Submitted by the EVE informal working group

Informal document **GRPE-79-28-Rev.1**
79th GRPE, 21-24 May 2019
Agenda item 9

# Electric Vehicles and the Environment (EVE IWG)

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## REPORT TO GRPE 79TH SESSION

# Original Mandate (Part B of 2nd Mandate)



- Hybrid power determination
  - Targeted establishment of a power determination GTR by AC.3 in the Global Registry in November 2019 with flexibility to extend by up to 1 year based on results of validation testing
- In-vehicle battery durability
  - Continuing research on EV battery performance and durability
  - Return to AC.3 with recommendation for next steps (such as GTR development) or conclusion of topic
- Method of stating energy consumption
  - Find another group within UNECE framework to assume leadership of the topic, with support of EVE IWG, with the *Group of Experts on Energy Efficiency (GEEE)* was identified as an initially promising option

# Updates to Mandate and Current Status



- Hybrid power determination
  - Initial mandate envisioned GTR as an Annex to GTR No. 15, but in March 2019 AC.3 approved decision to instead develop as a standalone GTR
  - Initial validation testing complete, with some open issues requiring further validation testing, draft GTR under development and revision
- In-vehicle battery durability
  - Continuing research on EV battery performance and durability, including testing and modeling
  - Plan to return to AC.3 with recommendation for next steps, or conclusion of topic
- Method of stating energy consumption
  - The *Group of Experts on Energy Efficiency (GEEE)* and the *Group of Experts on Cleaner Electricity Production (CEP)* have been contacted to request that they assume leadership of the work with the support of the EVE IWG as needed
  - Both groups have shown some interest, but neither have committed to leading the topic
    - Interaction with these groups is led by the Secretary of GRPE

# Update on Status Reports



- A draft status report on in-vehicle battery durability and method of stating energy consumption is available at EVE-31-03e
- List of vehicle architectures tested during validation testing program available as EVE-31-04e
- https://wiki.unece.org/display/trans/EVE+31st+Session

# Status of In-Vehicle Battery Durability



- EVE has completed its work under Part B of the current mandate
- Durability Status Report has been drafted and submitted for review
  - The report summarizes the work and the conclusions from Part B of the EVE mandate
- EVE was working under the premise that a future durability GTR would be discussed during this GRPE
  - However, this week it was made clear that provision for in-vehicle battery durability is expected

# Status of In-Vehicle Battery Durability



- European Commission expressed concern that a durability procedure would not be available for this fall
- Japan stated that while they support the development of durability requirements they would like to better understand the goals and work, before agreeing to an appropriate timeline
- EVE IWG proposed a near-term durability solution
  - Adopt predetermined deterioration factors
  - Confirm during in-use conformity tests

# Next Steps For Electrified Vehicle Durability



- Request permission from GRPE for the EVE to continue to work on the durability topic
- Include the development of a durability process in the agenda for EVE32, scheduled for this fall
  - Begin development of a durability provision informally
- Japan to provide recommendation for overall timing to be presented to GRPE in January 2020
- Potentially request new mandate to develop an in-vehicle battery durability GTR in January 2020
  - Final timing to be determined and will be discussed and hopefully resolved at EVE32 in October 2019

# Status of System Power Determination



- The drafting group has developed a working draft of a standalone GTR closely based on ISO 20762
- The first phase of a validation testing program has been completed by JRC, USA and Canada
  - To assess the practicability and results of the draft procedure
  - To generate information to assist its further development
- Results:
  - Ambiguities in the procedure were identified and the drafting group has implemented clarifications
  - A number of new technical concerns have also been identified

# Status of System Power Determination



- New technical concerns:
  - Results of TP1 and TP2 were observed to differ significantly
  - Potential sources of the difference have been identified but need further technical evaluation
  - How to verify key manufacturer inputs to TP1 and TP2
  - Variation in hybrid architectures pose technical concerns for TP1 and TP2 as currently defined
- It is likely that resolving these concerns will require the discussion and drafting of significant new technical and guidance content that is not present in ISO 20762
- A second phase of validation testing will also be needed to help develop and validate these changes

# Next Steps for System Power Determination



- Newly identified open issues to be resolved
  - Difference between result of TP1 and TP2 to be addressed
    - Sources of difference to be identified and corrected
    - Draft procedure to be modified to reduce, or eliminate, the difference
  - Applicability of TP1 and TP2 to a variety hybrid configurations to be examined, and guidance provided in the GTR
- Validation Phase 2
  - Matrix of hybrid configurations has been developed to guide the study design
  - New technical guidance to laboratories for Phase 2 testing is being developed
  - JRC, US and Canada plan to conduct testing in Summer 2019

# Proposed New Mandate (Not Finalized)



- Initial draft proposal for new mandate presented at EVE-31 on 21-May-2019
- Proposed new timeline for power determination GTR, included in draft working document being shown today
  - June – October 2019: complete additional validation testing
  - January 2020: Preliminary draft GTR available for GRPE
  - June 2020: Final working document for GRPE
  - November 2020: Approval by AC.3
- Proposed path forward for method of stating energy consumption
  - EVE remain available as experts on EV performance to support this work under leadership of another group such as GEEE or CEP

# Proposed New Mandate (Not Finalized)



- Preliminary timeline under discussion for in-vehicle battery durability (not all contracting parties in agreement on timelines)
  - November 2019 – March 2020: Develop preliminary procedure, based on deterioration factor (DF) concept and validated by in-service conformity
  - March 2020 – January 2021: Validation testing of draft procedure and refine procedure as needed
  - January 2021: Preliminary GTR available for GRPE
  - June 2021: Final working document for GRPE
  - November 2021: Approval by AC.3
- Japan has proposed to initially discuss and agree on the purpose of GTR in more detail before deciding on the timeline by January 2020

# EVE Meetings



- Regular meetings concurrent with GRPE each January and June
- 10-11 April 2017 – Ann Arbor, USA
- 24-25 October 2017 – Vienna, Austria
- 27-28 March 2018 – Tokyo, Japan
- 16-18 October 2018 – Ottawa, Canada
- 8-10 April 2019 – Stockholm, Sweden
- Fall 2019 (Tentative) – Ispra, Italy
- Spring 2020 (Tentative) – North America