



CASE STUDY: SOLID STATE BATTERY PACK

CELL-LEVEL FEATURES ENABLE BATTERY PACK DESIGN
OPTIMISATION, BRINGING VEHICLE-LEVEL BENEFITS

Safer Solid State Cells

Iluka's solid state battery (SSB) cells are expected to provide a combination of competitive battery performance vs current NMC lithium-ion cells, mixed with higher safety and similar impact upon abuse as LFP lithium-ion cells. We collaborated with UK battery pack experts Balance Batteries to theoretically model a battery pack that capitalises on SSB's safety features. A typical mass-produced SUV powered by high-energy lithium-ion cells was selected as benchmark: the current cells were then replaced with Iluka's cells.

Bill of Materials

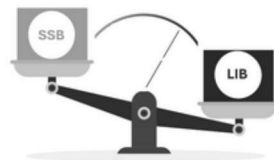
- Thanks to SSB's higher energy density, the pack mass was 32kg lighter than the benchmark pack
- Thanks to SSB's tolerance to operating at higher temperatures, intra-cell foam, thermal barrier materials and venting parts were removed losing 33kg
- Thanks to SSB's higher safety, anti-intrusion beams were thinned down, yielding 31kg

Cost Benefits

Assuming cell costs are the same, redesigning the pack by removing parts (fully or partially) could yield a \$3,000 cost reduction. Additional tooling would be required (totalling £78k) and would be absorbed over a few vehicles.

Driving Experience

Compared to the benchmark SUV, the lighter SSB pack enabled a -3% energy saving, equalling an additional 15km per full charge.



- 100 kg
(220 lbs)
Vehicle Weight



- £2,500
(\$3,000)
Bill of Materials



- 3%
(Wh/km)
Driving Efficiency

Fewer battery parts,
higher driving efficiency
and reduced cooling
during charges lead to
fewer CO₂ emissions



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Thank you to Archie Organ and Balance Batteries

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