

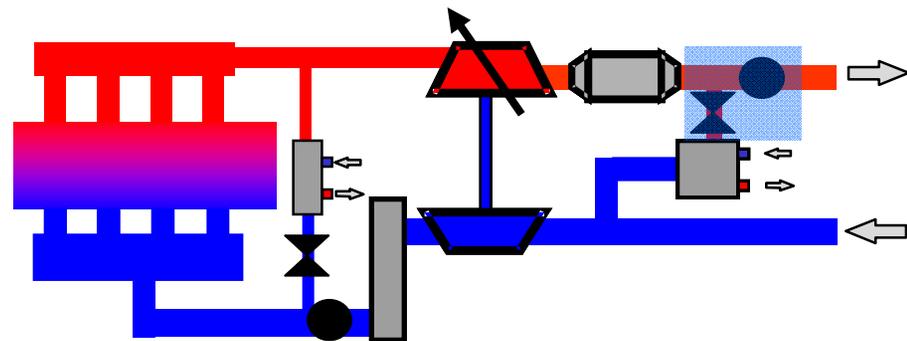
Future Breathing System Requirements for Clean Diesel Engines

Poster Location P23

■ Motivation

- Understand engine air system requirements to reduce NOx
- Identify interactions between components
- Develop new products to commercialize system
- Reduce emission controls costs to assure diesel market viability

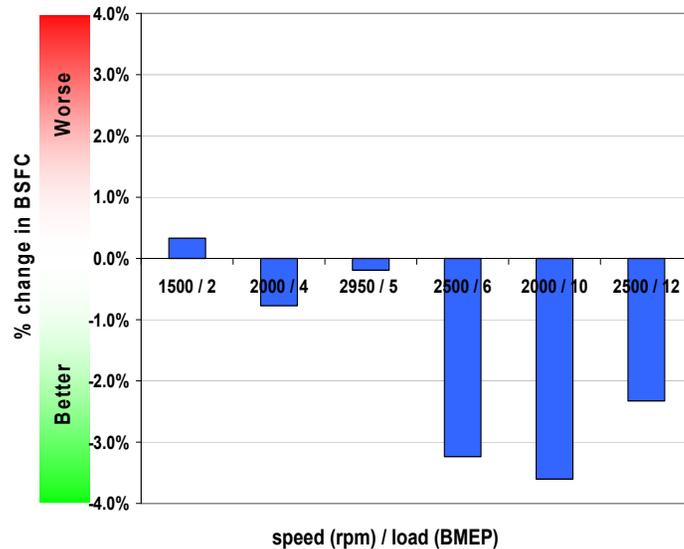
■ Results



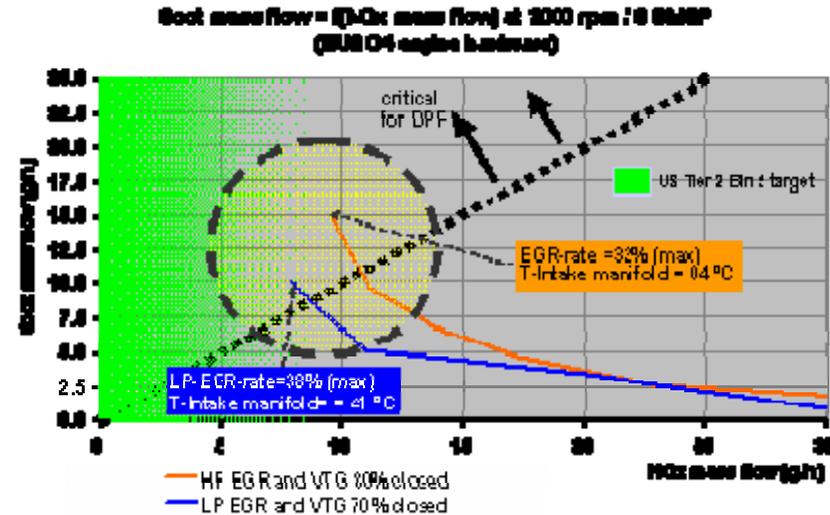
- Clean Hybrid EGR System (CHES)
- High Pressure & Low Pressure Loop EGR system
- New Enabling Products and Controls

Clean Hybrid EGR System- Key Results

■ Moderate LP-EGR Rates (identical to HP-EGR Euro 4/5 Baseline)



■ BSFC improvement up to 3.5% in most operating conditions using CHES



■ NOx reduction over 30% at constant soot achieved with LP EGR

□ BorgWarner sees CHES as the most efficient way to achieve NOx reductions to meet tighter emission standards