Overview
Advanced Structural Light-Weight Architectures for Electric Vehicles (e-Light)

- Budget 2.9 M€
- Starting date 1st February 2011
- www.elight-project.eu
The main objective of the E-Light project is to develop a multi-material modular architecture specifically designed for urban EV, achieving optimal light weight and crashworthy performances whilst ensuring good ergonomics on board.
Measurable objectives

• Lightweight EV architecture with a maximum vehicle weight of 600 kg (without batteries), a maximum BIW weight of 200 kg, and an electric motor in the range from 25 to 35 kW.
• On board space 4 passengers.
• Suitable and feasible joining technologies and manufacturing processes for the multi-material EV architectures developed.
• Equivalent performance to an IC vehicle architecture
• General design guidelines and testing procedures for EV automotive designers.
New characteristics of EV
  Modularity design
  Ergonomy and HMI
  Safety Requirements
  Composite and reinforced materials
  Advanced metallic materials
  Manufacturing and joining
  LC & Cost-benefit analysis
  EV structural designs
  Structural Integrity
  Energy absorption and crash
  NVH analysis
  General design requirements
  General safety requirements
  Testing procedures
Design Methodology

Weighting of Technical Requirements for Joining and Assembly Process

Technical requirements

Scoring of Joining and Assembly Processes according Technical requirements

Trade-off Joining and Assembly Technologies

Compatibility with Manufacturing processes

Weighted Manufacturing Processes from Work Package 3.1.

Scoring of Joining and Assembly Processes according Technical requirements and weighted Manufacturing Process

Scoring of Joining and Assembly Processes according Technical requirements and weighted materials

Compatibility with Materials

Weighted Materials from Work Package 3.1.

Scoring of Joining and Assembly Processes according Technical Requirements, weighted materials and weighted manufacturing Processes
Decision process

1- IDENTIFICATION
2- STRUCTURING
3- WEIGHTING
4- VALUATION
5- SCORING

- PREFERENCES
- RELATIONS OF DEPENDENCE
Decision process

Weighting of the drivers
Weighting of Design concepts

Factors of influence

Drivers / Design concept

Design concept / processes

Process / material

Factors of influence
Adequacy of design concepts to requirements and drivers
## Comparative Matrix

<table>
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<tr>
<th></th>
<th>MARKET SPECIFICATIONS</th>
<th>GEOMETRY</th>
<th>TECHNICAL SPECIFICATIONS</th>
<th>FUNCTIONAL REQUIREMENTS</th>
<th>INDUSTRIAL REQUIREMENTS</th>
<th>COST</th>
<th>MATURE TECHNOLOGY</th>
<th>ENVIRONMENTAL ASPECTS</th>
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**Changed range:** 7,7  7,7  7,7  10,0  3,1  6,2  0,8  3,8
### Decision Process

#### BIW Architecture

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<th>LEVEL OF IMPORTANCE OF KEY FACTORS</th>
<th>WEIGHT</th>
<th>PRODUCT SALEABILITY</th>
<th>PRODUCT DEVELOPMENT TIMING</th>
<th>PRODUCT MANUFACTURING TIMING</th>
<th>UNIT COSTS vs. INVESTMENTS</th>
<th>PACKAGING vs. ERGONOMY</th>
<th>VEHICLE DYNAMICS</th>
<th>STYLE (Current)</th>
<th>SAFETY</th>
<th>SUMMARY</th>
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#### Summary

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**Organized by:** Fira Barcelona  
**Hosted by:** AVELE  
**In collaboration with:** AVERE, NEA, Autonoma de Barcelona  
**Supported by:** EVAAP, EDTA, European Commission
Thanks for your attention