Federal Ministry
for Economic Affairs
and Climate Action

# Best practice example

for lightweighting in Germany

Lightweight starter battery

Version of a lightweight starter batteryt

## Small and lightweight modular starter battery

### Fields of application

Automotives

Commercial vehicle manufacturing

Manufacture of other vehicles

In this example, lightweighting allowed for the following reductions compared to a conventional model of a 90 Ah + 50 Ah lead starter battery:

Weight approx. -75%

Cost approx. -33%*

* The cost of the lightweight version is €12.50/kg.

### Application

In conventional vehicles, the engine is started using the starter battery and idling is powered by up to two lead batteries. For example, Tesla uses a lead battery to power the safety systems, touch screen and high-voltage contactors. As a result of rising vehicle weights and packaging problems, new solutions are needed such as modular housing provided with lithium technology.

### Challenge

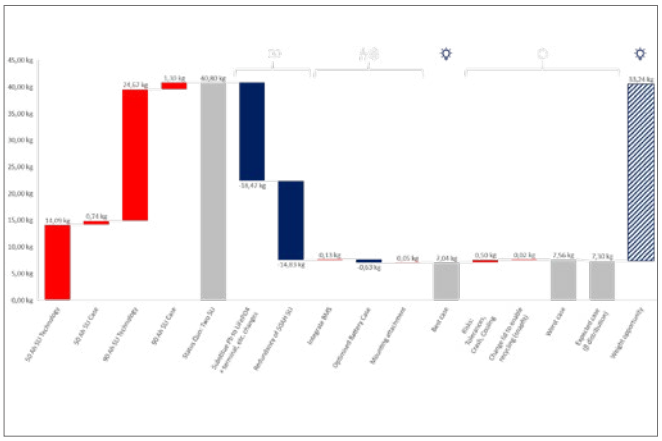
In addition to reducing weight and fitting components in a limited installation space, other considerations are keeping down the cost of the cell technology and how to manufacture/assemble the housing. This means that a focus needs to be placed on producing modular and standardised elements and that common interfaces to previous, standardised housing need to be maintained.

### Solution

In the cell holder/modular, prismatic housing ensemble, the entire battery is built up based on high-performance lithium iron phosphate cells which are packed tightly together. The power electronics and, if necessary, an additional cooling system are also integrated into the cell holder. The components are designed for injection moulding and the inherently rigid shape enables wall thicknesses to be reduced.

## Best-Practice-Beispiel | Lightweight starter battery

70 Ah lead battery next to 140 Ah lightweight starter battery



Breakdown of weight shows more than 30 kg in primary weight saving is made.

## Other potential applications

Energy technology

Construction of rolling stock

Sports and leisure equipment

Aircraft construction

Shipbuilding

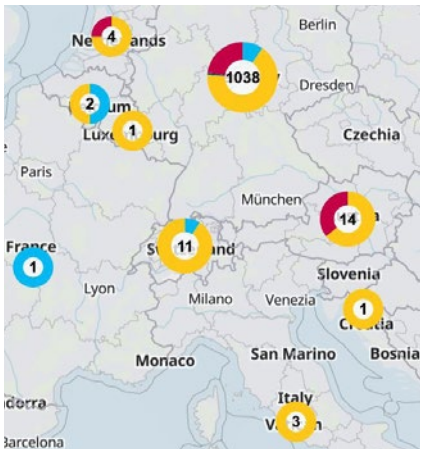
Spacecraft construction

With regard to sustainability, the lifespan of the starter battery is expected to be around three times longer than that of a lead battery and the housing can be opened using snap hooks without being damaged. Recyclate is also used in injection moulding to reduce the environmental impact. In terms of safety, it should be noted that lithium iron phosphate is thermally stable, which means that no further measures need to be taken in this regard.

Savings can also be made in the areas of secondary weight and installation space, as the battery holder can be optimised following the significant reduction in battery weight and the position of the battery in the vehicle can be adjusted.

In high-voltage applications, the prismatic shape of the battery can be used to absorb crash energy by sliding the inclined surfaces against each other.

Compliance with all requirements relevant for the sector is ensured. Research activities are being conducted so as to further improve health and safety, environmental protection and recycling.




## Der LIGHTWEIGHTING ATLAS

The LIGHTWEIGHTING ATLAS is an interactive web portal that pools information on those active in lightweighting and their skills across different industries and materials. The atlas is free to use and entries into the atlas are also free. You can find the LIGHTWEIGHTING ATLAS at www.leichtbauatlas.de

**The Lightweighting Initiative**

Modern lightweighting is of pivotal importance for German industry and its competitiveness. The Federal Ministry for Economic Affairs and Climate Action has established the Lightweighting Initiative to support lightweighting in Germany. The Lightweighting Initiative Coordination Office in Berlin, which is financed as part of the initiative, pools all activities relevant to lightweighting and supports German companies, especially SMEs, as they implement lightweighting.

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