Cleaner road vehicles: How are European regulations addressing Real Driving Emissions?

Green Week Conference

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Outline

• EU Background
• Existing regulatory elements
• Future developments
• Expectations
EU Background

- EU Air Quality Directives
  - Persisting NO$_2$ exceedances in urban areas despite more stringent emissions standards
  - Main contributor is road transport, significant deviations between actual and expected NO$_x$ emissions

- Strategy for climate and GHG emissions
- EURO 6 (LDV) and EURO VI (HDV) emissions standards
Existing regulatory elements

- EURO VI 582/2011 (Annex II) & 64/2012: In-Service Conformity and Type Approval for heavy-duty engines, based on real-world vehicle testing with portable measuring equipment (PEMS)

- Verifies conformity of heavy-duty engines on vehicles during normal driving – at type approval and during their normal life (“In-Service”)

- Includes implicitly ‘real-world’ emissions requirements and provides a functional and performance check of the emissions control technologies
Underlying principles

- Procedures for emissions at Type Approval and In-Service Conformity
- Range of applicable normal vehicle operating conditions ("Boundary Conditions")
- Testing under real-driving conditions (with advanced instrumentation = PEMS)
- Sound data evaluation principles (Averaging, Not to Exceed)
Heavy-duty Engines - Future

- Review of Euro VI PEMS procedures (practicability, implementation)
- Addition of PM (PEMS PM Pilot Program, Industry run)
- Assessment of Real Driving Emissions: Attention will be paid to urban and low load operating conditions.
- By the end of 2014
Light-duty vehicles - Future

- Euro 6 standards
- Important elements with respect to vehicle emissions performance
  - New Driving Cycle (WLTP)
  - Real Driving Emissions (RDE) requirements
- RDE procedure shall complement the main cycle at type-approval
• Evaluation of RDE candidate procedures until mid 2012
• Result: PEMS testing was chosen as ‘golden’ method
• Laboratory random cycles were kept as backup (depending upon the feasibility of certain technical elements with PEMS, in particular PN testing)
• Development of procedures by the end of 2013.
• Implementation of RDE for Euro 6 vehicles, calendar and implementation measures (e.g. sampling of vehicles, administrative aspects) not officially agreed, but the tentative entry into force is planned for 2017.
• Laboratory vs. on-road test: controlled vs. (completely or partially) uncontrolled set of testing conditions

• 3 methods being assessed by the RDE-LDV group to evaluate on-road emissions data

• Program to assess the performance of portable particulate number counting equipment (PEMS PN)
• Testing with PEMS is gradually becoming a key element of EU emissions regulations

• PEMS Instrumentation acceptable for the current needs but improvement on-going (e.g. power consumption, compactness, PN)

• Real driving emissions became or becoming part of industry engineering practices
Expectations

- Cleaner road vehicles, in particular for urban areas

- To improve the ability to measure and quantify the real life emissions

- To push for an optimized design of emissions control technologies within the normal operating conditions

- To introduce cost-efficient regulatory procedures, able to control with the emissions for the upcoming technologies (including hybrids) and to limit the use of defeat devices/strategies
• Many thanks for your attention !!!

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In-Service Conformity

- Pilot Program (Industry run program) to be completed by the end of 2012
- Implementation for Stage IV or V standards (under discussion)
- Contributions from major EU and US engine manufacturers
- Adaptation of heavy-duty procedures to NRMM
- Equivalence with US methods being assessed