Light-duty EV and HEV: What should be tested at type approval?

Presentation of objectives and state of play of a COM study
Contents

- Background and objective
- Scope
- Parallel activities – positioning of this study
- Consumer requirements
- Issues with current legislation (selection)
### Incentives
- European strategy to shift to alternatively-fuelled vehicles
- Potential environmental benefits
- Potentially lower running costs

### Targets/ Future Actions
- Mass production of EVs/HEVs in the following years

### Policy
- Regulations/legislation should be amended in order to include these vehicles

### Objective:
Identification of tests to be performed and parameters to be measured for type-approval of light duty EVs and HEVs

### Contractors:
Consortium led by TRL and Ecorys (this presentation has been largely prepared by them for stakeholders information)
Vehicle types M1/ N1/ L

What are the existing regulations/ legislations/ standards?

What are the vehicle utility parameters that should be provided to consumers and regulators (EU & national)?

Which test procedures should be developed in addition to the existing ones? Amending existing test procedures?

Which new test procedures are feasible from an industry’s perspective?

We focus on test procedures to collect relevant utility parameters, the political discussion of regulating any of the identified utility parameters is outside the scope.
Parallel activities – positioning of the study

• UNECE GRPE Informal Group on Worldwide Harmonised Test Procedures (WLTP)
  Harmonised Driving Cycle (HDC)
  Development of Test Procedures (DTP)
    PM/PN measurement procedures
    New pollutant measurements (NO2, VOC, ammonia, …)
    Lab procedures
    EV/HEV specific issues
    Reference fuels

• The main focus of WLTP is harmonisation – no mandate for new parameters or test
  procedures for EVs/HEVs

• This study complements the WLTP work => Results may be considered for WLTP
  (possibly at later stage) or complementary EU regulation
What should be achieved?

• End-users and regulators provided with sufficient information about the environmental utility and performance of the vehicle so that:
  End-users can make an informed choice when selecting an EV/HEV
  Regulators can design regulatory measures according to the desired environmental performance

• Test regimes that reflect real world conditions
  E.g. driving in full electric mode under different traffic/weather/road conditions

• Parameters of tests suitable for:
  Type-approval
  Conformity Of Production (COP) assessment
  In-Use Conformity (IUC) assessment

• Focus on better information not on defining design requirements!
Parameters for consumer

Consumers need information for decision making when purchasing EVs and HEVs

What information is important to the consumer?

- Not all information provided affects the decision of the consumer
- Not all information is equally significant

What are the existing trends in consumer preferences and decision making?

How can they make better judgements on purchasing an EV or HEV?
Consumers need information for decision making with respect to purchasing of EV’s and HEV’s. What are the main parameters? In orange the ones used in literature. The technical parameters are being examined in the present study.

**Financing**
- Capital cost
- Subsidies
- Maintenance/Operating costs (mainly fuel costs)

**Environmental/Social**
- Emissions data
- Fuel availability

**Technical**
- Performance (e.g. speed, acceleration)
- Energy consumption
- Battery durability/Battery lifetime
- Recharge time
- Electric range
- Ancillary loads etc
Consumers need information for decision making with respect to purchasing of EVs and HEVs

Information could be provided from the Stakeholders? Per EV/HEV/ Vehicle category

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Provided information</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric range</td>
<td>Yes/ No</td>
<td>High/ Low</td>
</tr>
<tr>
<td>Energy consumption</td>
<td></td>
<td></td>
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<tr>
<td>Performance</td>
<td></td>
<td></td>
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<tr>
<td>Durability of batteries</td>
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<td></td>
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<tr>
<td>Recharge time</td>
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<tr>
<td>Conditional parameters</td>
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<td>Maintenance parameters</td>
<td></td>
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<tr>
<td>Ancillary loads</td>
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<tr>
<td>Other?</td>
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</tbody>
</table>
Issues with the current legal procedures (selection)

• Coast-down tests
  - no proper solution for HEVs in the legislation.
  - need to warm up vehicle before coast-down tests – there may not be enough range in an EV to do all the tests in one go.
  - can battery regeneration be turned off for the coast-down tests?

• PHEV electric range determination: does it reflect the real use (driving pattern, ambient temperatures,…) of the vehicle?
  - determine “low” temperature electric range, include heating?

• HEV having different operational strategies: which one to select at type approval tests?

• Tests for (selection):
  - battery charging time,
  - battery durability,
  - vehicle performance with aged/deterioated battery?

• Operation of auxiliary devices (e.g. air conditioning)
Thank you for your attention!

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