UNECE EVE-IWG

In-Vehicle Battery Durability

Position on an appropriate MPR level
-Phase 1 of the GTR-

EVE #41 meeting

16. December 2020

Global technical regulation (GTR) „In-Vehicle-Battery-Durability“

OICA position on MPR numbers for M1/N1 PEV/OVC-HEV

Proposed values for M1 vehicles (passenger cars) for Phase 1:

Vehicle Category	Min. Remaining energy	Max. Mileage	Max. Year-Number
M1	**70%**	**100.000 km**	**5 years**

➔ Further justifications/explanations: next slide

Proposed proceeding for N1 vehicles (vans) → monitoring for Phase 1

Vehicle Category	Min. Remaining energy	Max. Mileage	Max. Year-Number
N1 (up to 3.5t)	**Phase 1: No requirement → monitoring**	**Phase 1: No requirement → monitoring**	**Phase 1: No requirement → monitoring**

➔ Further justifications/explanations: next slide

Global technical regulation (GTR) „In-Vehicle-Battery-Durability“

Justification for OICA position on MPR numbers for M1/N1 PEV/OVC-HEV

OICA position on MPR numbers for M1 SOCC → 70% after 100.000km and 5 years (whatever comes first)

Justification of numbers for M1 SOCC MPR:

- 70% as minimum MPR level value ensures to be in the area of linear and predictable battery degradation (see next slide)
- 100.000 km and 5 years is basing on requirements of current ISC procedure
- 100.000 km and 5 years are still following the idea of a rock screening level for Phase 1

OICA position on MPR numbers for N1 SOCC → No numbers proposed as N1 SOCC should go into Phase 1 monitoring

Justification for N1 SOCC monitoring:

- Not enough vehicles on the market
- Not covered by TEMA model
- Broader data base required for MPR discussion (→ Phase 1 data can be used for Phase 2 discussion)

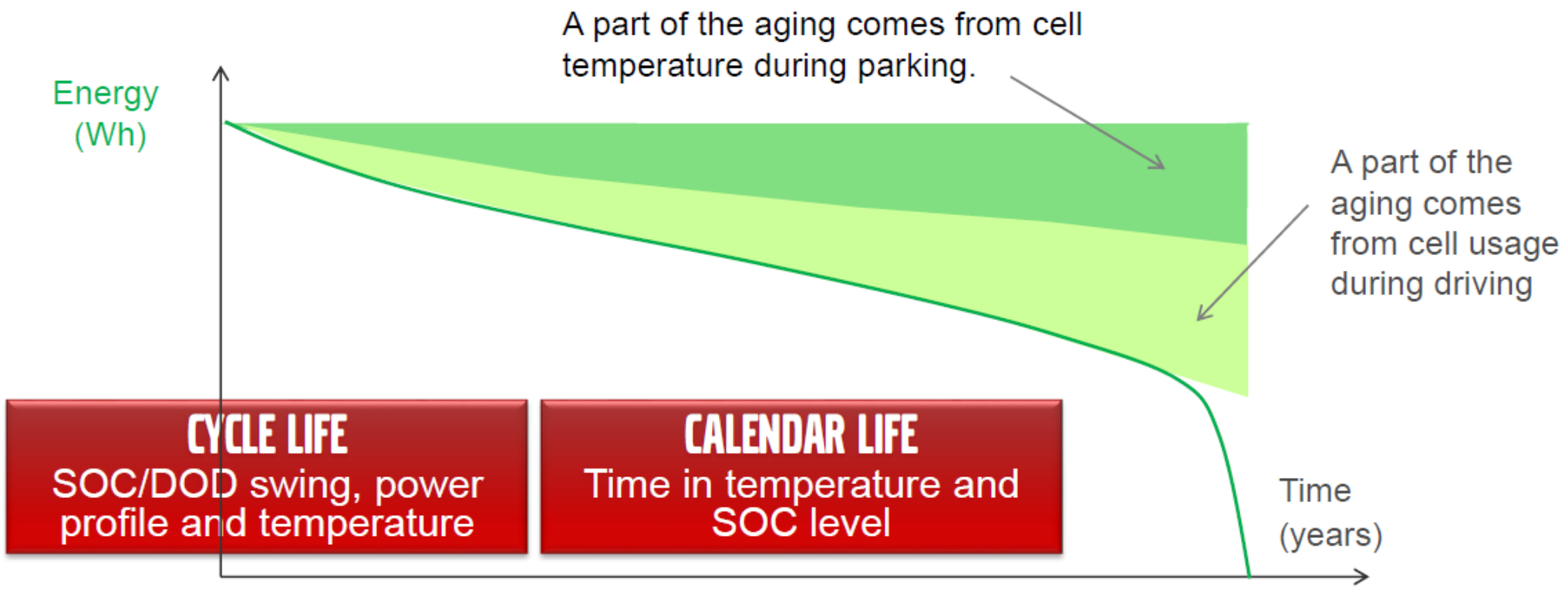
OICA position on MPR numbers for M1 and N1 SOCR→ No numbers proposed as M1 and N1 SOCR should go into Phase 1 monitoring

Justification for M1 and N1 SOCR monitoring:

- More influencing parameters on range
- Higher tolerances required for range
- Further evaluation especially on EAER required
- Please also see EVE-39-03e-pdf

Global technical regulation (GTR) „In-Vehicle-Battery-Durability“
Example for a battery aging curve (OICA presentation EVE-22-05e.pdf)

CYCLING & CALENDAR AGEING



Global technical regulation (GTR) „In-Vehicle-Battery-Durability“

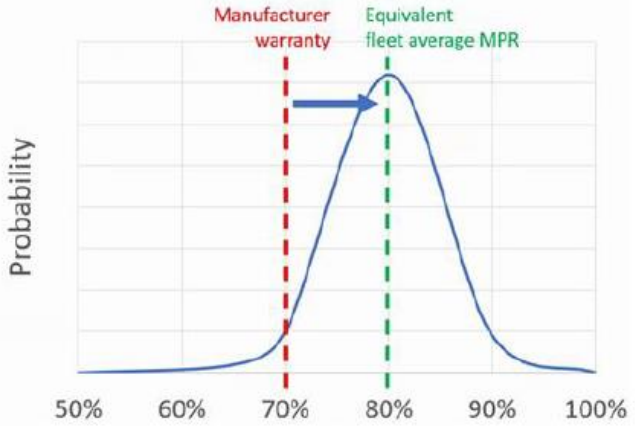
OICA concerns on proposed backstop solution

Reminder: Pictures from EVE-40-02-Rev1e.pdf (Presentation Mike Safoutin):

NOTE: the concepts presented here are for discussion only, and values presented are only for illustration of the concepts.

Difference between warranty and MPR

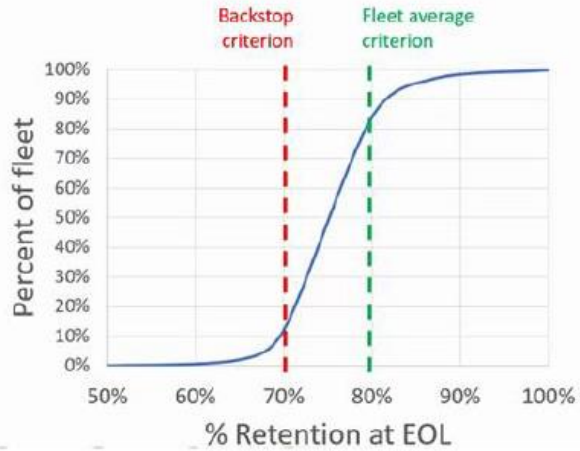
- MPR concept enforces a fleet average performance
- By contrast, manufacturer warranties enforce individual performance
- For a given performance curve in the field, the warranty level chosen by OEMs is therefore lower than the “equivalent” fleet average MPR



NOTE: the concepts presented here are for discussion only, and values presented are only for illustration of the concepts.

Possible “backstop” concept for MPR structure

- MPR might consist of fleet average criterion + backstop criterion
- Both must be met. For example:
  - Fleet must average 80% retention
  - AND not more than 10% of fleet can achieve less than 70% retention



Key concerns from OICA:

- The shape of the curve is critical as at this stage, OEMs don’t know the shape of the curve: Different regions, driving profiles, battery chemistry all play into the shape, etc.
- TEMA model cannot be used for creating the shape of that curve as TEMA still needs further evaluation

➔ Phase 1 with implemented SOCC and SOCR should be used to identify the distribution in the field and the shape of the curve

➔ Furthermore, following the rock screening approach in Phase 1, there should not be multiple ways for the manufacturer to be analyzed

➔ Discussions on such a solution should not start before Phase 2