Vehicle Emissions Reductions by Innovative Software

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Road Data Can Improve Fuel Economy
Input for Powertrain Processes

- Powertrain processes can be helped by reliable knowledge of the road ahead
  - Information about upcoming hills and curves
  - Information about upcoming speed limit changes and stop signs
  - Information about traffic signals phase and timing
  - Information from variable signs such as speed limit and lane usage
  - Information about pavement surface quality
  - Information about difficult weather conditions
  - Information about traffic conditions
Benefits of Data Input

- Help the environment with a 6% reduction in fuel use and CO\textsubscript{2} emissions
Use of Probe Data about Actual Emissions Instead of Bench Tests to Set Vehicle Emissions Regulations
Current Approaches to Emissions and Fuel Economy Regulations

- Most jurisdictions use simulated driving conditions in laboratory tests to determine vehicle manufacturer compliance with fuel economy and emissions regulations.
- The tests do not accurately represent actual use and maintenance of vehicles.
- Vehicle manufacturers develop vehicles to maximise laboratory test results, not real-world behaviour.
- Bottom line:
  - More fuel used than necessary
  - More CO$_2$ produced than necessary
An Alternative Approach Using Vehicle Probe Data

- Fuel economy and emissions regulations can be based on real-world performance.
- In-vehicle connectivity allows direct tracking of fuel usage and emissions as probe data, generated from vehicle sensors.
- This probe data can be used to determine actual average fuel consumption during a vehicle’s service life under actual:
  - Driving conditions
  - Driving styles
  - Maintenance protocols
Impact: More Fuel Usage Reduction for the Same Investment

• With fuel efficiency based on the current regulatory approach, determined by the current testing methods
  ‣ Vehicle manufacturer investment may reduce real average fuel usage per kilometre driven by 30% for new vehicles in 2025

• But if fuel efficiency and emissions regulations become based on real-world, vehicle-life fuel averages
  ‣ The same vehicle manufacturer investment could reduce real average fuel usage per kilometre driven by over 50%* for new vehicles in 2025

* Based on reliable private estimates by senior vehicle manufacturer engineers
Operating Environment

- All the relevant technology already exists and is commercially available
- Connected vehicles are becoming widespread
- UNECE WP.29 can create the appropriate regulatory structure
• Strategies must be put in place to manage privacy issues
  ▸ For example, probe data should only include enough of the VIN data field to identify vehicle year and model
  ▸ Regulation mandating real-world emission enforcement could require vehicles that violate emission rules to send the entire VIN
    ▪ The VIN can be matched to license plate records to enforce proper repairs
Thank You