Real Driving Emission tests
The industry perspective

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KEY FIGURES ABOUT THE INDUSTRY

12.1 million direct and indirect jobs

€41.5 billion in R&D spending, largest private investor

€95.1 billion positive net trade contribution
• **Industry should communicate better** and improve collaboration with other stakeholders:
  - How to reconcile what is possible with what is needed.

• **EU environmental policy needs to be more coherent:**
  - Important regulations on emissions and test cycles continue to be drafted separately – disregarding interconnections.
  - Air quality improvements and further reducing CO₂ emissions need to be addressed together.

• **Innovation always goes faster than regulation:**
  - Revisions needed to adapt to new realities.
  - Limits to what can be regulated.
NOx: WHAT INDUSTRY WILL DO

- **GREEN** shows the Euro 6 NOx limit.
- **DARK BLUE** shows ICCT measurements of some Euro 6 cars (using PEMS).
- **LIGHT BLUE** (RDE) shows that RDE will (in short time) dramatically reduce emissions in real world driving.

RDE will deliver Euro 6 requirements in the laboratory and on the road.

Source: Euro 6 = http://www.theicct.org/real-world-exhaust-emissions-modern-diesel-cars
WHY NEW TESTS ARE NEEDED

• The **New European Driving Cycle (NEDC)** is the current test cycle used to verify compliance with emissions limits.

• It is a *laboratory test*, which ensures *repeatability and reproducibility*, but NEDC is out-dated.

• A new test cycle, the Worldwide Harmonised Light Duty Vehicles Test Procedures (WLTP), will **replace NEDC**.

• Industry has pushed for WLTP as a global new test cycle.
• For air quality related emissions, laboratory tests will be complemented by tests on the road: a new procedure known as **Real Driving Emissions (RDE)**.

• Actual real-world **emissions vary depending on conditions met on the road and on driver behaviour**.

• Real-world emissions are also influenced by the use of **new car features** that didn’t exist when NEDC was developed.

• European **Commission adopted a step-by-step approach**:  
  
  o Two packages are still missing and are urgently needed to complete the legislation.
RDE package 1 (cars):
- General framework of RDE legislation, 90% of boundary conditions, data analysis procedures and normalisation tools, data for RDE monitoring phase

Status:
- Agreed in May 2015
- Publication ≈ April 2016 (tbc)
- Effective in Q2 2016

RDE package 2 (cars):
- 2-steps, dates, conformity factors, completion of boundary conditions

Status:
- Agreed TCMV 28 October 2015
- Approved by Council on 12 February
- Publication ≈ April 2016 (tbc)

RDE package 3:
- PEMS for particles (PN), LCVs

Status:
- On-going work: due summer 2016

RDE package 4:
- RDE in-service conformity

Status:
- Not started: due end-16/early-17
Technical challenges

- Important **software** and **hardware upgrades**.
- Deployment of **latest generation NOx emission control technologies** across fleet (i.e., SCR, LNT).
- **Modifications to vehicle design** to accommodate emission control systems including urea tank (trade-off between customer convenience and efficiency).
IMPACT OF RDE

Technical challenges

• Important: **AdBlue refuelling infrastructure** needed for cars.
• Investment in **new testing equipment**: Portable Emission Measurement Systems or PEMS.
• Need to make PEMS smaller and lighter.
Financial challenges

• Measures to reduce NOx may **contradict previous investments in technologies aimed at reducing CO2** (such as engine downsizing).

• **Significant investments** in the next generation emission control technologies, but also changes to assembly lines and testing:
  - Manufacturing costs of **€600 - €1,300 per vehicle**;
  - **€120 million** in development, retooling, new test facilities and equipment **per manufacturer from now until 2019**.
Expected impact on the passenger car fleet

- 5% of planned diesel models will be **scrapped with step 1.**
- **Up to 25%** of planned diesel models to be dropped for step 2.
- Loss of investment return and **less choice for customers.**
The 2\textsuperscript{nd} RDE package sets a conformity factor (CF) of 1.0 as of 2020/21 plus a PEMS error margin of 0.5.

Margin for error necessary because both the accuracy of measurement equipment and accuracy of testing procedures are affected by various factors.

Does this mean that vehicles will emit 120mg/km instead of 80mg/km?

\textbf{No}, vehicles will have to perform \textbf{well below the 80mg/km limit} to ensure compliance with the conformity factor in the most extreme driving conditions. The limit will be met in the laboratory and on the roads.
REVIEWING THE ERROR MARGIN

• If the accuracy of equipment and testing procedures improves, the error margin could go down.

• The European Commission should also propose:
  
  o A system for regular auditing of testing parties to ensure the correct setting-up of vehicles and running of the tests;

  o A system for homologation of the PEMS equipment.
CONCLUSIONS

• RDE is urgently needed despite being a major challenge for the industry, both in terms of investments and production.

• Adoption of the 2\textsuperscript{nd} RDE package was essential to allow manufacturers to start preparing, but \textit{industry urgently needs the additional two RDE packages}.

• \textbf{CF of 1.0 means the legal limits are upheld}, the 0.5 error margin is necessary for the time being.

• A future revision of the error margin completed with robust procedures auditing system and homologation of the PEMS should allow the \textit{error margin to go down}. 
THANK YOU FOR YOUR ATTENTION

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