UNECE EVE-IWG

In-Vehicle Battery Durability

# Arguments for range monitoring and base MPR + wide tolerance for UBE in Phase 1 of the GTR

EVE #39 meeting

04. November 2020

# Proposed contents for GTR Phase 1 and Phase 2

- Phase 1: UBE → base MPR + wide tolerances; range → monitoring

| | | OVC-HEV | PEV |
|---|---|---|---|
| **Phase 1** | UBE indicator | Part A: Verification with Tolerance X<br>Part B: MPR_base | Part A: Verification with Tolerance X<br>Part B: MPR_base |
| | Range indicator | Monitoring_OVC-HEV* | Monitoring_PEV |

*Note: Regarding „Monitoring_OVC-HEV“: removed if no agreement is reached in Phase 1 for an appropriate range metric (AER, EAER, …)

- Phase 2: UBE → advanced MPR + tighter tolerances; range → MPR + tolerances (based on monitoring)

| | | OVC-HEV | PEV |
|---|---|---|---|
| **Phase 2** | UBE indicator | Part A: Verification with Tolerance Y<br>Part B: MPR_adv | Part A: Verification with Tolerance Y<br>Part B: MPR_adv |
| | Range indicator | Part A: Verification with Tolerance Z<br>Part B: MPR_base | Part A: Verification with Tolerance Z<br>Part B: MPR_base |

| | |
|---|---|
| Tolerances | Tolerance X (P1) >> Tolerance Y (P2);<br>Tolerance range Z >>> Tolerance UBE Y |
| MPR_base = | Base MPR to ban substandard products from the market |
| MPR_adv = | Data driven MPR based on Phase 1 experience/learning (if needed) |

# Arguments for range monitoring in Phase 1

**Argument 1 (for OVC-HEVs and PEVs):**

- Range is influenced (also on dyno) on a lot more parameters than UBE (see presentation ACEA/Alliance: EVE-37-04-Rev2e.pdf)
- That higher influence from other parameters is requiring a higher tolerance for the indicator
- How much the higher tolerances need to be is hard to quantify

➔ Range monitoring in Phase 1 can be used to get a broad data base for defining an appropriate tolerance for range indicator
➔ Alternative to range monitoring: pretty conservative tolerances in Phase 1 which can be tightened anyway in Phase 2

**Argument 2 (for OVC-HEVs and PEVs):**

- Data from ACEA/Alliance in EVE-37 as well as from Japan in EVE-38 showed (currently) no influence of EC on range
- Therefore, as range is (currently) a function of decreased UBE, no urgency to set MPRs and tolerances for range already in Phase 1 (in Phase 1, that is sufficiently covered by tolerances and MPRs for UBE)

➔ To respect the requests from legislator, range indicator will be kept but MPR and tolerances for range first in Phase 2
➔ Range monitoring in Phase 1 can be used to get a broad data base for defining appropriate tolerances and MPRs for range indicator

**Argument 3 (for OVC-HEVs):**

- Range value for range indicator of OVC-HEVs is still in discussion (no decision yet; only feeling that EAER could work)
- Current results/findings on EAER look promising but further evaluation and scrutiny necessary
  - Is EAER really working under all circumstances? Is there any job stopper coming along?

➔ Range monitoring gives more time to make this analysis and to avoid implementing something which does not work
➔ At least for OVC-HEVs, this assessment is definitely required

# Arguments for wide tolerances and base MPRs in Phase 1 for UBE

**OICA position regarding tolerance and MPR level:**

- For UBE: base MPR and wide tolerance in Phase 1 (“rock-screening”), tighten tolerances and MPRs in Phase 2 based Phase 1
- For range: no MPR and tolerances defined in Phase 1; set MPR and tolerances in Phase 2 based on monitoring results

**Argumentation for base MPR in Phase 1 for UBE:**

- MPR level should be set in a way to ban substandard products from the market
- MPR level should not only base on simulation data from TEMA model and premium car vehicles (currently broad mass of EVs)
- MPR level (if too low) can be tightened anyway with the Phase 2

**Argumentation for wide tolerances in Phase 1 for UBE:**

- Tolerances should be wider as also with the UBE indicator some more experience need to be made
- Tolerances can be wider as they can be tightened anyway with Phase 2

**Argumentation for shifting MPR and tolerances definition of range to Phase 2:**

- Range value (especially for OVC-HEVs) needs more in-depth scrutiny and evaluation
- Critical point is for both OVC-HEVs and PEVs the definition of appropriate tolerance for the range indicator (Part A)
- Phase 1 can be used to find the appropriate tolerance and MPR level for range in Phase 2
- Industry understands concerns from legislator regarding range
  (although range degradation is currently no function of increased EC but just decreased UBE)
  → Industry accepts the range indicator but is asking for that monitoring phase as additional input for MPR and tolerance definition

# Proposed timeline for GTR Phase 1 and Phase 2

Data sources (e.g. data from OEM, TEMA, etc.)

Input

Development of GTR Phase 1

Implementation of GTR Phase 1 into regional legislation

Regional legislation (contents GTR Phase 1) In EU, US, JPN, etc.

Technical lead-time required (indicator need to be implemented)

Other data sources

Input

Input

Contents of GTR Phase 1
- UBE indicator:
  - Part A: Verification with Tolerance X
  - Part B: MPR_base
- Range Indicator*:
  - Part A: Monitoring
  - Part B: Monitoring

*Note: Regarding „Monitoring_OVC-HEV“: removed if no agreement is reached in Phase 1 for an appropriate range metric (AER, EAER, …)

Development of GTR Phase 2

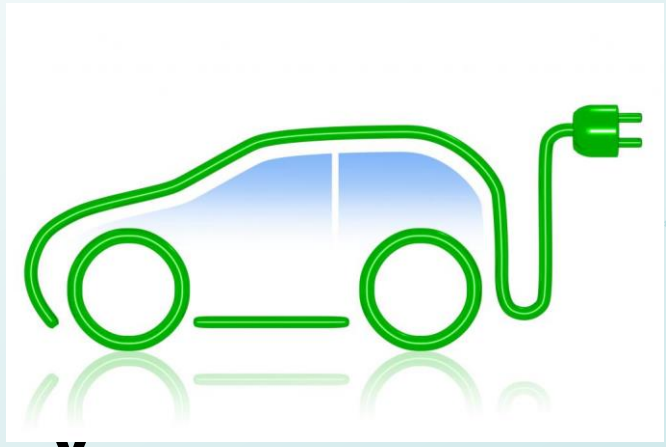
Proposed contents of GTR Phase 2
- UBE indicator:
  - Part A: Verification with tighter Tolerance Y (if necessary)
  - Part B: MPR_adv (replacing MPR_base if necessary)
- Range Indicator:
  - Part A: Verification with Tolerance Z
  - Part B: MPR_base

**Need for an appropriate starting time and length of the GTR Phase 2 development: Robust and wide data base is required for the indicator evaluation (indicator need be available + evaluation on broad basis of vehicle, especially aged vehicles)**

# Overview: Customer information and regulator information

## Information for the legislator

Range **indicator** (cycle/procedure based)
→ Relevant for comparison with MPR
→ No information for the customer



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## Customer information

UBE **indicator** (cycle/procedure based)
→ Relevant for comparison with MPR
→ Should be shown to the customer as important for second hand users

Remaining battery range
(individual for each customer)
Not relevant for comparison with MPR
Will be shown in the HMI as important for knowing when to charge the vehicle