

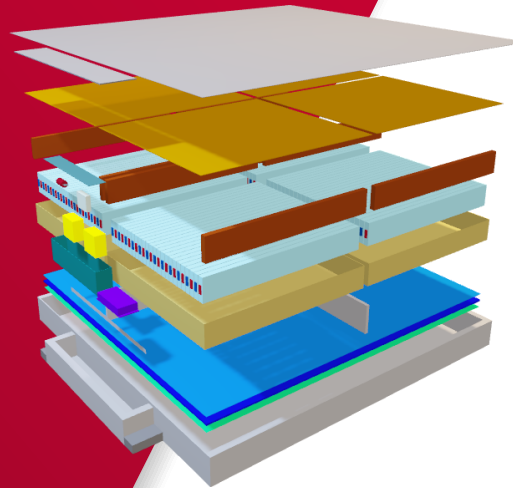
FEV Signature Solutions

FEV BATT.code – Battery Concept Development Tool

Our software tool enables to design, visualize and evaluate your battery concepts in the (pre-)concept phase

FEV offers

- Fast and user-friendly generation of virtual battery cells, modules and packs
- Automatic generation of battery concept evaluations
- Quick, extensive reporting & systematic comparison
- Best battery system concept within 2 – 4 weeks
- MATLAB based 3D concept visualization

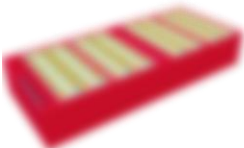
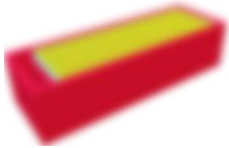
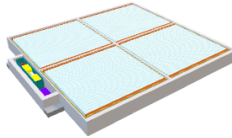












Why FEV

- Our solution has been successfully utilized in over 30 different customer projects
- Proven fundamental pre-concept decisions provide the basis for the subsequent concept and A-sample development phases
- Best practices values for key engineering system parameters
- Coupling with the FEV battery cell database comprising more than 1500 cells and the FEV cost benchmarking
- Full battery development support up to series, covering all sample phases, prototype build up and testing

Reference projects

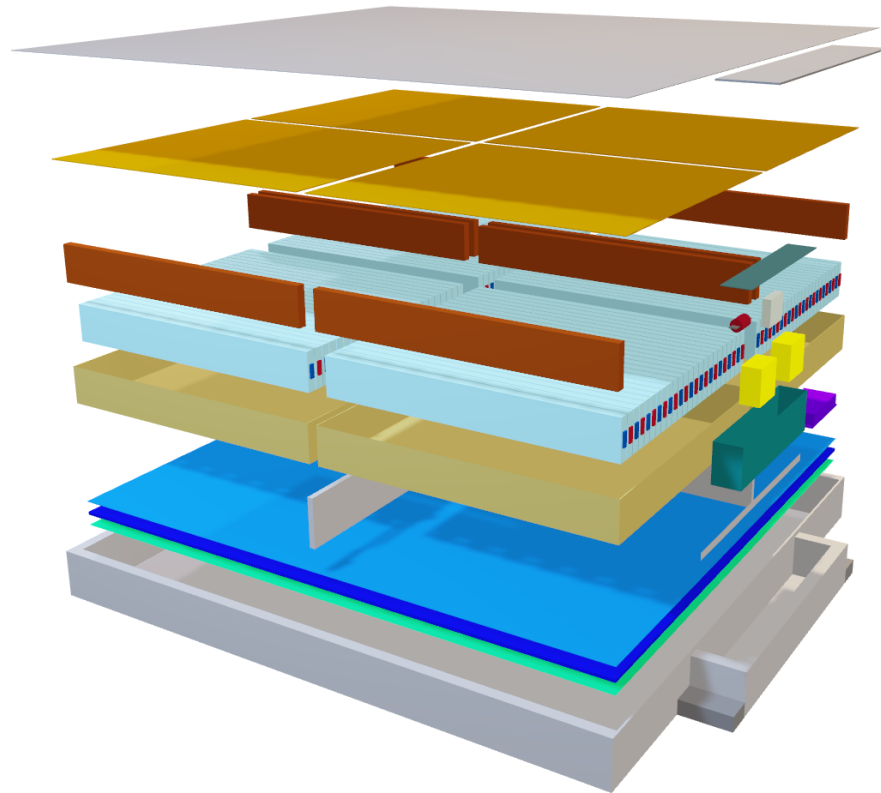
FEV BATTERY CONCEPT DEVELOPMENT

 <p>Fuel cell hybrid truck battery (Series development)</p>	 <p>Truck EV battery study (Battery concept)</p>	 <p>Solid state EV battery study (Battery concept)</p>	 <p>Passenger car EE box concept (Series development)</p>	 <p>EV light commercial vehicle (Series development)</p>
 <p>Multilayer EV cell study (Prototype)</p>	 <p>Serial hybrid PHEV battery (Series development)</p>	 <p>Solid state EV battery (Prototype)</p>	 <p>EV future cell format study (Series development)</p>	 <p>EV conversion design (Series development)</p>

-  Battery concept study for existing Body in White
-  Battery concept study
-  Cell study

FEV BATT.CODE – from cell design to concept evaluation

DEVELOPMENT APPROACH TO IDENTIFY THE OPTIMAL CONCEPT FOR YOUR APPLICATION



Conceptual battery cells

Creation of virtual battery cells based on customer requirements or from FEV's proprietary cell database.
Variation: Cell format, dimension & chemistry

Conceptual battery modules

Development of battery modules using best practice design parameters (e.g. intercell distances).
Variation: Cell orientation & configuration (s/p), TM

Conceptual battery packs

Aggregation to a battery system, including placeholder for electrical and thermal components/interfaces.
Variation: Module number, thermal interface, housing

Battery concept reports

Individual results report for each of the developed concepts in form of one-pagers. Direct comparison of the requirements with the achieved parameters.

Matrix result comparison

The comparison of the individual result evaluations in a matrix leads to well-founded concept decisions.

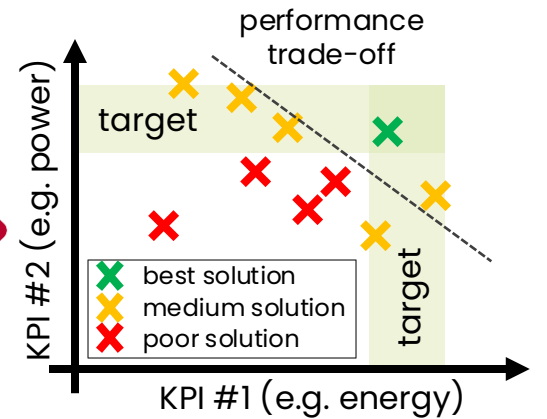
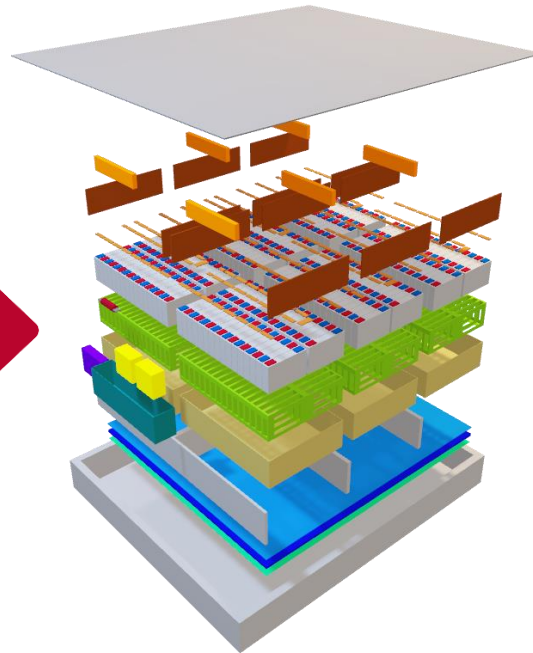
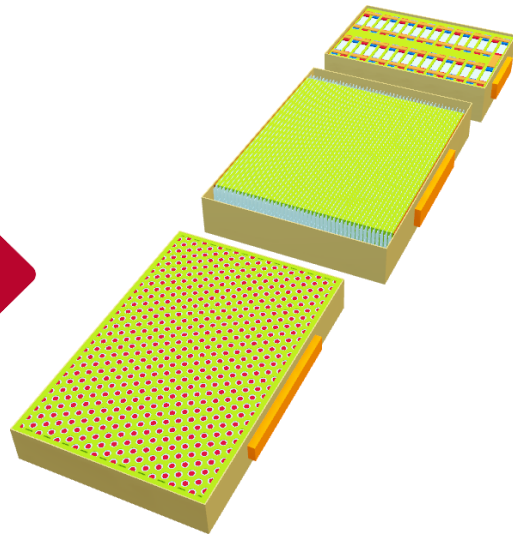
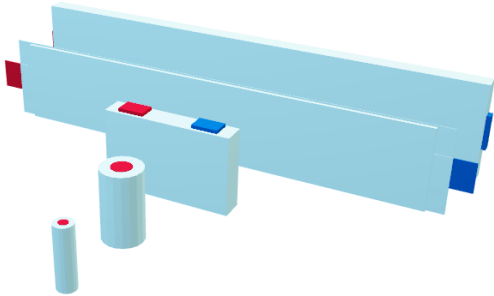
FEV's concept methodology enables a quick start, time-efficient implementation and precise results

FAST GENERATION AND VISUALIZATION OF BATTERY CONCEPT OPTIONS

FEV
BATT.CODE



FEV Cell Database containing > 1500 cells



Example:

8

Different battery cells*

x

6

Module concept ideas**

x

4

Pack concept ideas***

=

192

Different system concept ideas

*e.g., 4 pouch & 4 prismatic cells;

**e.g., 2 cooling concepts & 3 cell configurations

***e.g., 4 different module configurations

• **“Best solution within 4 weeks”**

Batt.Code – create, evaluate and compare different design concepts

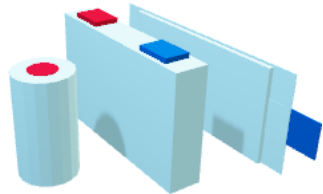
APPROACH OVERVIEW – FINDING THE MOST APPROPRIATE CONCEPT IN A VERY EARLY PROJECT PHASE

Concept KPI's

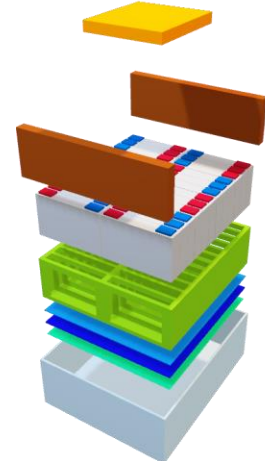
- Installed energy
- Usable energy
- Peak power
- Continuous charge and discharge power
- Dimensions
- Weight
- Min. and max. voltage level
- Life cycle assessment**

** available in 2025

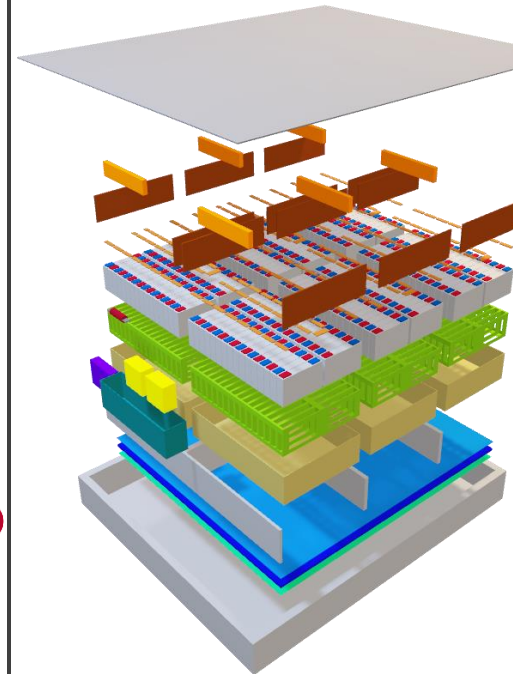
Conceptual battery cell



Conceptual battery module



Conceptual battery pack



Components considered

- All types of battery cells
 - Prismatic, pouch, cylindrical
- Placeholders for key components
 - BMS master and slave
 - Switch and fuse box incl. contactors, fuses, capacitors
 - Cooling system
 - Cell-2-cell connectors
 - Module - and pack housing
 - Cross- and longitudinal beams
 - End-plates for cell stack compression

Get in touch with us for further information



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