Submitted by the EVE Secretariat

Informal Document EVE-72-07e
72nd EVE IWG session: June 17-18, 2024

Report of the 72nd session
Electric Vehicles and the Environment Informal Working Group (EVE IWG)

Location:	Virtual - Webex
Date:	June 17 – 18, 2024
Time:	05:30 – 08:00 EDT
Chairs:	Mr. Michael Olechiw (United States of America) Ms. Elena Paffumi (European Commission)
Vice-Chairs:	Ms. Chen Chunmei (China) Mr. Nobunori Okui (Japan)
Secretariat:	Mr. Leeson Guay (Canada)

Day 1 – June 17, 2024, 05:30 EDT

1. Introduction, review of agenda, and meeting recap

   Documentation

   - EVE-71-06e
   - EVE-72-01e

   Context

   The EVE IWG co-chairs addressed members and welcomed everyone to the virtual meeting.

   The co-chairs presented the meeting agenda to EVE IWG members, which can be seen below. The agenda was reviewed and adopted by the EVE IWG prior to beginning discussions.

   Day 1 – June 17, 2024, 05:30 EDT

   - Introduction, review of agenda, meeting recap
   - HDV GTR – Comments on open items
   - HDV GTR – Open items and discussion points

   Day 2 – June 18, 2024, 05:30 EDT

   - Introduction, review of agenda

- HDV GTR – Open items and discussion points
- Closing remarks

The EVE IWG secretary briefly reviewed the *Report of the 71st EVE IWG session*, highlighting action items and key decisions from the discussions, held virtually, on May 28-29, 2024.

Discussion

The co-chairs brought to the group's attention that there were some items that participants would like to discuss at the next session regarding United Nations (UN) Global Technical Regulations (GTR) No. 21 and No. 22. The co-chairs raised this to give participants sufficient notice approaching the next EVE IWG session.

Action Items

- Secretariat to ensure UN GTR No. 21 and UN GTR No. 22 have allocated time during the 73rd EVE IWG session.

Decisions

2. HDV GTR – Comments on open items

Documentation

- EVE-72-04e

Context

The Organisation Internationale des Constructeurs d'Automobiles (OICA) presented a document outlining finalized details of the pilot phase testing in addition to slide on the state of certified energy (SOCE) verification proposal from the previous session, as a reminder, for further consideration.

Discussion

OICA suggested including the proposed SOCE verification as part of the pilot phase testing to see whether it will work.

Action items

Decisions

3. HDV GTR – Position on open items

Documentation

- EVE-72-03e

Context

The Japanese delegation presented a document outlining their position on several topics in the draft text of the electrified heavy-duty vehicle (eHDV) GTR.

Discussion

The drafting coordinator indicated that the items brought forward by the Japanese delegation will be integrated into the draft document in time for the drafting session, which will take place mid-July. The Japanese delegation said that they do not agree on all the topics so not all of it can be included. The drafting coordinator reassured the Japanese delegation that only items that have been agreed upon will be included in the draft text.

Action items

- Drafting coordinator to ensure all feedback received has been incorporated into the eHDV GTR draft text for discussion at the regulation drafting session.

Decisions

4. HDV GTR – Open items and discussion points

Documentation

- EVE-72-02e
- EVE-72-05e

Context

This item was set with the objective of discussing and resolving outstanding topics of the eHDV GTR draft text.

Discussion

Alternative test method

The European Commission (EC) expressed that they have concerns with the proposal on the alternative chassis dynamometer testing because they have not yet been able to conduct and verify the testing themselves. The Japanese questioned the hesitation from the EC, as the procedure for chassis dynamometer testing is confirmed in UN GTR No. 4. The EC stated that the concern lies in the lack of availability in chassis dynamometers in Europe. The Japanese delegation indicated that the EC is in favour of chassis dynamometer testing because they historically voted in favour of UN GTR No. 4, which outlines the procedure. OICA has expressed concerns over testing accuracy, but the chassis dynamometer eliminated this uncertainty because it can be done in a controlled environment. OICA clarified that the test procedure for compression ignition engines and positive ignition fueled engine with natural gas or liquified petroleum is what is outlined in UN GTR No. 4, and it may not be chassis dynamometer procedures. The Japanese delegation insisted that UN GTR No. 4 outlines the chassis dynamometer test procedures. The American delegation stated that testing has always been done on the component level and this would be a departure from the heavy-duty vehicle approach. The American delegation offered their support for the inclusion of the chassis dynamometer testing as part of the eHDV GTR text. China highlighted that the proposed test procedure is aligned with UN

GTR No. 15 with other portions of the proposed test procedure aligned with method 1a, 1b type approval and the Society of Automotive Engineers (SAE) J2711 phase of electric balance. The Japanese delegation stated that they are in favour of the Chinese proposal. The EC communicated that they will review the test procedure and come back at the next meeting offering an update on their position.

Family definitions

The Japanese delegation highlighted that with the Part A family definition, paragraph c) and f) appear to be similar and perhaps they can be joined into a single item. OICA expressed the same sentiment, that if paragraph f) is removed, the text could be captured in paragraph c), as needed. A representative from industry expressed that paragraph f) seems to be more of a mix up with paragraph c) because the dimensions of a cell have no impact on the aging of a cell. The load profile may have an impact on the battery depending on the pack configuration, but this is more of a concern for the Part B family definition. OICA suggested leaving this item to the dedicated drafting session. The cell level is important but the pack level not so much. Pack sizes might need to be modified for the vehicle depending on configuration and mission profiles. The Japanese delegation stated that if you have a battery focused on traction and a battery allocated to auxiliary systems then there needs to be more defining criteria because there are different associated algorithms. OICA expressed that algorithms cannot be shared in this general forum because they are proprietary. The Japanese delegation suggested that since OICA is unable to provide more details then there needs to be more defining criteria. OICA clarified that the traction battery is used for the whole system and can be used for other things, certain functions would exist for hoteling but perhaps this is not the way of the future because it then adds weight and other considerations which may not be in the best interest of the customer. The Japanese delegation reiterated that if there are different algorithms then the criteria need to be revisited. An industry representative communicated that battery packs are already considered under the Part A family definition and if the manufacturer differs from this then it will be demonstrated to the authority.

The industry representative communicated that the nominal charging power can be deleted from the text. The drafting coordinator indicated that if the charging is defined in the text, then we know which power we are using. We also know that eHDVs can be charged at higher speeds, but we do not want to stress the batteries too much in warming. I agree that the nominal charging for paragraph e) can be removed. Would everyone be alright with 150 kW charging. Paragraph a) and the additional sentence at the end should adequately cover our basis with the different number of battery packs. The American delegation mentioned that they had a thought and maybe the test method outlined in paragraph g) should be outlined in another part of the text rather than here to prevent any testing confusion and overlap of testing methods. The Japanese delegation suggested that a solution may be to delete paragraph g). The drafting coordinator stated that this can be put into square brackets for now so that we can think about this further for the next meeting when discussing the Part A family definition.

The Japanese delegation suggested that paragraph h) should be defined similarly to UN GTR No. 22. The American delegation highlighted that the definition in UN GTR No.22 is desirable because it does

not specify the types of charging speeds which could then be problematic and require further definitions.

The drafting coordinator asked whether there were any feelings towards the inclusion of vehicle category in the definitions. The American delegation indicated that it is a good idea to have because of how relevant it is to the vehicle families in the United Stated.

Break-off criterion

OICA expressed that they are convinced results will come for their pilot phase testing and the feasibility will become clear at that time.

Other items

The drafting coordinator brought up the topic of the selection of a test method in the case of bidirectional charging being available. OICA stated that they will consider this and get back to the group with a decision.

The drafting coordinator brought up the topic of the vehicle survey and specifically the text surrounding dynamic charging. OICA expressed that the survey depends on the feedback of the customer so maybe there can be a caveat added, if the information is available, because perhaps the customer is not aware.

Action items

- The EC to review the Chinese chassis dynamometer proposal and offer an updated position at the 73rd EVE IWG session.

- EVE IWG members to consider the modifications made to Part A family definitions for the next EVE IWG session.

Decisions

Day 2 – June 18, 2024, 05:30 EDT

1. Introduction, review of agenda

Documentation

- EVE-72-01e

Context

The EVE IWG co-chairs addressed members and welcomed everyone to the virtual meeting.

The co-chairs presented the meeting agenda to EVE IWG members. The agenda was reviewed and adopted by the EVE IWG prior to beginning discussions.

Discussion

Action items

Decisions

2. HDV GTR – Open items and discussion points

Documentation

- EVE-72-02e
- EVE-72-05e
- EVE-72-06e

Context

This item was set with the objective of discussing and resolving outstanding topics of the eHDV GTR draft text.

Discussion

Metrics and minimum performance requirements

The drafting coordinator shared a document outlining a proposed approach for an optional annex containing minimum performance requirements (MPR) in the eHDV GTR.

OICA requested clarification on whether the Transport Technology and Mobility Assessment (TEMA) model results showed that vehicles exceeding 16 tons could have a different capacity energy fade depending on the usage. Will this be taken into consideration when setting up the MPRs. The drafting coordinator clarified that it was considered and whenever we move to set the values, this

can be considered. There was a large deviation in the long-haul vehicles operating at roughly 1000 kilometers per day.

The Chinese delegation request clarification what the goal of the first phase of the regulation might be as it seems that the idea is to include all the metrics proposed, by the different contracting parties, in the text without determining the exact MPR values. Some of the metrics are incompatible, for example in the less than 16-ton category having both 8 years, 400,000 km and 10 years, 375,000 km seems unreasonable. The drafting coordinator clarified that the use and values of the metrics still need to be discussed and there needs to be consistency in the approach. The Chinese delegation followed up asking whether energy throughput would be used as a metric when evaluating MPRs. The drafting coordinator indicated that energy throughput will be included as part of the monitoring phase because particular attention needs to be made to not penalize any vehicle characteristics or designs. The drafting coordinator stated that the proposed tables will be included in the text and values can be discussed at the 73rd EVE IWG session.

Revision of definitions

The drafting coordinator showed the definitions of battery and rechargeable electrical energy storage system (REESS), proposing to reinstate the definition of battery into the regulatory definitions, to avoid having to redefine and modify the text for every instance that battery is mentioned. OICA commented that they would think about this and come back to it at the next session.

Steps of the test procedure

The drafting coordinator showed the break-off proposal for the completion of the REESS depletion. The American delegation asked what the purpose is of having the vehicle stop within 60 seconds of the break-off criterion being reached. The drafting coordinator responded that it is to ensure that the vehicle stops and does not regenerate energy in any way. The American delegation pointed out that when the break-off criterion has been reached the vehicle testing is finished so it might not matter what occurs after that point. OICA indicated their support for what the American delegation said. The drafting coordinator mentioned that the text on accelerator deactivation could also be removed if everyone agrees. The American delegation asked whether this is an on-road setting or dynamometer. The drafting coordinator stated that it is on-road.

The drafting coordinator showed the bidirectional charging requirements within the test procedure. The co-chairs expressed that it appears as though the general direction will be to move towards giving manufacturers more options for testing. The drafting coordinator highlighted that this is still an open item. The American delegation indicated that it also appears that the chassis dynamometer testing is becoming the baseline, so we are supportive of removing the need for the demonstration of equivalency to the other methods. We would also be in favour of maintaining text that ensure consistency in testing approach but removing text on equivalency. The Japanese delegation stated that this has been a topic of discussion for more than a year and Japan has already provided equivalency data regarding the testing. After the pilot phase testing, we will see how accurate the other methods are and if we have serious concerns we can eliminate those methods because we know that the chassis dynamometer will be more accurate. If we have several options for the test

procedure, this is indicting that the test procedure does not matter but if there is sufficient data to demonstrate equivalency then we can remove the statements on equivalency. The EC clarified that if they can prove the other test methods are roughly equivalent to the chassis dynamometer, then the equivalency requirement can be removed. The American delegation communicated that previous discussions have suggested that on-road testing has greater variability so by having a clause to use method 1 b) does not achieve the objective of minimizing uncertainty between the steps of the test procedure, and so we are not sure this clause is helpful. On-road testing can be done in a broad range of conditions whereas the chassis dyno can be done in a controlled environment. The other option might be to enable the testing of a method with minimal variability all the time and in certain instances allow for the other testing options that have higher variability. OICA pointed out that, as stated in their 71st EVE IWG session comments, the certification testing may introduce small loads followed by large loads for in-service testing, leading to inconsistencies in results. The American delegation stated that their takeaway from this is not an issue with the testing method but rather the way that the vehicle is configured. If the goal is to load and drive the vehicle the same way, then we need to be more specific and perhaps there is a requirement for more constraints around payload and other boundary conditions.

The drafting coordinator went back to the vehicle survey in Annex 1 to briefly review the dynamic vehicle charging. The co-chairs asked if dynamic charging includes the charging of a bus at a bus stop. The drafting coordinator indicated that it does not look like that would be covered by the definition. The Japanese delegation stated that they are supportive of not excluding dynamic charging from the vehicle survey and would like to verify whether the vehicles using ground rails, overhead trolleys and overhead pantographs are within the scope of the UN vehicle categories. A representative from industry proposed adding an additional question prior to the question on average use of dynamic charging, which seeks to determine whether the surveyor knows if the vehicle is equipped with dynamic charging technology. For the answer to this question, one would not need to know precisely how often it was used, but if the user can give an answer, we still have the option to specify.

The drafting coordinator introduced an item within the vehicle survey of Annex 1, regarding the vehicle examination and maintenance by the testing centre. The item concerned the adequate charging of a vehicle in the last month. The American delegation highlighted that for eHDV there are some that are similar in range to light-duty vehicles and whether it would be possible to be more accurate in the requirements than requiring more than 50 km of discharge. Perhaps a solution could be to indicate a discharge of 50 % of the usable battery energy (UBE).

The drafting coordinator displayed some text surrounding the scope of the eHDV GTR. The American delegation commented that the items listed as out of scope such as all-wheel drive vehicles may not be appropriate. OICA stated that generally heavy-duty vehicles do not include pickup trucks so this could be the reasoning. The American delegation clarified that in the United States, there are regulations covering pickup trucks and while not all pickup trucks are covered by the heavy-duty vehicle regulations, some of them certainly are within scope. It seems that this text is approaching policy decisions rather than technical considerations for the GTR. The drafting coordinator stated that they would investigate this further and return to it.

The drafting coordinator showed draft text concerning the vehicle selection criteria. The American delegation requested clarification on why the text is restrictive in that we are limiting the selection to the lowest energy demand configuration and not defining which tests we are referring. The Japanese delegation commented that as an engineer it should be relatively simple to select which vehicles have the highest and lowest energy demands for testing and in the GTR we want to know the certified UBE and this value does not vary significantly between low and high energy demand. The EC wondered why this provision exists at all since it seems risky and easily manipulated. OICA stated that if you take a vehicle that has the highest energy demand but the vehicle load is rather small, it could result in a higher energy demand than is representative. Perhaps the load during the driving cycles should be more of the focus because this can get complicated with all the different vehicle configurations in eHDVs. The EC suggested that these loading conditions might be able to be defined regionally.

The draft coordinator highlighted some text regarding the depletion of the battery during test method 1 b) using auxiliary systems for safety reasons. The EC suggested that the text leaves things open for manipulation and that planning can be done in a way to ensure that the vehicle can be discharged to get an accurate reading. The American delegation agreed and suggested removing the text. The drafting coordinator agreed and stated that it can be removed unless OICA is able to demonstrate battery discharge through the auxiliary systems is verifiable. The American delegation also mentioned that the text does not include a definition for auxiliary systems or the UBE discharge equivalency to the vehicle driving loads. The EC stated that if the vehicle knows the auxiliary systems are being used, it can discharge to a much lower UBE level than if it were driving on the road. We could introduced a declared value prior to testing so that the auxiliary depletion stops at this specified level before the warning indicators come on. The American delegation suggested that if this is done using voltage, it could be restrictive to manufacturer design and development.

Action items

- Drafting coordinator to include optional annex on MPRs to the draft text of the eHDV GTR.
- EVE IWG members to discuss internally and come prepared to discuss MPRs at the 73rd EVE IWG session.

Decisions

3. Closing remarks

Documentation

Context

This item was set with the objective of closing the meeting and looking forward to the next, addressing logistics and miscellaneous topics.

Discussion

Next meeting

The secretariat indicated that the 73rd EVE IWG session will take place on July 09-10, 2024, from 05:30 – 08:00 EDT.

Drafting session date

The secretariat indicated that a draft session for the eHDV GTR will take place on July 16-17, 2024, from 06:00 – 08:00 EDT. Invitations have been sent out to individuals who have expressed interest in participating in the drafting sessions. If other members are interested in participating, please reach out to the secretariat as soon as convenient.

Summer EVE sessions

The co-chairs expressed that the EVE IWG has been working hard and there may be some availability conflicts during the month of August so perhaps it is worth taking a well-deserved break until the EVE meeting in Tokyo, Japan.

Japan EVE session

The secretariat communicated that the invitation for the Japan EVE IWG session will be sent out within the coming days. Members who intend to participate in person must fill out the online form to reserve a seat for the EVE IWG session, the reception, and the organized symposium on automotive decarbonization technology. The Japanese delegation will provide communications, containing further details, at a later time.

GRPE EVE session

The co-chairs suggested having a virtual check-in EVE IWG session in advance of the 91st session of the Working Party on Pollution and Energy (GRPE). The secretariat suggested a single day EVE IWG session on October 8, 2024, from 5:30 to 08:00 EDT.

Action items

- Secretariat to send out the invitation for the hybrid Tokyo meeting, which is taking place in September 2024.

- EVE IWG members to contact the secretariat directly to be added to the drafting session communications list, if interested.

- EVE IWG members to reserve a spot at the upcoming Tokyo, Japan EVE IWG session by completing the online form, before the August 19, 2024, deadline, if they intend to participate in-person.

Decisions

- 73rd EVE IWG session will take place on July 09-10, 2024, from 05:30 – 08:00 EDT.

- drafting session for the eHDV GTR will take place on July 16-17, 2024, from 06:00 – 08:00 EDT.