EU-Commission
JRC Contribution to EVE IWG:
HDV in-vehicle battery durability

Web-Meeting

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16th February, 2022

In-vehicle battery durability: LDVs vs HDVs

- LDVs:
  - TA of entire vehicle with specific driving cycle and test procedure
  - Possibility to repeat the TA test assessing the whole vehicle, i.e., battery and power train
  - Different usage profiles in different geographic areas for the MPR definition

- HDVs:
  - TA of components
  - Simulation tool determines fuel consumption and CO2 emissions of HDVs based on vehicle component (engine, air drag, gearbox, axles, tyres,…) input data
  - Heavy-duty vehicles have a large number of different types of vehicles for a single powertrain.
  - Different usage profiles, load and scope
  - Assessment of the aged components

Full procedure

As Japanese proposal, same methodology as for LDV:

1. **Different procedure for assessing the SOH indicators**
2. Families definition is needed to be defined
3. Work is needed to define the acceptable MPR for HDV

HDV Battery Capacity Retention Assessment

- Different proposals:
  - Removing the aged battery from the vehicle for component testing
    - *Too expensive and ignores full vehicle losses*
  - **Aged battery testing inside the vehicle applying a RTE*-like test at given mileage or years**

**RTE: Round Trip Efficiency*

HDV Battery Capacity Retention Test

- **Possible RTE test:**

Depleting completely the battery and fully charged it back while measuring the energy in and out at the battery to avoid combined battery-inverter efficiency and energy losses

- Fully deplete the battery according to a procedure to be defined:
  - Depleting by driving at defined C-rate/depleting current or by new available charging stations; assessment of the two methods accuracy needed (new systems and V2X standards under development to cover different charging mode and plugs)
- Fully recharge the battery according to a procedure to be defined:
  - Charging at full with a defined C-rate/charging current
- These two steps are performed on a new vehicle per family (at type approval) to get reference values
- The same procedure is performed on vehicles from the field to assess the SOCE indicator
- Test boundary conditions to be defined (see next slide)

HDV Battery Capacity Retention Test

- **Test boundary conditions to be defined:**
  - Power of charging/discharging, AC vs DC, temperature, SOC level and SOC swing…
  - Test repetitions, accuracy, distribution
  - OVC-HEV vs PEV
  - Families definition
  - Battery energy, capacity …
  - …

Thank you for the attention

Q&A

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