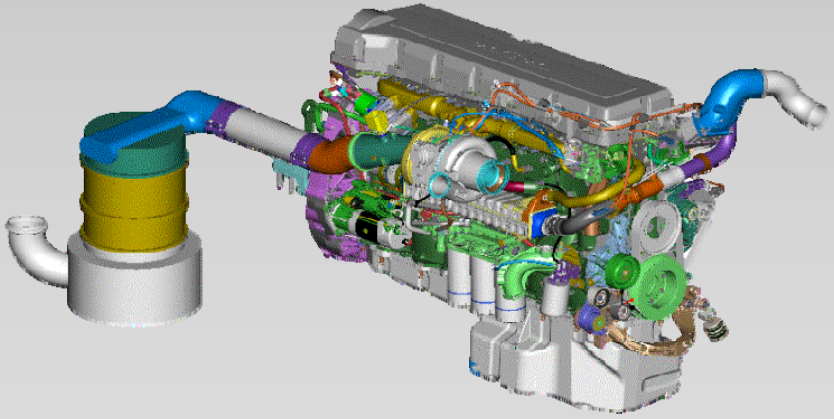
D12D – LIGHT EGR

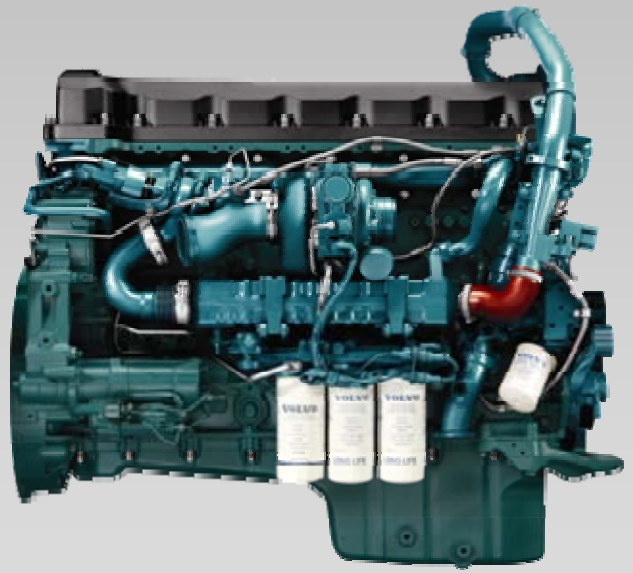
- NOx reduced from 4 to 2.5
- Light EGR added



D13F – HEAVY EGR

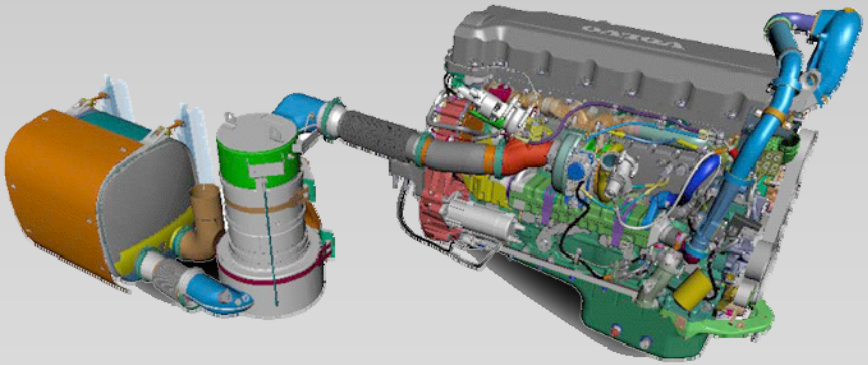
- NOx reduced from 2.5 to 1.2
- Soot reduced 90% to near zero
- DPF after-treatment added

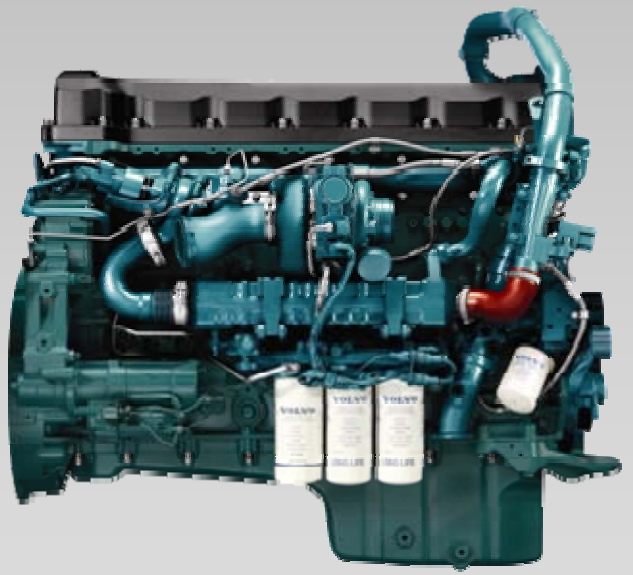




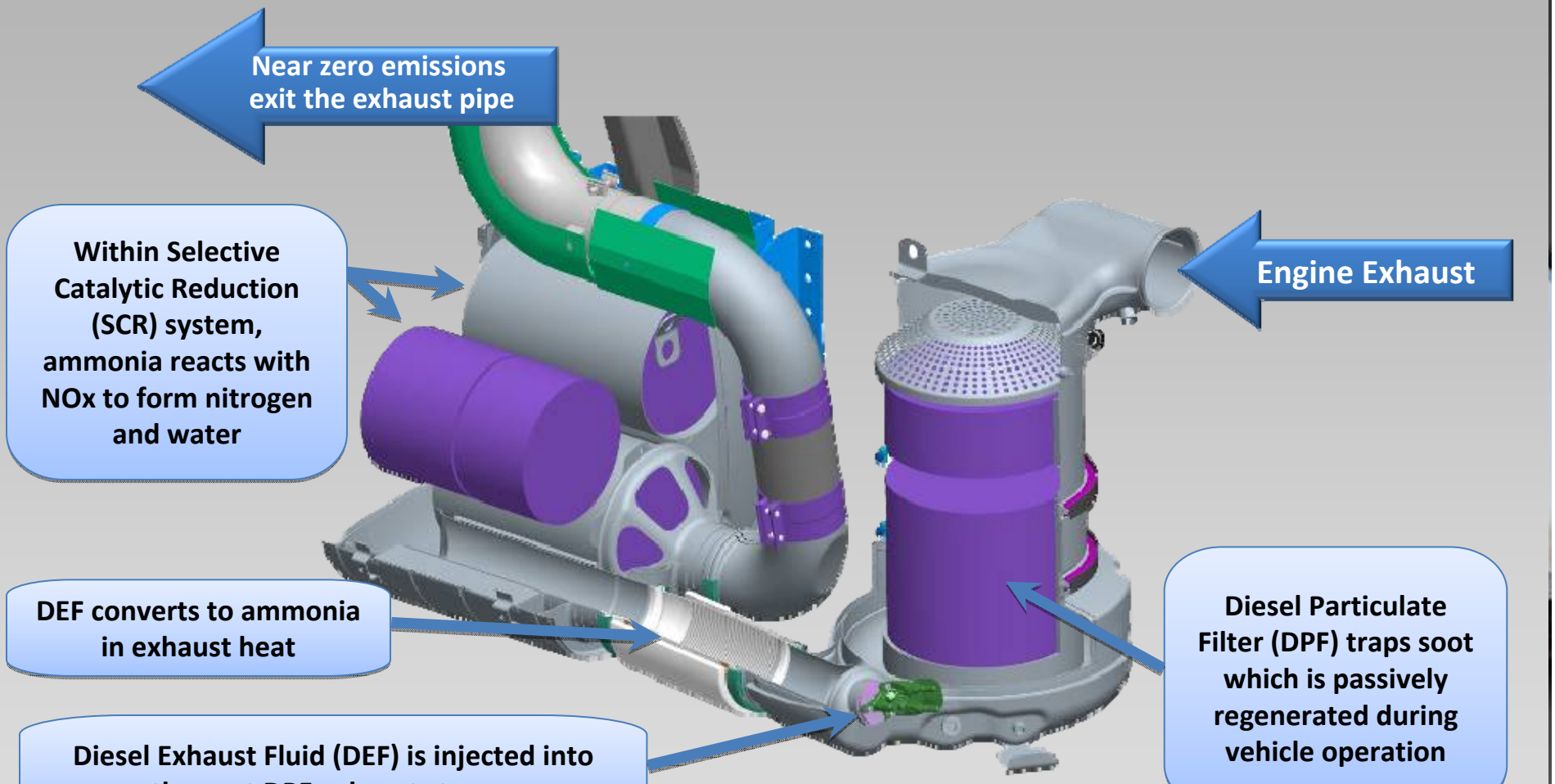
D13H – EGR REDUCED, SCR ADDED

- NOx reduced from 1.2 to 0.2 (near zero)
- SCR after-treatment added





EPA 2010 AFTER-TREATMENT SYSTEM

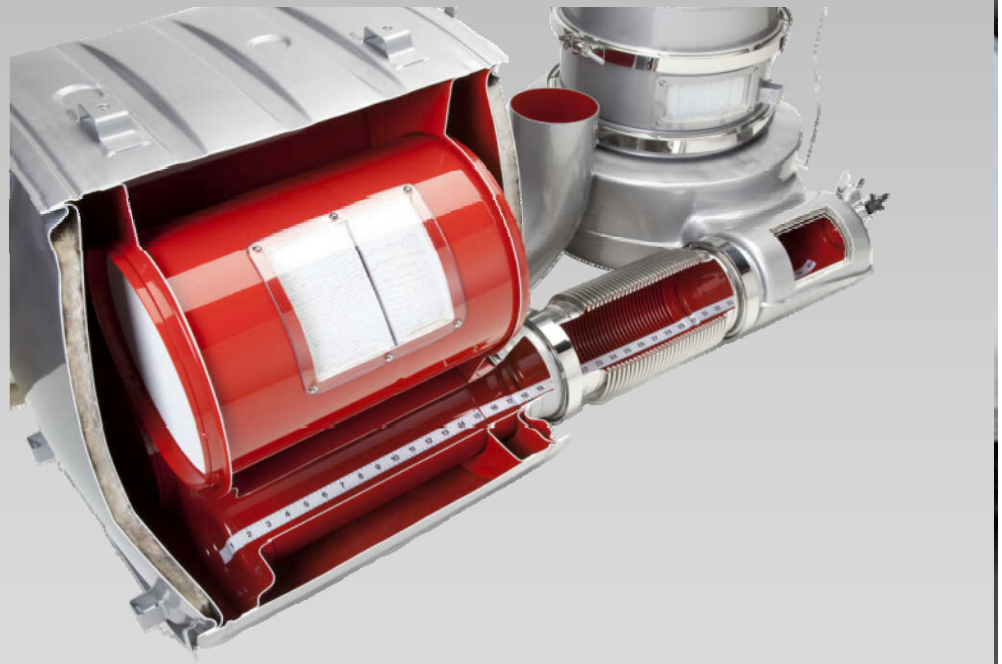


NO ACTIVE REGENERATION

- Volvo's SCR Technology eliminates active regeneration for EPA 2010 highway trucks*

LARGER CATALYST MEANS GREATER EFFICIENCY

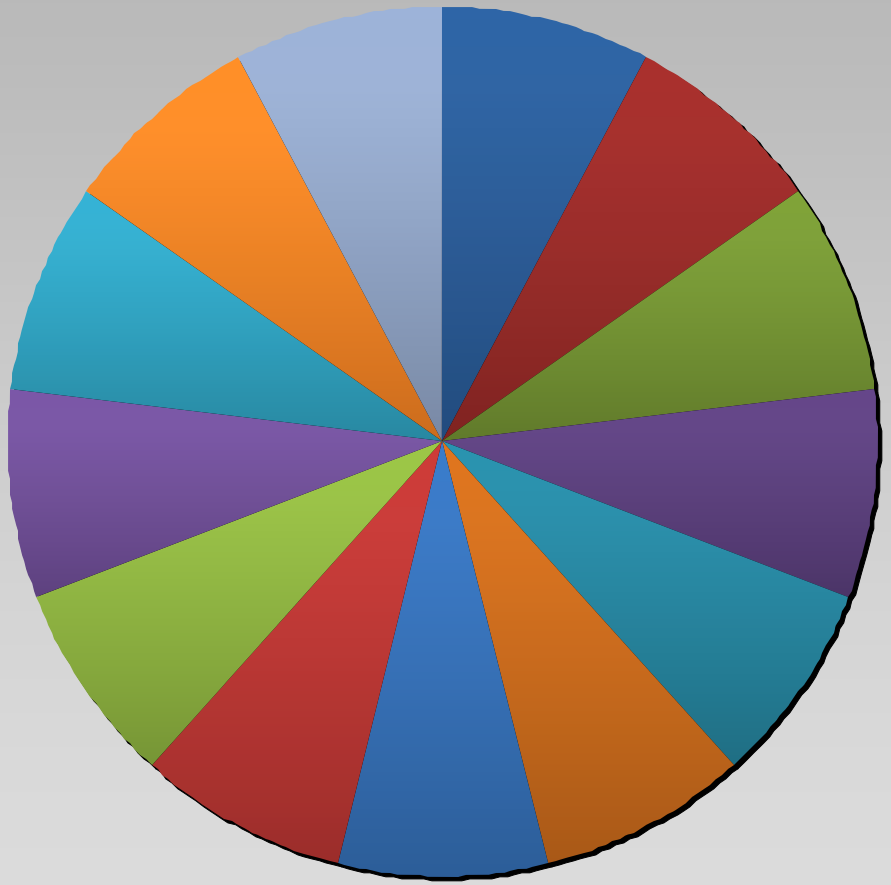
- Industry's longest decomposition zone
- Three bricks instead of two
- No active regen
- More NOx
- Less EGR
- Greater fuel efficiency
- 5% over 2007



FUEL ECONOMY VALIDATION

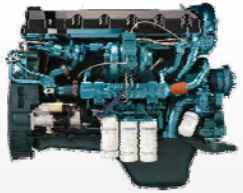
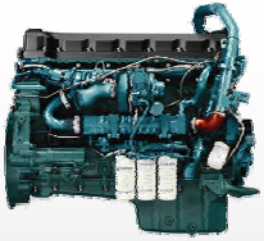
- EPA'07 vs. EPA'10
- Back-to-back testing in engine dyno
  - Maximizing control of variables, simulating "real" road cycles
- "On-road" confirmation testing
  - Controlled and standardized road cycle, control of test variables
  - Tests performed by internal experts and professional drivers
- Real world conditions, Identically specified trucks, achieved up to 5% fuel savings for EPA'10 vs. EPA'07

FUEL ECONOMY ELEMENTS



- Drivetrain efficiency
- Tires
- Aerodynamic aids
- Driver
- Tractor trailer configuration
- Engine programming
- Top speed gearing
- Idle technology
- Maintenance practices
- Terrain
- Weather
- Combination weight
- Management practices

WHAT HAS VOLVO DELIVERED FOR 2010?


- Same base engines as last EPA'07
- Less EGR – engines run healthier and deliver better fuel economy
- The No-Regen philosophy. *We've even taken off the inhibit switch!!*
- First one on the street. Only one with three winters of testing.
- 5% improvement in fuel economy from our already great 2007 D13

CONFIDENCE. RELIABILITY. SAVINGS.