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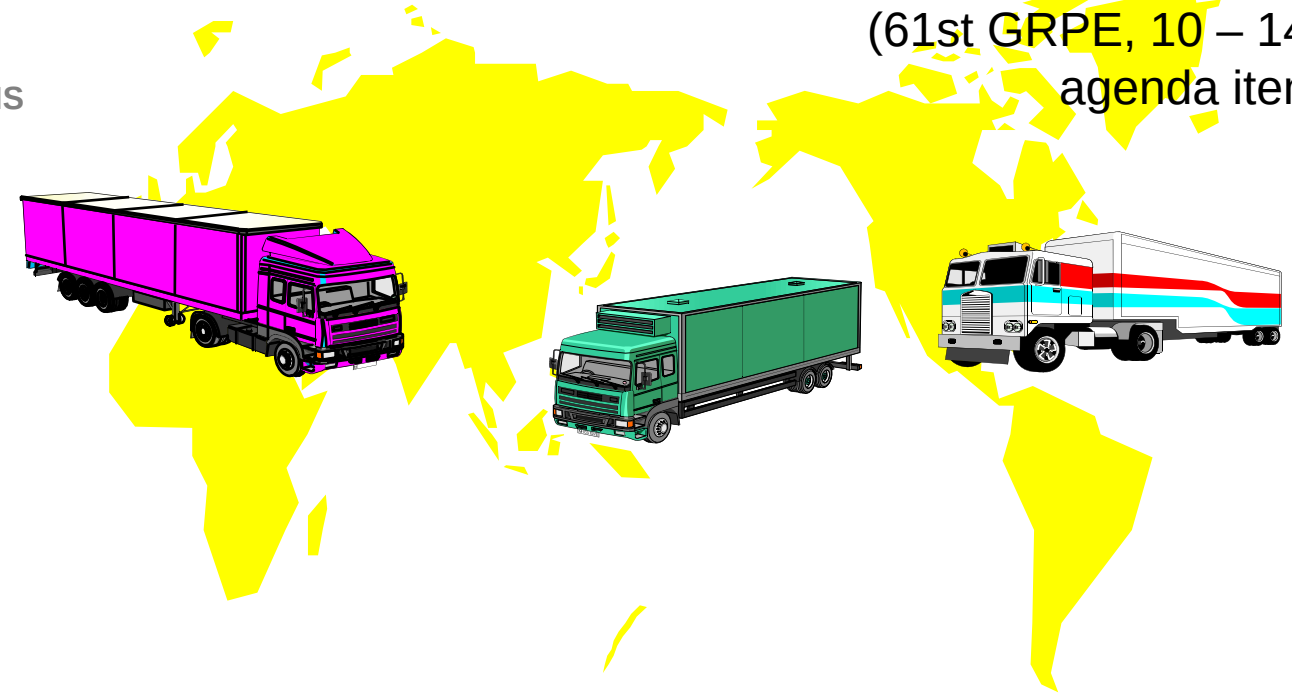
Informal document No. **GRPE-61-17**
(61st GRPE, 10 – 14 January 2011,
agenda item 2(c))



GRPE Informal Group on Heavy Duty Hybrids

Secretary's Report to GRPE 61, Geneva, 13 January 2011

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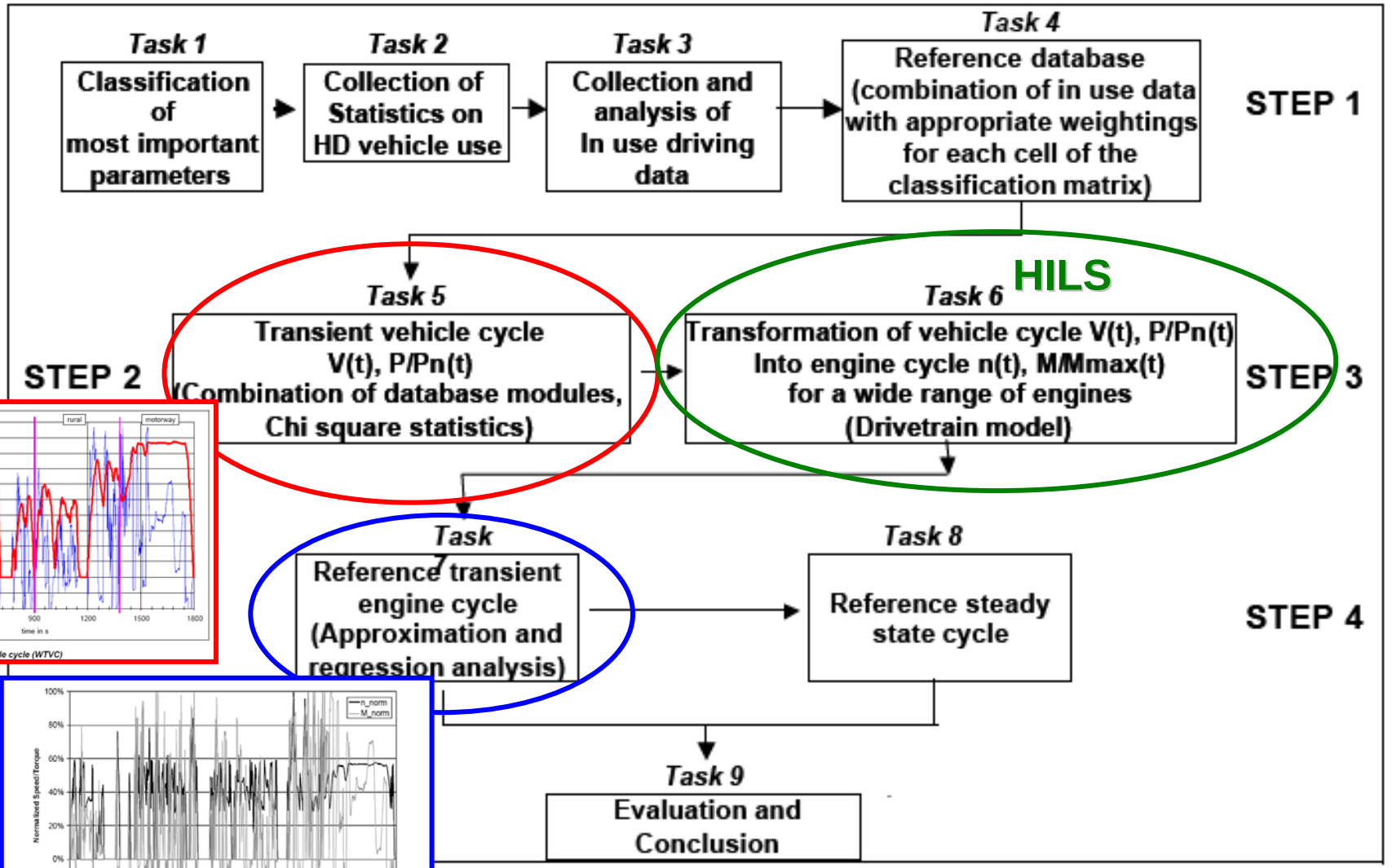
Development of WHDC Engine cycles



the development of representative engine test cycle

Relation between HILS and WHDC

- **Development of WHTC (universal engine cycle)**
  - Tasks 1 to 5 resulted in the universal WHDC vehicle cycle (WHVC), which is the basis for the engine cycles WHTC and WHSC
  - Under task 6, the WHVC was transformed into an engine cycle on the basis of a standardized drivetrain and vehicle model
  - Under task 7, the resulting engine cycle was finalized into the reference transient cycle WHTC by regression analysis
- **Development of HILS/WHDC (individual engine cycle)**
  - WHDC tasks 6 and 7 are replaced by HILS on the basis of an individual (hybrid) drivetrain and vehicle model
  - As a result, individual engine reference cycles will be established
  - Since only the engine is tested, the test cell and data evaluation procedures of gtr n°4 can be applied w/o major modifications
  - A new annex on the HILS procedure would need to be added to the gtr

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Conclusions from 3rd HDH Meeting

- **The conclusions were summarized by the Chair as follows:**
  - **The terms of reference and proposal (GRPE /60/11 and GRPE/60/12) were confirmed**
  - **The first step is to investigate the HILS approach and develop the methodology**
  - **The methodology should make sure that no “back sliding” of emissions compared to conventional vehicles can occur**
  - **It is crucial that the procedures are robust and transparent enough for a regulation that may be used by different contracting parties and approval authorities with consistent results**
  - **Keeping the uncertainties in mind the group should be open to investigate other possibilities such as powerpack testing even though this is not included in the current mandate**
  - **Feasibility of chassis dyno testing should be done and reported to GRPE. Some investigations can possibly be done in parallel**

Framework of Hybrid Certification

- **As a result of these conclusions, hybrid emissions certification must**
  - **cover a wide range of RESS (battery, capacitor, hydraulic accumulator, kinetic storage device, flywheel capacitor, fuel cell)**
  - **account for RESS and engine power**
  - **allow for technology development**
  - **include provisions for transmission, gearing and rear axle ratio**
  - **account for benefits of hybrid PTO operation**
  - **account for vehicle regenerative energy gained or lost during testing**
  - **minimize discrepancy between certification and real world CO2 and criteria emissions**

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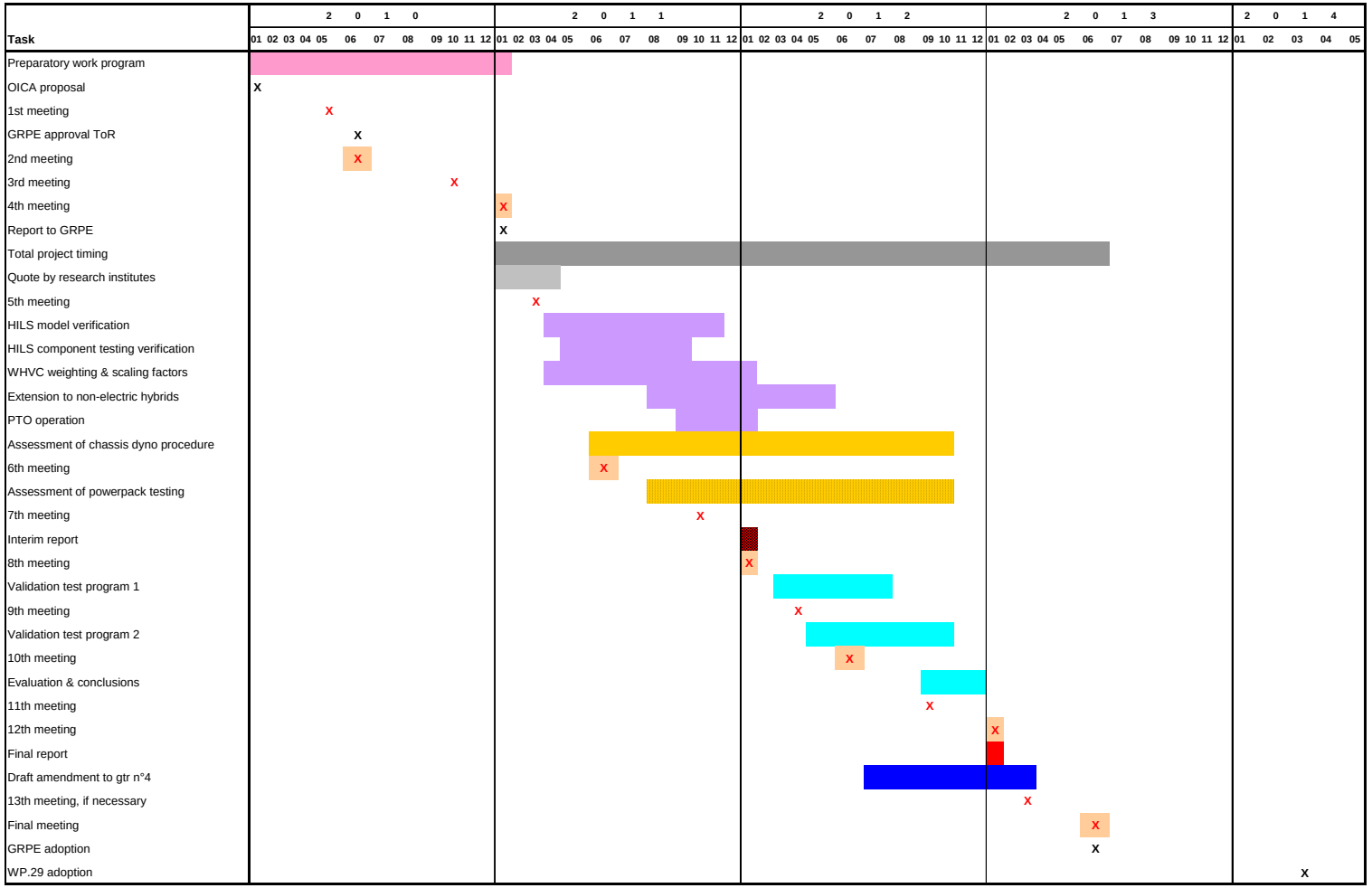
Roadmap & Project Planning



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Report from 4th HDH Meeting

- **The results of the 4th meeting are as follows:**
  - **Amendment to gtr 4 as first option, as proposed by the Chairman, has been agreed; development of a separate gtr will be re-assessed and the conclusions reported back to GRPE at a later stage**
  - **Roadmap and project planning as presented by the Secretary have been agreed with minor modifications**
  - **The open source model provided by Japan will be evaluated**
  - **4 research institutes expressed interest in conducting the work program, and will be asked for quotes**
  - **OICA will provide 200 t€ budget, COM contribution is pending**
  - **The next meeting will be from 16 to 18 March at EPA, Ann Arbor**
- **GRPE is asked to**
  - **Approve the roadmap and project planning**
  - **Approve extension of the mandate to powerpack testing**
  - **Reserve a half day HDH meeting at the 62nd GRPE in June 2011**