SmartBatt
Smart and Safe Integration of Batteries into Electric Vehicles

OBJECTIVES
- Development of an electric vehicle battery
- Minimization of weight
- Optimization of safety
- Minimization of costs
- Design capable for series production

REALIZATION
- Battery for an A-class BEV with 100km NEDC Range
- 15 % lighter than SotA (75 % weight ratio between system and cell)
- same static and dynamic requirements as SLC BW required

WP1: PROJECT MANAGEMENT

WP2: SPECIFICATION ANALYSIS/REQUIREMENTS
Definition / analysis of system constraints
- ~20 kWh energy content
- 15 % lighter than SotA systems
- Same crashworthiness as SLC
- Identification of existing standards
  - IEC/ISO, FMVSS, SAE, ECE R100

WP3: CONCEPT & FEASIBILITY STUDY
- Definition of interfaces / BMS
- Cell selection and characterization
- Simulation of driving cycle and thermal behaviour (Artemis Cycle)
- Package room/battery housing
- Accident statistics
- Structural solution of EV body

WP4: RISK ASSESSMENT
- Theoretical risk and failure analysis
- Acceleration pulses derived from simulation of NCAP crashes
- Experimental analysis on cell and module level like sledge tests, nail penetration, overcharge, short circuit

WP5: DESIGN & DEVELOPMENT
- Design of housing and modules by simulation based optimization of strength and fatigue behaviour.
- Die cast polymer module housings also act as a structural part
- Aluminium hybrid foam sandwich structure
- Target of 169 kg outperformed by 9 kg

WP6: HARDWARE BUILD-UP & FINAL VALIDATION
- Testing on pack level
- Mechanical, electrical and environmental tests
- Performance and EMC tests

WP7: ASSESSMENT
- Range improvement
- Cost savings
- Impact on Standardization (e.g. new materials)
- Life Cycle Analysis

WP8: EXPLOITATION
- Knowledge Transfer
- Battery Integration Workshop with 4 other EU-Projects
- Presentations & Workshops: Fire-fighter Workshop, EARPA, EGCI
- Publications: EEVC 2012, ECCOMAS 2012
- Exhibitions: Aluminium2012
- Input for Standards (e.g. ISO SC21)

SOLUTION
- High grade of BiW structural integration
- New materials like Al hybrid foam sandwich
- 23 kWh with a total mass of 155 kg
- ratio between cell- and total mass over 80%
- housing mass just 8.5 kg
- Energy density of 148 Wh on system level

FACTS
- 3.1 million EUR overall budget
- THEME GC-SST.2010.7-4. Smart storage integration
- 2.25 million EUR funded budget
- January 2011 – December 2012
- 9 Partners from 5 European countries

PROJECT COORDINATION
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