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The “battery butterfly effect”: small cell drift can cause enormous loss of useable capacity

In conventional battery management systems (BMS), every load cycle causes a very small cell drift that can neither be detected nor measured until much later. But what starts small will eventually have dramatic consequences: low useable capacity and fewer remaining load cycles. ETA-Leveling will prevent this.

A use case from real life illustrates the benefits of this algorithm that can be integrated into existing hardware without any modifications. The BENNING CMS Technology GmbH Battery Leveling Laboratory tested a used e-mobility traction battery with 80 percent useable capacity – a state that meant it had reached its end of life for use in electric vehicles (EV). The Laboratory team reanimated the battery (i.e. leveled it), lending it around 900 more load cycles before it will drop back to 80 percent.

Saying goodbye to cell drift with ETA-Leveling

BMS that use ETA-Leveling from the very start prevent the premature ageing of individual cells in the first place, thus heading off cell drift and the resulting loss of useable capacity. In EV batteries, useable capacity equals range – and cell drift equals loss of range. While we are dealing with losses of below 10 percent (3.5 percent in the tested battery), these seemingly small figures cannot hide the fact that consequences can be severe. This is especially true for e-mobility, where every little bit of range matters. “Shorter ranges and fewer load cycles are caused by inadequate BMS,” explains Frederik Fuchs, Managing Director of Benning CMS Technology. “Our ETA-Leveling technology leads to more usable energy under the same conditions.” ETA-Leveling is available for any type of battery block and can be implemented into BMS following the purchase of a licence.

You can find more information at <https://cms-technology.de/en/>.

((Preface & body text: 1,817 characters, including spaces))

ETA-Leveling and what it can do

The cells which cause a battery block to become defective have usually aged prematurely. This means that compared with neighbouring cells they have lost considerably more of their efficiency and their state of charge (SoC) differs. This causes the block to become unbalanced. If these cells regularly exceed set cut-off limits in the upper or lower voltage range, they at some point prevent the entire block from being charged or discharged sufficiently. By this point at the latest, the entire block is discarded. ETA-Leveling targets various aspects of this process: When used as BMS in the first place, it prevents the premature ageing of cells and prolongs the lifespan of a battery block considerably. When used in defective blocks, this charging process can at best re-level the cells so that the block can continue to be used. ETA-Leveling is also suitable for second-life

applications: “patchwork batteries”, consisting of cells combined as desired, can be connected in series using this technology.

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About Benning CMS Technology GmbH:

BENNING CMS Technology considers itself a battery system thinktank. Founded in 2017 as a start-up called Sybac Systems GmbH, the company has specialised in new developments of power electronics and charging processes for battery systems. All employees could already look back on a number of years developing and operating electricity storage systems when they founded the company. Industrie automation Energiesysteme GmbH has held 50% of company shares since spring 2019. It was within the framework of this cooperation that Q-Leveling became ready for series production. Its successor, ETA-Leveling, has been a marketable product since 2021, with the development team labelling it as disruptive technology due to it being the very first charging process tackling efficiency levels (hence the name ETA-Leveling – derived from the Greek letter “ η ”, used in physics to denote efficiency).

You can find more information at <https://cms-technology.de/en/>.

Images:

(Please note, this is screen resolution only.)

To request print resolution quality, please contact batterie-leveling@pr-hoch-drei.de.)

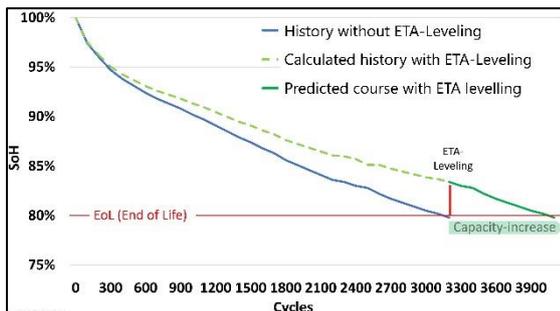


Image 1: ETA-Leveling improves useable capacity and increases the number of available load cycles. A leveled test battery was able to achieve around 900 additional load cycles.

Image credits: BENNING CMS Technology GmbH

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