



17th Heavy Duty Hybrid (HDH) meeting **8th- 9th April 2014, Madrid, Spain**

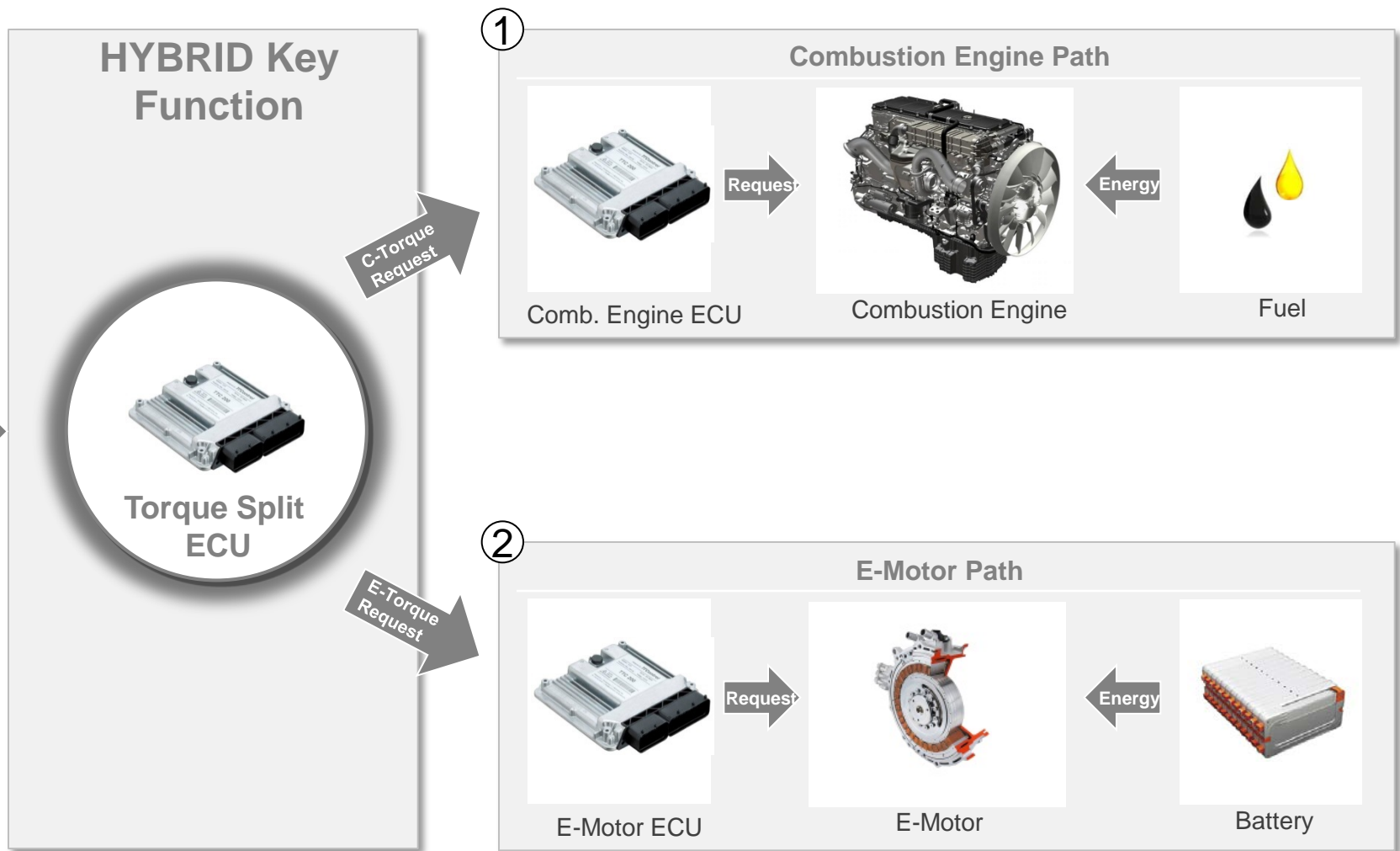
Agenda

- Hybrid Key Function (proposal)
- Exclusion of mild hybrid systems from HILS certification (proposal)

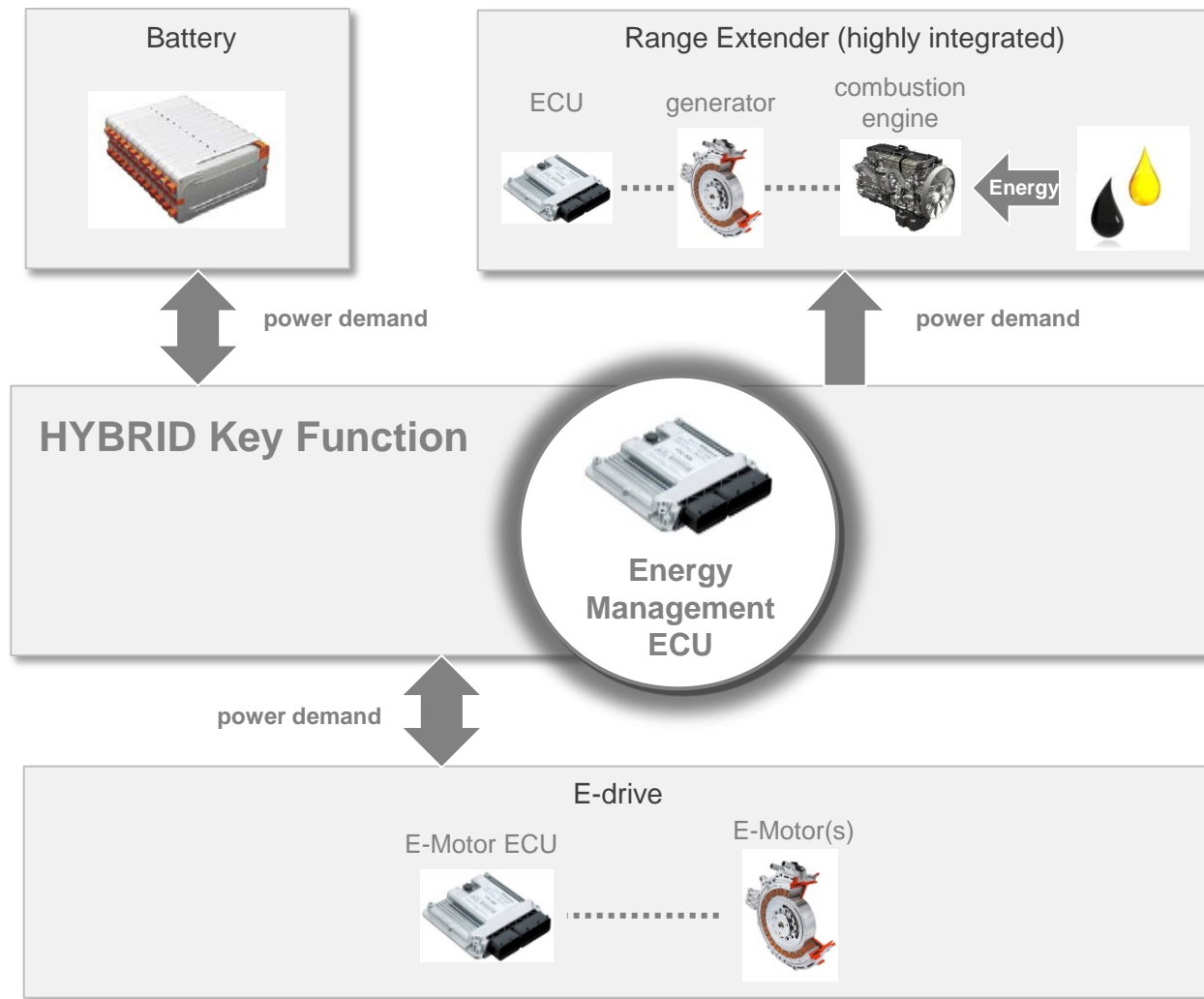
Introduction

- One important open question of GTR HILS is suitable definition of requested hardware configuration of HILS system
- At 15th HDH meeting discussion regarding HILS hardware configuration was started and concluded that hybrid key function should be requested as real ECU for GTR HILS
- Currently no common understanding reached regarding definition of hybrid key function
- Therefore OICA would like to make proposal for hybrid key function

“TORQUE SPLIT” should be defined as hybrid key function of parallel hybrids



“ENERGY MANAGEMENT” should be defined as hybrid key function of serial hybrids



Proposal for hybrid key function

- HILS system should represent real hybrid vehicle behavior but be **as simple as possible**
- **Only ECU(s)** that include **hybrid key function** should be requested mandatory as HW for HILS system within GTR
- Hybrid key function should be defined as follows:
 - For **parallel hybrids**: **torque split¹⁾**
 - For **serial hybrids**: **energy management²⁾**
- **Integration of ECU of HV battery and E-motor/inverter** into HILS system is **not recommended** because...
 - ... lead to high voltage HIL system (incl. component cooling)
 - ... functionality and performance of HV components already verified by component test and HILS validation on chassis dyno
 - ... ECUs integrated in HV component and therefore very difficult to separate/extract
 - ... very high complexity of HILS system if ECUs of HV components are included
 - ... no benefit of using real ECUs in comparison with implementation of relevant software functionality
- All other **relevant hybrid functionalities** should be covered by **SW or optionally as HW as decision by OEM**

¹⁾ e. g. between combustion engine and e-motor

²⁾ e. g. of battery, combustion engine and generator

Proposal for exclusion of micro hybrid systems from HILS certification

- Automotive industry is making efforts to reduce environmental impact especially on limiting CO2 emissions.
- Micro hybrid systems (e.g. based on 48V level) tend to be a good compromise between fuel saving and system cost
- Impact of a hybrid system on pollutant emissions is mainly defined by the positive power of the hybrid system
- Due to minor impact of micro hybrid systems on combustion engine operation it is reasonable to exclude them from HILS certification
- As criteria for exclusion the ratio of positive electrical power to total system power should be defined
- OICA considers a ratio of positive electrical power to system power of 5-10% to be reasonable