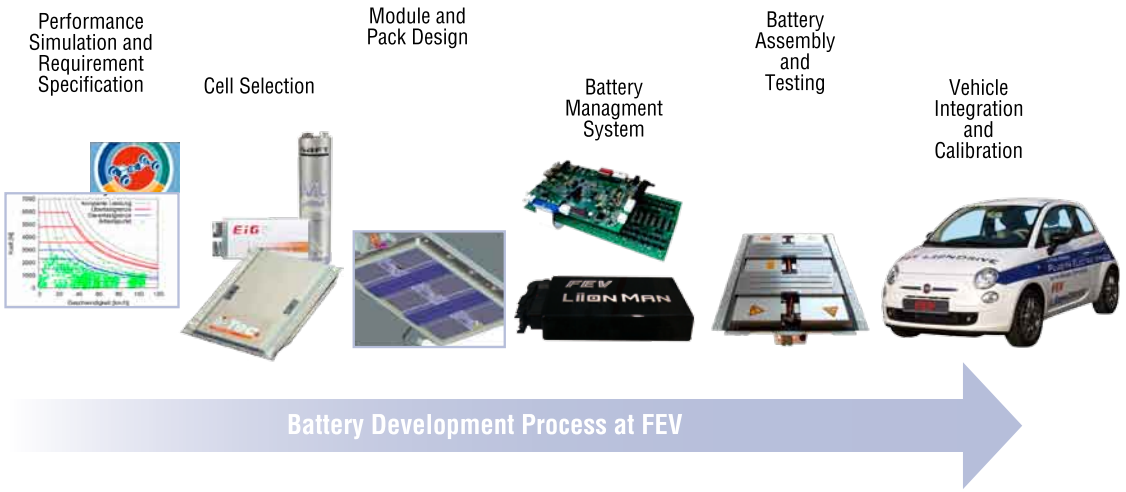
Battery Development at FEV



FEV offers the development of entire battery systems, including the Battery Management System (BMS) and battery testing. While FEV can access standard modules and its own BMS (FEV LiiONMAN), it also offers the services of new product development.

At FEV, the development process is accompanied by computer simulations that can predict the temperature distribution and support cooling design and structural calculations. The development of the battery pack is carried out according to the specifications resulting from vehicle integration, thermal requirements, and electric target values. It includes the configuration and connecting of the battery modules (e.g. FEV standard modules of 1kWh/2kWh) as well as the development of the cooling system and the integration of power relays, pre-charge circuit, service plug, and battery control unit.

Testing and validation are important steps within the development process of battery systems. Hence, FEV designed its own battery test benches, which allow it to carry out all necessary battery module and battery pack tests. In order to fulfill all safety requirements, not only the respective battery system but also the complete vehicle must be considered. Based on a risk analysis, FEV develops safety concepts that take into account functional and high voltage safety.

Within the framework of a safety agenda according to ISO DIS 26262, all of the required steps from the technical specifications through to the scheduling, completion and documentation of validation activities and reviewing of suppliers of safety-relevant parts are taken.

The FEV battery control unit (FEV LiiONMAN) combines the surveillance of all critical values with operational strategies to create a performance projection. This enables safe operation and optimized utilization of the cell's capabilities. FEV LiiON MAN is based on a flexible master/slave concept. Via CAN-bus, slave modules integrated into the battery modules are connected to the master unit. The master unit's algorithm structure is based on the widely used MATLAB/SIMULINK environment and can therefore be designed with a model-driven approach. The benefits are transparency, flexibility and modularity.

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