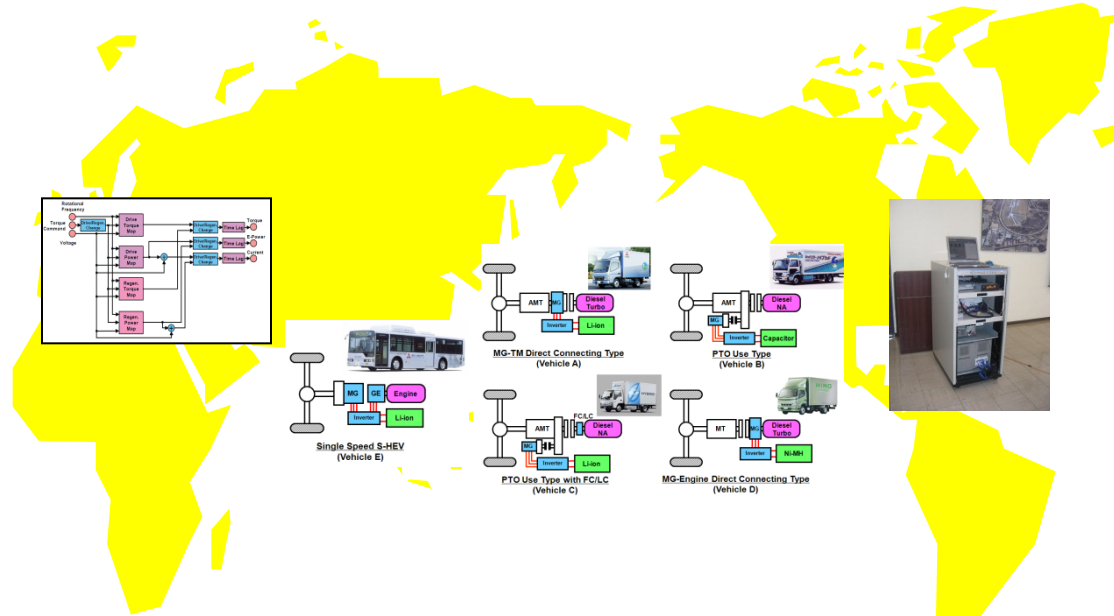




UNITED NATIONS

Working Paper No. **HDH-18-03e**
(18th HDH meeting, 03 June 2014)



GRPE Informal Working Group on Heavy Duty Hybrids

18th HDH, Geneva, 03 June 2014



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Summary of 17th HDH Meeting

The results of the 17th meeting in Madrid on 08/09 April 2014 are summarized, as follows:

- HILS library version 1.0 was released and agreed
- WHVC slopes based on mini cycle approach with polynomial correction were agreed; TUs will validate slopes with original WHTC gearbox model
- System work as basis for emissions calculation was agreed; equation proposed by the TUs was agreed in principal, but slight modification still needed
- Rated power proposal by TUs was agreed; some additional data needed for final solution
- Hybrid system family was agreed on the basis of the flowchart provided by Japan
- Validation criteria were met for parallel hybrids, but not for series hybrid bus
- General agreement that HILS method was very well developed
- Gear shifting is one of the major problems for model validation
- ± 2 km/h deviation can be relaxed for chassis dyno validation, but must be retained for HILS emissions test.
- Less stringent R2 values for chassis dyno validation are not recommended
- Japanese validation criteria were agreed for both parallel and series hybrids, but further work is needed in a potential second step
- CPs may decide to make HDH mandatory
- Japanese cold start evaluation proposal was agreed
- Micro hybrids will be excluded from HDH approach, but clear provisions are to be developed by the drafting group
- Energy management ECU was agreed as key hybrid functionality for hardware tests; drafting group is asked to provide details
- The test procedure developed by HDH IWG was agreed to be submitted to GRPE for approval as amendment 3 to gtr n° 4
- HDH IWG will consider to propose a second step based on input being available at the 18th HDH meeting



Topics for 18th HDH Meeting

- **HILS verification criteria**
- **Rated power**
- **Hybrid system family concept**
- **Approval of HDH test procedures (HILS & powertrain)**
- **Additional investigations**



Drafting Group

➤ Meetings in 2014

- 3 web meetings (n° 8, 9, 11) were held between January and March 2014
- The 10th meeting was held on 18/19 February 2014 in Tokyo
- The 12th meeting was held on 10/11 April 2014 in Madrid
- 3 web meetings (n° 13, 14, 15) were held in April and May 2014

➤ Result

- The formal document of the gtr was submitted to GRPE on 10 March 2014
- Extensive drafting was done between March and May 2014 to complete the HDH test procedures
- WP.29 approved partial alignment between gtrs n° 4 and n° 11 resulting in a few amendments not related to HDH
- The complete set of changes in relation to formal document ECE-TRANS-WP.29-GRPE-2014-11e was submitted as informal document GRPE-69-10



Timeline of gtr Submission

- **Informal document GRPE-68-12 was presented to GRPE 68 for consideration; it included text finalized by December 2013**
- **GRPE 68 approved the following timeline:**
 - **Submission of formal document based on informal document GRPE-68-12**
 - ❖ Document number: ECE-TRANS-WP.29-GRPE-2014-11e
 - ❖ includes drafting and work progress by 01/03/2014
 - **Submission of an informal document to GRPE 69, which will**
 - ❖ include drafting and work progress after March 2014
 - ❖ include alignment with gtr n° 4
 - ❖ complement formal document ECE-TRANS-WP.29-GRPE-2014-11e
- **After adoption of both documents by GRPE 69, a consolidated document will be provided to WP.29 for approval**
- **The technical report was submitted as informal document GRPE-69-11, since the work program was not completed in March 2014**
- **HDH mandate has been successfully completed**



Additional Investigations

- **HILS verification using the Japanese criteria has not been fully successful**
- **Further work on the verification method might be necessary with respect to**
 - **Testing additional vehicles**
 - **Looking into alternative verification methods**
- **A potential HDH step 2 (like with WLTP) was suggested at the 17th HDH meeting to deal with issues not yet fully resolved**
- **Step 2 requires commitment from all stakeholders to continue**
 - **Essentially, co-sponsors (EU, Japan) must support continuation**
- **Step 2 requires budget, vehicles, test cell capacity and ToR**
 - **Not yet available at this 18th HDH meeting to suggest step 2 to GRPE 69**
- **If the above requirements are fulfilled, a step 2 proposal may be submitted to November WP.29 (in conjunction with HDH approval)**