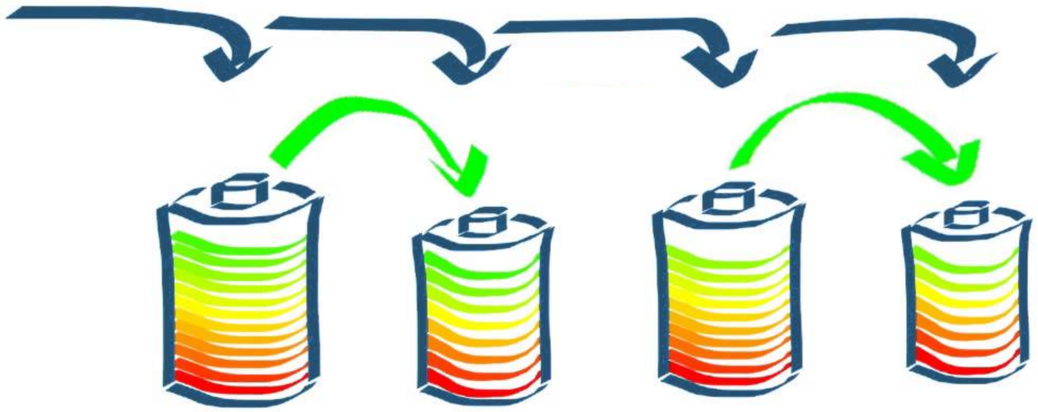
ACTIVE BALANCING: HOLY GRAIL OR GRAVEYARD?

Active Balancing is the Holy Grail of Battery Management

To be commercially viable, an active balancing system must embody the three “E’s”:

- Efficient – move energy from cell to cell with minimal losses
- Effective – keep the battery balanced regardless of the age and condition of the cells
- Economical – the value it adds must be greater than its cost



Active Balancing is a Graveyard

Over the past 20+ years there have been countless attempts to develop commercially viable active balancing systems. Millions of engineering man-hours and millions of R&D dollars have been spent trying to come up with an active balancing system that embodies all three E’s. All of these efforts ran into dead-ends.

A review of active balancing patents looks like a graveyard full of aging tombstones.

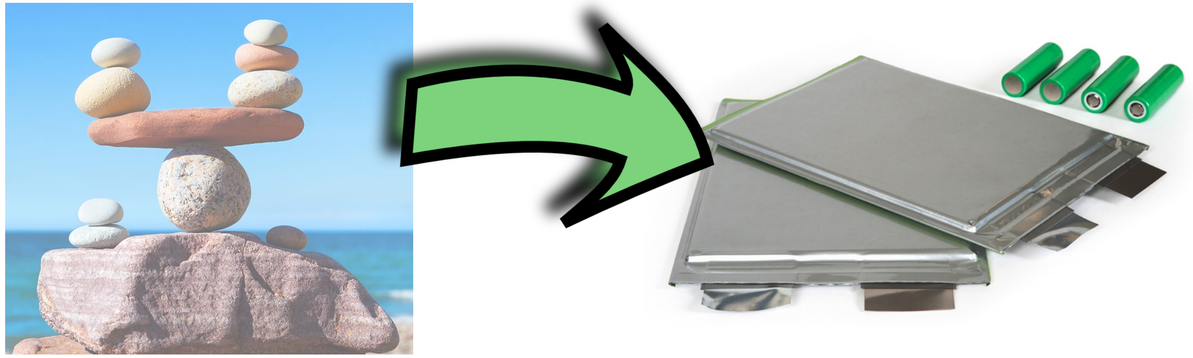
After years of effort, the battery and EV industries largely gave up hope of finding an active balancing technology they could use. They raised the white flag and retreated to simple (and largely ineffective) passive balancing systems that are now used in most automotive battery packs.

A SEISMIC SHIFT: FROM BALANCING TO BATTERIES

Battery and EV industries adopted a new mindset:

“We haven’t been able to come up with a good active balancing system, so we’ll settle for passive balancing and we’ll shift our focus to making better batteries.”

This has been the mindset of most of the industry for the past six to eight years, right up to the present.



To compensate for the limitations and shortcomings of balancing technology, engineers in the battery and EV industries have invested billions of dollars in R&D expenditures, trying to come up with new battery technologies and better manufacturing processes. The new goal became:

“Develop battery technologies that will produce cells that are almost perfectly matched when new, and will remain matched for the life of the battery. The SOC and SOH of every cell in every battery must always be virtually equal.”

That is an exceptionally difficult task, bordering on the impossible. R&D efforts in new battery technology can take years or decades, are staggeringly expensive, and are very high risk.

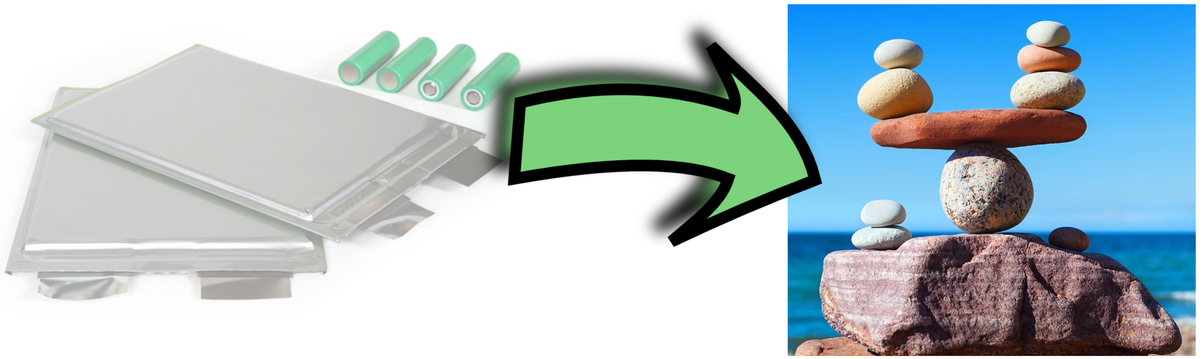
This new goal may never be reached. Getting close to the goal will take years.

There is an alternative that is proven to work; that is low-cost; and that is available now.

TAKE A FRESH LOOK AT BALANCING

True Balancing is available now, and it redefines what balancing systems are capable of.

With True Balancing, your cells don't need to be closely matched. True Balancing maximizes the performance of real-world batteries that have real-world variations in their cells.



True Balancing compensates for variations in cell capacity, self-discharge rate and temperature. With True Balancing, out-of-balance conditions are completely eliminated in every battery, for the entire life of the battery.

The only battery that doesn't get out of balance is a battery in which every cell is perfectly matched from day one and remains perfectly matched for the life of the battery.

Such a battery does not exist today and it may never exist.

For all other batteries, there is True Balancing.

True Balancing embodies the three E's of the ideal active balancing technology – it is Efficient, Effective and Economical.

If you worked on development of active balancing systems, we empathize with you. Keeping lithium-ion batteries balanced is a monumental challenge. If you'd like to work on an active balancing system that really does it all, please contact us and let's work together to integrate True Balancing into your BMS.