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| Transmitted by the experts from CHINA | Document: EVSTF-08 -02 |

**Proposal for “****Indication of low energy content of REESS（applied to BEV）”**

Proposals:

**Technical Rational and Justification**

**4.6.x Rationale for the criterion “Indication of low energy content of REESS（applied to BEV）”**

The purpose of the indication is to remind the driver that the REESS remaining energy can only drive a short distance and to charge the BEV as soon as possible. If no mandatory regulations with this function, some poorly designed vehicles may lack of this indication. The vehicle may run out battery energy without any failure symptom and suddenly stop while driving on congested road or highway. This shall bring critical risks to both the driver and the surrounding vehicles.

As the traffic conditions and layout of charging stations varies from different contraries, it is difficult and unnecessary to set a mandatory limit of this “low energy”. Manufactures could specify the limit value of RESS remaining energy themselves according to the certain road conditions and performance of their product. It is also suggested that the remainder range (including the driving condition) could be introduced to the driver in the automobile manual.

Currently, all conventional vehicles equip with low fuel warning devices. When there is little fuel left, the warning signal shall be given to the driver to refuel as soon as possible. The manufactures define the threshold value on their own.

Although there are no recorded accidents for BEV related to REESS running out of energy, it should be noticed that in some countries, this function of indication is mandatory. It helps a lot to regulate the necessary design for BEV manufactories at the current technical development level of BEV.

Due to the complexity of the vehicle warning signals, only basic requirements can be proposed for regulatory purpose, but the inclusion of such requirements will contribute to eliminate the use of poorly designed vehicles.

For reference, an optical signal in yellow or text in the information display could be used to remind the driver, but other reasonable and effective ways of reminding should also be allowed.

Because the test method to verify the function is same as BEV range test procedure, tester only need to confirm the function works at the end of range test as the energy content drops very low to the BEV’s designed limit. Nowadays range test procedures for BEV have been published in most countries with BEV markets, it is not necessary to discuss again in this regulation.

**Performance requirements**

5.X.1 If a low state of charge in the REESS has a relevant impact on the vehicle normal driving performance, this low energy state of REESS shall be indicated to the driver that the vehicle should be charged as soon as possible. At the indicated low state of charge specified by the vehicle manufacturer, remaining energy in the REESS shall still be able to meet the following requirements:

a) It shall be possible to move the vehicle out of the traffic area using its own propulsion system.

b) A minimum energy reserve shall still be available for the lighting system as required by National and/or International Standards or regulations, when there is no independent energy storage for the auxiliary electrical systems.

**Test procedures**

6.X.1 To verify the function of indication of low energy content of REESS, the test shall apply in accordance with the published range test procedures of a country or region for BEV. As the energy content of REESS dropped very low to the BEV’s designed limit, this function of indication should be captured by the tester in the designed way.