

**Report of the 15th Session of the
Electric Vehicles and the Environment Informal Working Group (EVE IWG)**

Location: Room XXVII, Palais des Nations, Geneva
Time / Date: June 8th, 2015
Chair: Mr. Michael Olechiw (USA)
Co-Chairs: Mr. Kazuyuki Narusawa (Japan)
Ms. Chen Chunmei (China, by teleconference)
Secretary: Ms. Erin Marchington (Canada)

1. Welcome, Introductions, and Agenda (item 1)

Mr. Michael Olechiw, Chair of the informal working group, welcomed participants to the meeting. The meeting was well attended, with over 30 participants from contracting parties, other WP.29 working groups, and industry organizations. In addition to Mr. Olechiw, Ms. Marchington (Secretary), Mr. Narusawa (Co-Chair), and Ms. Chunmei (Co-Chair, by teleconference) were present at the meeting.

Mr. Olechiw outlined the objective for the 15th EVE meeting, which was to continue work on Part A of the new EVE mandate. Building on issues discussed during the 14th EVE IWG meeting, lead parties/organizations were to present an update on the status of their work.

The agenda for the meeting (EVE-15-02-Rev2e) was reviewed and accepted by all participants.

2. Review EVE IWG #14 Meeting Report (item 2)

Speaking to agenda item 2, Ms. Marchington reviewed the action items from the EVE-14 meeting (EVE-14-12e). Many of the 10 action items are ongoing, with the exception of EVE-14 Action 7, 8, 9 and 10, which were completed during the EVE-15 meeting. The ongoing action items are re-named below:

ACTION 1 (EVE-14 Action 1, ongoing): Concerning future work under Topic 2, the EVE group will consider the development of a technical report that could be added into the SR1 and/or RE3 documents and discuss further at the next EVE meeting.

ACTION 2 (EVE-14 Action 2, ongoing): The EVE group will continue discussion with the WLTP IWG and European Commission about potential areas for collaboration in EV work.

ACTION 3 (EVE-14 Action 3, ongoing): All interested parties are encouraged to contribute data to build the database proposed by China by reaching out directly to Ms. Chen Chunmei (chencm@miit.gov.cn).

ACTION 4 (EVE-14 Action 4, ongoing): All interested parties wishing to participate and/or contribute to the literature review proposed by USA and Canada by reaching out directly to Mr. Olechiw (olechiw.michael@epa.gov) and Ms. Marchington (Erin.Marchington@ec.gc.ca).

ACTION 5 (EVE-14 Action 5, ongoing): All interested parties wishing to participate in this work by Germany and Korea should reach out directly to Mr. Holdik (Hans.Holdik@bmvi.bund.de) and Mr. Dongseok Choi (dsechoi@ts2020.kr).

ACTION 6 (EVE-14 Action 6, ongoing): Any interested parties and/or stakeholders wishing to speak to the issue of battery recyclability at future EVE meetings should inform the EVE Secretary ahead of the meeting so they can be added to the agenda.

3. Update on other GRPE and WP.29 IWGs (item 3)

Mr. Olechiw led a roundtable discussion of work related to EVs occurring in four other GRPE and WP.29 IWGs, with a focus on potential linkages to current EVE work. An update was given by Mr. Tetsuya Niikuni on the E.lab subgroup within the Worldwide harmonized Light vehicles Test Procedure (WLTP) IWG using document EVE-15-08e and WLTP-11-26e. Two open issues were discussed as being relevant to EVE work: #52 (end of PEV range criteria) and #58 (PEV shorten test procedure). Also, battery durability was noted to be under consideration for WLTP Phase 2 work (to start in 2016).

An update was given by Mr. Guido Gielen on the Environmental Propulsion and Performance Requirements (EPPR) IWG using document EVE-15-09e. The group has made the most progress on drafting a new GTR regarding crank case and evaporative emissions and, to continue work, a mandate extension is currently under review. Mr. Gielen noted that the EVE work on power determination will be of interest to the EPPR group in the future, when this issue is addressed in the EPPR IWG.

Mr. Kazuyuki Narusawa gave an update on the Electric Vehicle Safety (EVS) IWG. The group is currently discussing a mandate extension and a two-step approach to future work. Mr. Brian Lawrence from Jaguar informed the EVE group that he would like to make a brief presentation on EVS issues of concern to industry to the EVE group in the future (Action 8), with an emphasis on potential constraints to EV technological development.

Finally, there was no update from the Vehicle Propulsion System Definition (VPSD) IWG because work on the VPSD summary document is nearing completion.

ACTION 7: Mr. Brian Lawrence (Jaguar) will give a brief presentation at a future EVE meeting on EVS issues of concern to industry.

4. Update on subgroup activities for Part A of the new EVE mandate (item 4)

Method of stating energy consumption (EVE-15-03e)

Ms. Chen Chunmei (China) introduced EVE-15-03e, which outlines a status update of China's work. The results of their literature review were presented (EVE-14 Action 8) with four observations: a) many papers were related to the assessment of energy saving and GHG emission reductions of EVs in different countries/districts; b) the upstream stage of power supply should be covered in the assessment of EV energy consumption; c) data about the electricity mix and upstream emissions factors of different power supplies can be collected from most countries; and d) therefore, a standardized method for calculating and stating energy consumption and the associated GHG emissions for EVs is recommended for consideration. China is still collecting data for the development of a database and contracting parties were encouraged to submit data outlined on slide 25 (also detailed in EVE-14-11e) as soon as possible (Action 3). Discussion concerned the need for methodology to consider not only country-level, but regional-level differences in energy supply, which will have an impact on the

emissions calculated. Also, there was emphasis that manufacturers could not affect vehicle fueling choices by the consumer, and therefore upstream emissions, of a vehicle. Action 1, the development of a technical report, was not discussed and will be addressed in future EVE meetings.

EV Battery performance and Durability (EVE-15-04e)

Mr. Olechiw introduced EVE-15-04e, which reviewed the status of FEV's literature review on EV battery durability: factors effecting EV durability, examples of EV testing methodologies, HEV testing, PHEV testing, and test laboratory examples (Idaho National Laboratory studies, National Renewable Energy Laboratory studies, and National Traffic Safety and Environment Lab studies). The FEV literature review is anticipated to be completed in mid-July 2015, at which point it will be distributed to the group and discussion of the results will be continued during the EVE-16 meeting (Action 9). Discussion concerned whether the factors affecting durability was an exhaustive list, which it is up to this point, although a few may be added in the future. Also, there appears to be a natural grouping of the factors into three areas related to activity, drive cycle and environment or exposure. There were several questions related to the goal of this work, which was clarified by Mr. Olechiw to be to summarize the state of EV durability (definition, parameters involved, existing vehicle-level test methodologies, etc.) and then, only if enough information is known, to make recommendations going forward (i.e. test procedure). However, it was emphasized that this work is very complex, and that if test procedures that address EV durability are put in place, this could have a limiting effect on battery innovation and development. Also, the challenge of limited data concerning consumer charging patterns was discussed, as this activity impacts durability but is out of the control of vehicle manufacturers. Clarification on two issues will be sought by Mr. Olechiw from FEV: a) what the purpose of the elevated storage temperature methodology is (i.e. this is not a comprehensive method to evaluate durability) and b) what is the difference between the factors of 'driver aggressiveness' and 'drive cycle' (i.e. they should be considered as the same factor) (Action 10). All EVE group members were encouraged to send questions for FEV concerning the literature review to Mr. Olechiw (Action 11). Finally, it was clarified that this work would not target specific battery chemistry, but that the intent would be to develop a generic durability test. Also, it was emphasized the test program/methodology recommendations that will be presented by FEV in the finalized literature review will be the opinion of FEV and may or may not be adopted by the EVE group.

ACTION 8: The FEV literature review on EV durability will be distributed to the group ahead of the EVE-16 meeting for review and comment.

ACTION 9: Mr. Olechiw will clarify with FEV questions concerning the purpose of the elevated storage temperature methodology and the difference between the factors of 'driver aggressiveness' and 'drive cycle'.

ACTION 10: EVE group members should send further questions for FEV concerning the literature review outlined in EVE-15-04e to Mr. Olechiw (email: Mr. Olechiw, olechiw.michael@epa.gov, cc: Mr. Tom Casciani, Casciani@FEV.com, Erin.Marchington@ec.gc.ca).

Determining power of EVs (EVE-15-05e, EVE-15-07e)

Mr. Narusawa introduced document EVE-15-05e, which reviewed the timeline and work objectives for the ISO HEV System Power WG, supported by the Japan Automobile Research Institute. Discussion of this work will be continued during the EVE-16 meeting with a presentation by Mr. Kubodera (Action 12).

Mr. Hans Holdik introduced EVE-15-07e, which outlined the status of Germany and Korea's work on the determination of powertrain performance of HEVs, including activities since the EVE-14 meeting and planned activities to the EVE-16 meeting. A summary of the ongoing projects related to EV system power (i.e. SAE-J2908, KATRI, ISO, etc.) gathered from the second and third question of the questionnaire distributed to the group (EVE-14-07-Rev1e) was presented. Also, responses from the EU, Japan, Korea, and Canada to the first question in the questionnaire (which regulatory approach is most appropriate) were summarized and presented. Further analysis of the questionnaire responses will be completed prior to the EVE-16 meeting, along with a discussion paper to be distributed in August or September (Action 13). The goal for the EVE-16 meeting will be to decide on the regulatory approach and procedure for the work going forward. Discussion focused on the strong need expressed by the WLTP group for this work. It was clarified that the regulatory approach to issue (i.e. recommendation, UN Regulation or GTR) has not yet been decided, although the EU has stated a preference for a broad approach that would cover all vehicle types and update UN Regulation 85, after which a GTR could be developed. The issue of determining peak power and other similar parameters was also discussed.

ACTION 11: Mr. Kubodera will present an update on the ISO HEV System Power WG during the EVE-16 meeting.

ACTION 12: Germany and Korea will draft a discussion paper on their work regarding the determination of powertrain performance of HEVs and distribute it to the EVE group ahead of the EVE-16 meeting.

Battery recyclability

The EVE leadership did not receive any new information on this topic or requests to discuss this further, so no discussion on battery recyclability occurred, but Action 6 will remain ongoing for future meetings.

5. Review of Roadmap for EVE mandate, Part A (item 5)

Ms. Marchington presented document EVE-13-06-Rev1e, reminding the group that the roadmap was developed based on the EVE mandate document approved by WP.29 (2014 formal document 88, amended by informal document WP.29-164-15). Key tasks going forward include: status report from each subgroup (Jan 2016 GRPE), informal discussion and approval by GRPE on the proposed workplan and (if appropriate) requests for GTR or Regulation development (June 2016 GRPE) and approval by WP.29 of the proposed workplan and (if appropriate) GTR or Regulation development (November 2016). The EVE group was requested to review the document going forward and provide any comments to the Secretary ahead of the EVE-16 meeting.

ACTION 13: The EVE group should review the EVE-13-06-Rev1e document ahead of the EVE-16 meeting.

6. Discuss next EVE meeting (item 6)

Ms. Marchington presented document EVE-15-06e, which outlines a draft invitation and agenda for the EVE-16 meeting to be held in Ottawa on October 19-20, 2015. The objectives for the meeting would be to continue sharing information on completion of research in the three subgroups under Part A of the current EVE mandate, but to also hold preliminary discussions on potential GTR or Regulation development and a draft workplan ahead of the January 2016 GRPE and EVE-17 discussions. Members of the EVE group were requested to review the draft

EVE-16 agenda in document EVE-15-06e and send any comments as soon as possible to the EVE Secretary, as the invitation will be distributed to the group in a few weeks.

ACTION 14: The EVE group should review the draft EVE-16 agenda in document EVE-15-06e and send any comments as soon as possible to the EVE Secretary, who will distribute the EVE-16 invitation asap (Erin.Marchington@ec.gc.ca).

ACTION 15: The EVE Secretary will revise and post the draft agenda and related documents for the EVE-16 meeting on the UNECE EVE website.

7. Discuss report to GRPE (item 7)

Mr. Olechiw informed the group a presentation summarizing the EVE-14 and EVE-15 meeting results would be drafted and shared with the EVE leadership and sub-group leaders for review. The aim of the presentation would be to keep the GRPE forum informed of the group's work, especially concerning discussions related to regulatory development (i.e. EV power determination).

ACTION 16: The report of the EVE group to the 71st GRPE forum will be drafted and shared in advance with the the EVE leadership and sub-group leaders for review.

8. Concluding remarks, Closing (item 8)

Mr. Olechiw closed the meeting by thanking participants for attending.