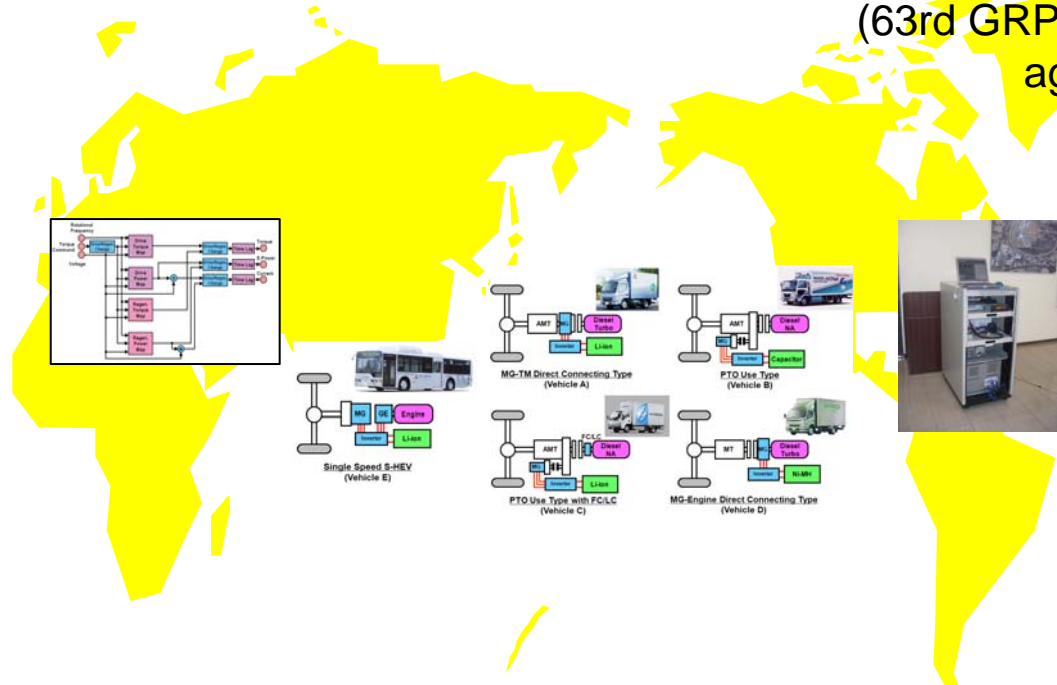




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GRPE Informal Group on Heavy Duty Hybrids

Report to GRPE 63
Geneva, 19 January 2012



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HDH Research Program

➤ Project Overview

- **At the 6th HDH meeting, the following project plan was adopted**
 - **TU Vienna will cover tasks 1 and 2; budget by OICA**
 - **TU Graz will cover tasks 4 and 5; budget by EU COM**
 - **Chalmers will cover task 3 and contribute to tasks 1, 4 and 5; budget shared between OICA, Sweden and Swedish Energy Agency (SEA)**
 - **TNO will assist EU-COM in managing the program (originally TRL)**
 - **Total budget is 265 k€**

➤ Status

- **Work program at TU Vienna has been finished**
- **Work program at TU Graz and Chalmers is in progress and about 2 months behind schedule due to problems with contracts getting signed**



Report from 7th HDH Meeting

- **Results of the 7th meeting, Vienna, 12 to 14/10/11:**
 - **US EPA presented the status of the US GHG (Greenhouse Gas) rule**
 - **The project is delayed by 2 months but still within the overall timeline**
 - **The very thorough technical discussions during the meeting significantly helped the participants in better understanding the complex issue of hybrid testing**
 - **Based on first results, the Japanese HILS model seems to be a good baseline for a global technical regulation**
 - **Based on first results, non-electric hybrid powertrain concepts seem to fit well into the same categories as for electric hybrid powertrains**
 - **The proposal of TU Graz for the evaluation of WHVC weighting factors was agreed**
 - **Discussion on chassis dyno and powerpack testing will continue on the basis of input from ongoing programs at the Contracting Parties**



Report from 8th HDH Meeting

- **Results of the 8th meeting, Geneva, 17/01/12:**
 - **TU Vienna presentation**
 - Japanese HILS certification method is a possible concept and provides a good basis in order to do certification of heavy duty hybrids
 - Interface and powertrain model have to be modified in case of additional necessary signals
 - If simulation results are not accurate enough, model depth has to be enhanced
 - In cases of using multiple ECUs, measurement hardware and the software model have to be able to handle ECU signals
 - **TU Graz presentation**
 - Wheel power cycle (WHDHC) as an alternative to the vehicle cycle WHVC seems to work properly for hybrids
 - WHVC weighting factors can be calculated from HDV-CO2 test cycles or from any other representative cycles
 - PTO loads not suggested for criteria pollutants, but may be included for CO2
 - **Chalmers presentation**
 - Non-electric hybrid powertrain topologies fit well into the same categories as for electric hybrid powertrains
 - Mathematical models for flywheel, accumulator, pump/motor and CVT have similar model structures as in the Japanese regulation



Major Items for Next Meetings

- **The following items need further investigation:**
 - **Simulation of a real heavy duty hybrid vehicle by using the Japanese open source model**
 - **Determination of break even point between minimal simulation effort and maximum model quality**
 - **Investigations into possible alternatives, such as extended HILS-testing method or powerpack testing**
 - **Acceptance of wheel power cycle (WHDHC) and establishment of a method to define and to normalize the full load curve for hybrid power packs**
 - **Determination of vehicle category for PTO simulation**
 - **System modelling for non-electric hybrids**
 - **Determination of validation scheme**
 - **Finding laboratories for validation studies**



Next Meetings

- **The next meetings are scheduled as follows:**
 - **The 9th meeting will be from 21 to 23 March 2012 in Tokyo**
 - **The 10th meeting will be on 05 June 2012 in Geneva (to be confirmed)**
 - **The 11th meeting will be in October 2012 (possibly in Canada, oral invitation by EC, to be confirmed)**

- **GRPE is asked to**
 - **Reserve a half day for the 10th HDH meeting during the 64th GRPE in June 2012**