



## **RSC evaluates the feasibility of novel approach to EV battery architecture to help a Tier-1 automotive supplier explore new product offerings**

Ricardo Strategic Consulting (RSC), in conjunction with Ricardo engineering assists a global supplier identify and evaluate innovative EV battery concepts to enable the supplier to develop and offer products in this growing segment.

### **CHALLENGE**

A large Tier-1 supplier is looking to expand their product portfolio with offerings in the growing Connectivity, Autonomous, Sharing, and Electrification (CASE) transformation of the automotive industry. Internal R&D proposed a significant change to EV battery architecture that could substantially reduce the cost of EV batteries and open up a new business opportunity for the client.

RSC utilized extensive EV battery benchmarking experience to quantify the potential benefits of this novel architecture and select two representative production vehicles to run proof-of-concept experiments to confirm the feasibility of this idea.

After approving the plan, RSC and Ricardo engineering acquired two test vehicles, one BEV and one PHEV, and quickly perform a series of

experiments at the cell, module, and battery pack levels and provide data vital to the development of this new technology.

## APPROACH

RSC starts with the hypothesis this new architecture is engineering feasible and presents a compelling business case to the industry. Business analysis and lab experiments are used to confirm or reject the hypothesis.

- **Quantify the business opportunity** by evaluating the cost advantage of this new proposed battery architecture which will put the client in position to compete in this segment
- **Identify representative xEV architectures** using RSC benchmarks of technological trends to maximize customer learning and future relevance of the experimental data
- **Create a test plan and methodology** considering how the proposed architecture would interact electrically with cells, modules, conductors, and battery structure. Specify lab equipment, measurement techniques, and test procedure
- **Execute an accelerated test plan** – acquire test vehicles, instrument cells, modules, and battery packs. Run tests on the bench, in environmental chambers, and on full chassis dyno
- **Synthesize and summarize data** relevant to the customer to identify any potential enablers or inhibitors of the technology

## RECOMMENDATIONS

After extensive experimentation, RSC and Ricardo engineering identified key design considerations critical to the function of the novel EV battery architecture. These findings resulted in a change in design direction and illuminated the client's engineers on battery behavior under the test conditions.

## RESULTS

- Hundreds of datasets on lithium-ion cells, modules, battery packs, and xEV vehicles under all the tested conditions
- Synthesized user-friendly interactive data useful for client engineers in the design process
- Highlighted parameters which could inhibit or enable the novel architecture and which battery technology trends are relevant to future applications
- Lessons learned for the client engineering to integrate into product development of novel architecture

- **Experienced xEV multidisciplinary automotive team**
- **xEV market insights**
- **Disruptive technology identification**
- **xEV subsystems analysis**

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