

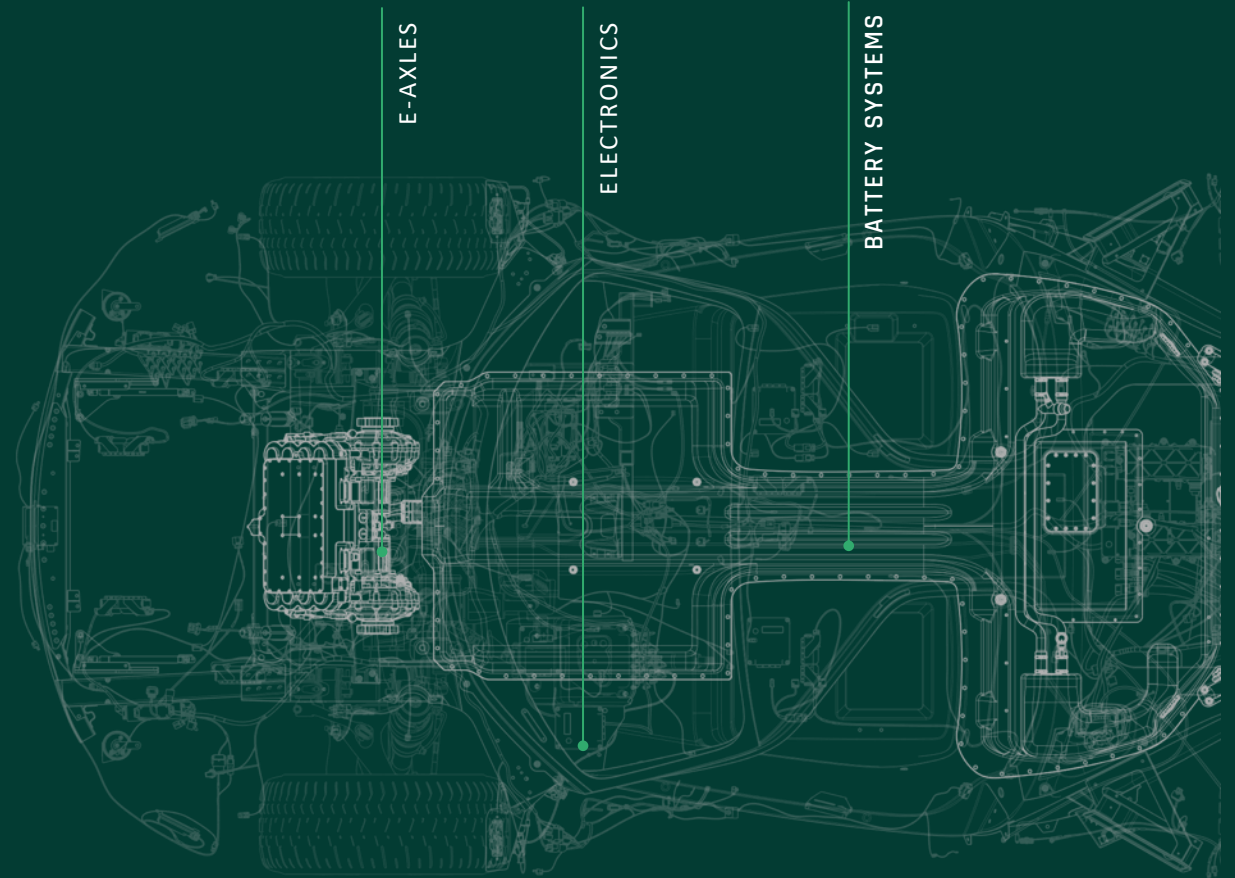
RIMAC ENERGY

SINESTACK - EXTRACTING MORE ENERGY FROM EACH CELL

[RIMAC-ENERGY.COM](https://rimac-energy.com)

DANIEL PARRY – BATTERY PERFORMANCE LEAD

OUR ROOTS



HYPERCARS



Developing and building the world's most advanced hypercars.



EV TECHNOLOGY

Helping the car industry go electric by designing and producing key components for large OEMs.

A LEGACY OF BATTERY EXCELLENCE: DRIVING OUR ENTRY INTO THE STATIONARY STORAGE MARKET

IN 2009, **MATE RIMAC** STARTED IN HIS GARAGE BY ELECTRIFYING HIS BMW AND PLANTING THE SEED FOR A FUTURE TECHNOLOGY LEADER



TODAY, **RIMAC GROUP** IS THE WORLD'S MOST ADVANCED HYPERCAR MANUFACTURER AND A LEADER IN EV TECHNOLOGY, WITH MORE THAN **2,100 EMPLOYEES**¹



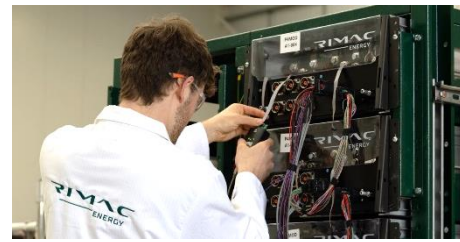
RIMAC ENERGY WAS INCUBATED WITHIN RIMAC GROUP INTRODUCED OUR INNOVATIVE SINETECH TECHNOLOGY INTO THE STATIONARY STORAGE MARKET IN 2024



2022

Technology demonstration

Dedicated team was established; SineTech technology successfully demonstrated in both stationary and automotive applications



2023

Commercial product meets development

System designed for scalability, with patents filed and custom hardware and software developed, tested, and verified



2024

First SineStack delivered to customer

A significant milestone that validates the potential of our technology

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RIMAC ENERGY

SineStack

RIMAC ENERGY

REDEFINING ENERGY STORAGE



Unique Technology &
Architecture



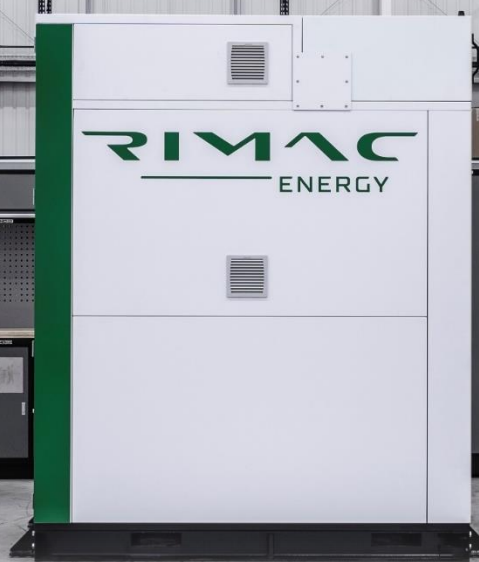
Advanced In-House
Software

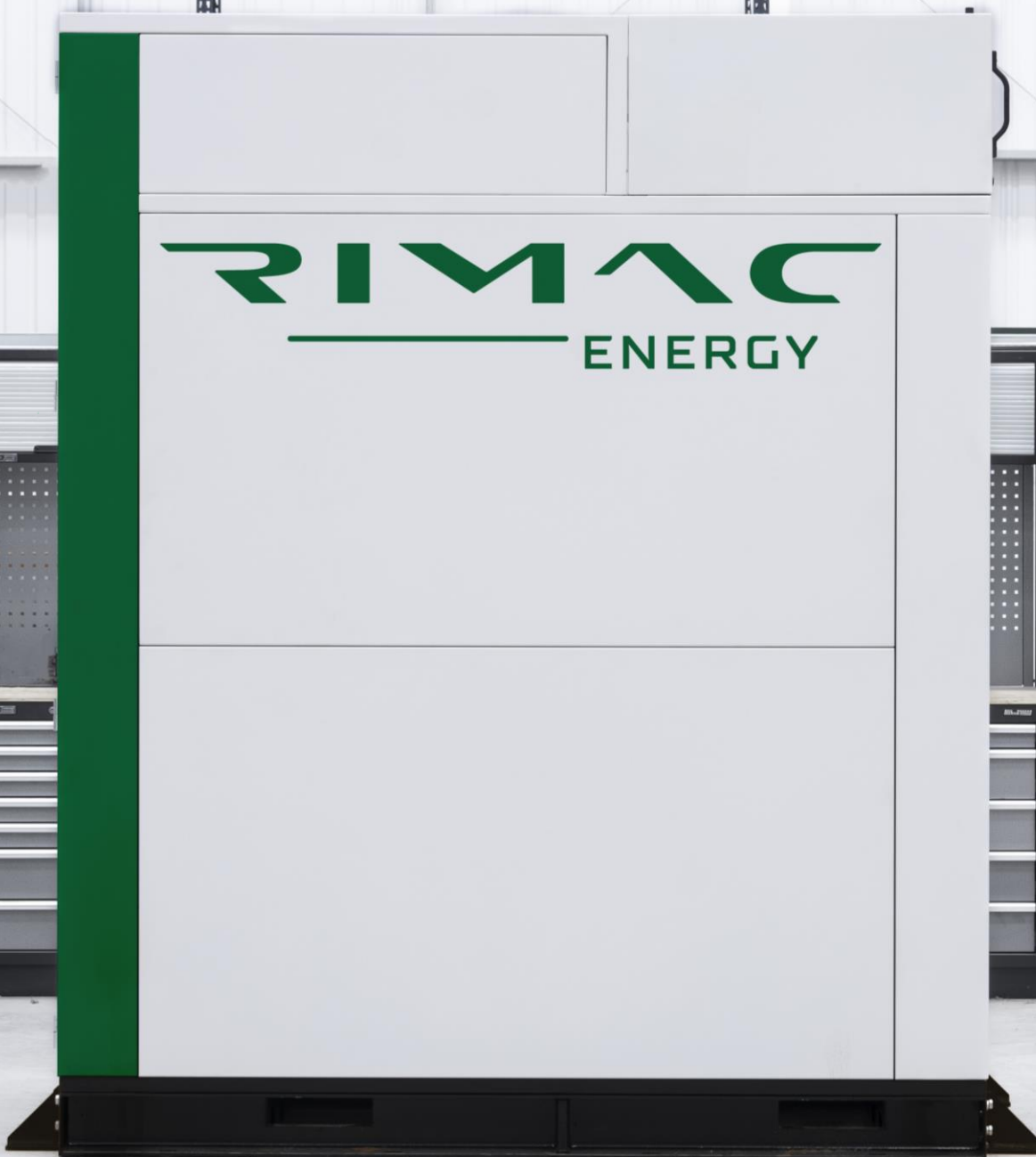


European Supply & Service



Turnkey Solutions





SINESTACK



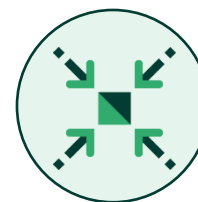
LOW LEVELISED COST OF STORAGE

SineStack drives down the levelised cost of storage (LCOS) by combining a 12,000-cycle lifetime with a class-leading 92% round-trip efficiency



ZERO EARLY PERFORMANCE FADE

To be achieved using state-of-the-art pre-lithiated cells, optimally integrated with advanced monitoring and prediction algorithms enabled by our distributed inverter architecture



COMPACT FOOTPRINT

With a 40% smaller footprint than leading competitors, SineStack efficiently packs 868 kWh into just 3m², maximizing revenue potential



NEAR-SILENT OPERATION

A high-efficiency liquid cooling system with optimal fan placement ensures quiet operation at less than 60 dB from a 10-meter distance

INTEGRATED SOFTWARE ACROSS ALL HARDWARE LEVELS FOR UNPARALLELED PERFORMANCE



HEALTH: ADAPTIVE STATE DETECTION

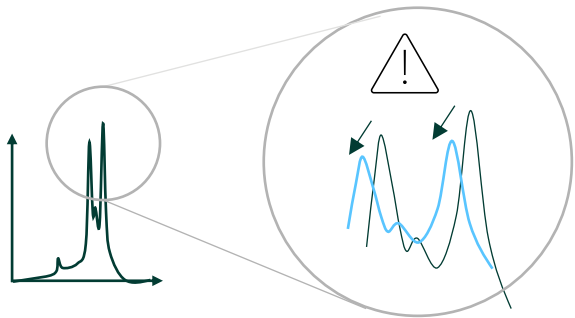


POWER: SMART DISTRIBUTION

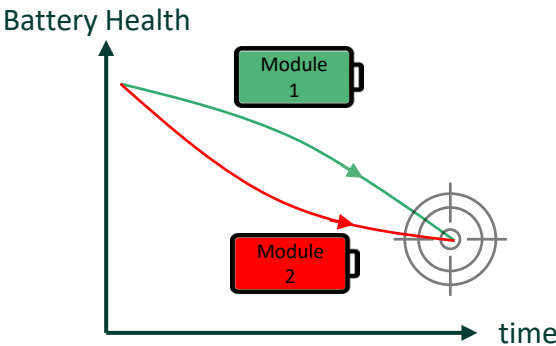


RELIABILITY: FAULT TOLERANT DESIGN

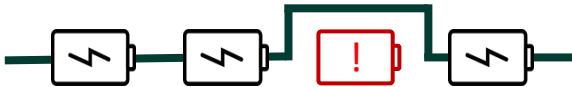
ADVANCED BATTERY MANAGEMENT



SMART POWER CONTROL



MAXIMISING BESS AVAILABILITY



Innovative State Detection Algorithms

In-depth knowledge of cell dynamics enables true state detection, unlocking each cell's potential



State of Health Driven State Detection

Actionable, adaptive insights at the cell level to maximize lifespan, boost reliability, and drive better ROI



Next-Gen Chemistry Compatibility

Engineered for smooth integration with future cell technology software, driving innovation and a competitive edge



Seamless Integration of Battery Intelligence

Novel Power Conversion System leverages advanced software for granular control



Adaptive Power Scheduling

Utilize advanced state detection algorithms to optimize energy extraction while enhancing system longevity and efficiency



Smart Diagnostics & Bypass

Fully vertically integrated hardware system for seamless operation, resulting in enhanced safety



Multi Cell Support

Enables seamless integration of different cells within the same system, enhancing flexibility.



Independent Module Control

Allows precise tuning of charge and discharge settings for each module, optimizing mixed-cell performance



Offline Module Repair

Power conversion and BMS at module level enables standalone testing, reducing the need of additional equipment for repair and reconditioning

HEALTH: ADAPTIVE STATE DETECTION



Real-Time SOC Calibration

Capacity and internal resistance rise can be tracked through life, SOC algorithms can be updated in real-time for high accuracy and dependable monitoring.



Enhanced management in cell-to-cell variation

Each cell will have its own dedicated SOX algorithm to minimise the impact of cell-to-cell variation and degradation.



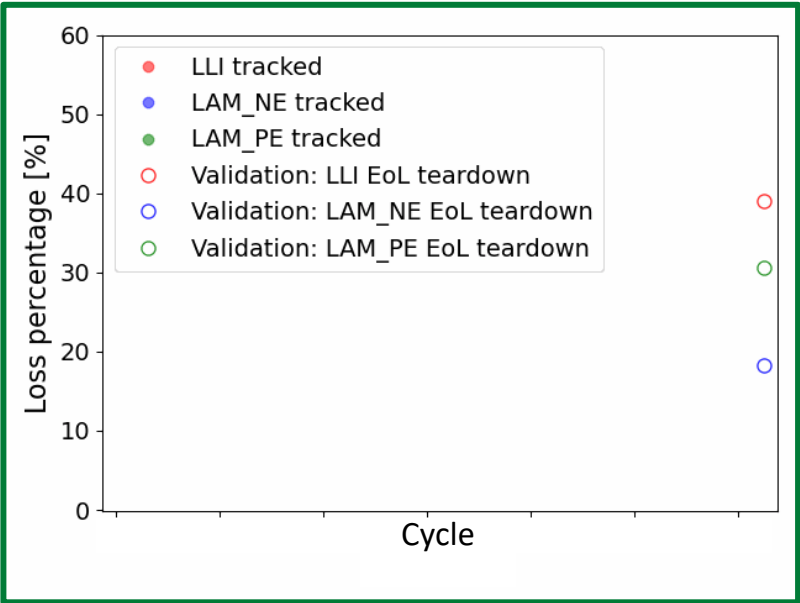
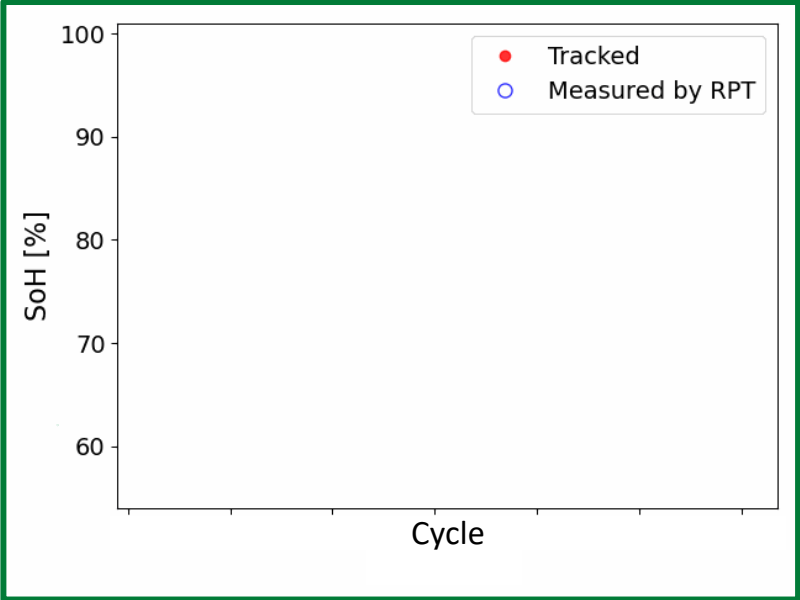
State of Health Tracking Throughout Life

Accurate and dependable SOH tracking throughout life to improve warranty, reduce downtime and increase product longevity

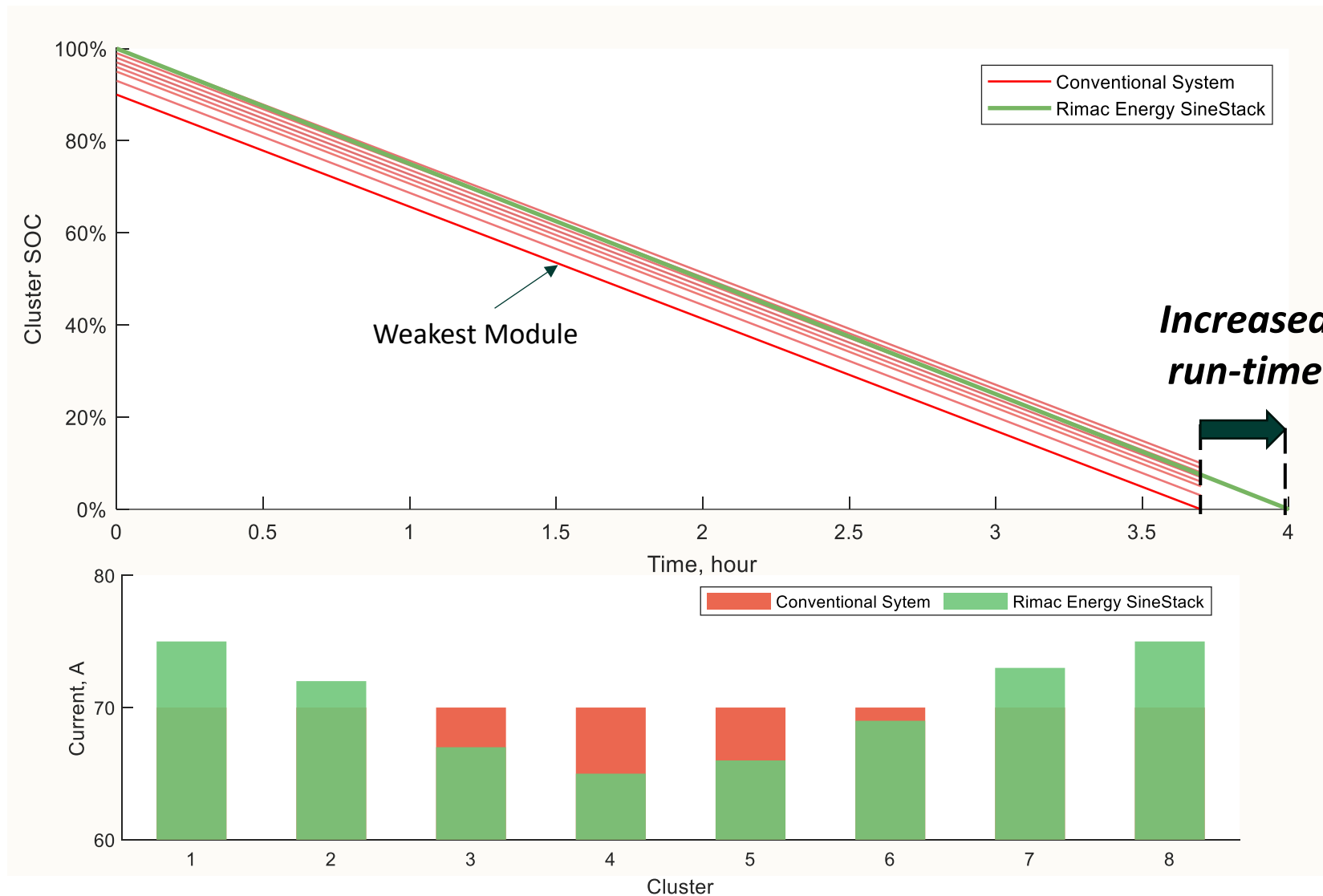


In Depth Tracking of Degradation Signatures

Distinguishing between LLI and LAM degradation we can optimize operating conditions to slow down the dominant aging factors.



POWER: SMART DISTRIBUTION AT MODULE LEVEL



Active SoC Balancing

+7%Typical Extracted
Energy* per cycle

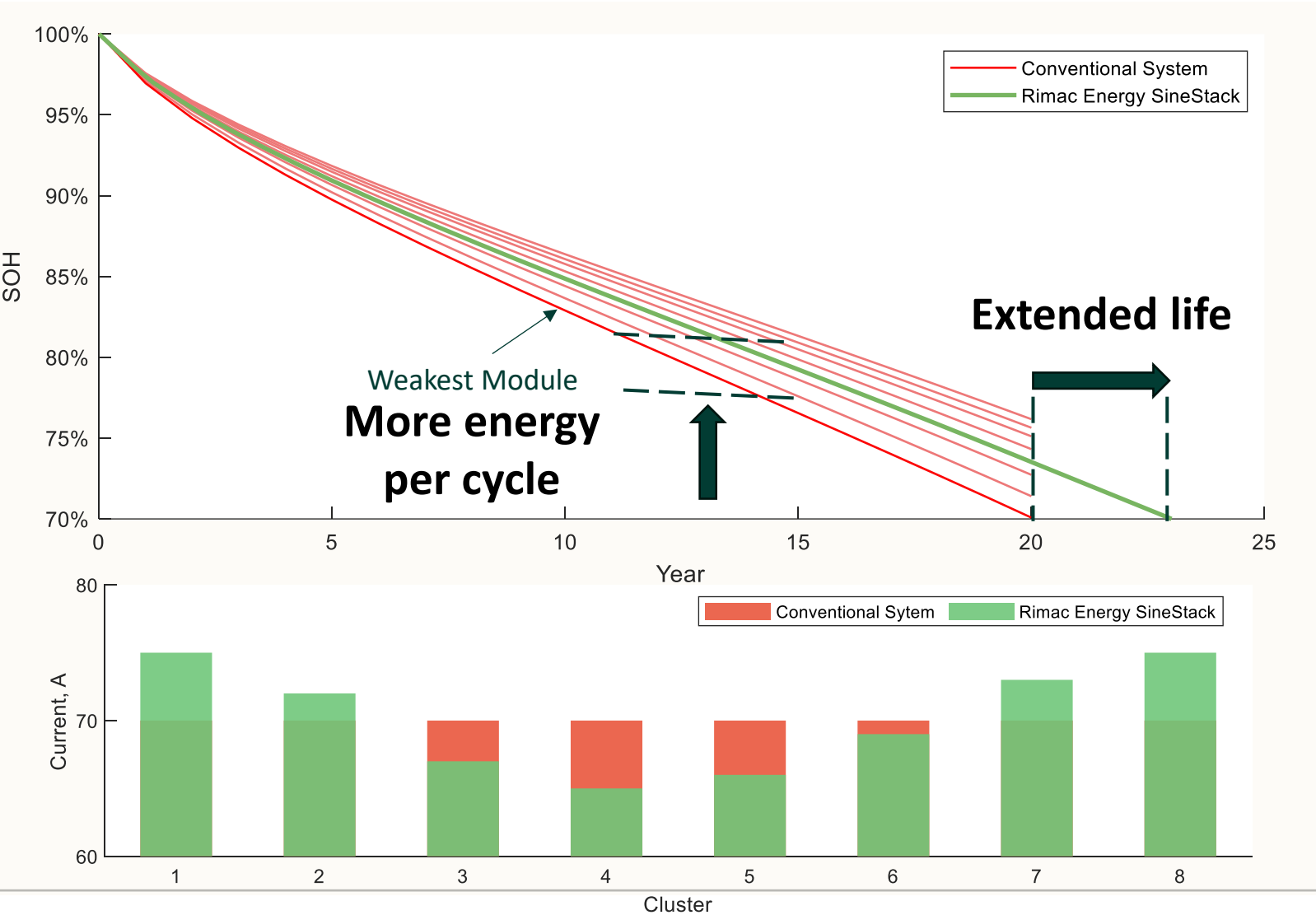
- ✓ SineStack optimises energy extraction by independently adjusting the current through each module
- x Conventional systems are limited by the weakest module, preventing full energy discharge from other modules

*Not guaranteed against all systems, but typical against common BESS in the industry

POWER: SMART DISTRIBUTION AT MODULE LEVEL



Active SoH Balancing



+1200 Cycles

UPTO 18% Additional energy extracted over life

- ✓ SineStack allows module-specific degradation management by adjusting load and duty cycle conditions independently for each module, extending system longevity
- x Conventional systems are constrained by their weakest module, which limits overall performance and accelerates aging imbalances between modules

RELIABILITY: FAULT TOLERANT DESIGN

CONVENTIONAL INVERTER

- ❌ **Single point of failure:**
One module failure results in loss of BESS operation
- ❌ **Limited Flexibility:**
Cannot dynamically adjust power flow at the module level
- ❌ **Increased Maintenance Costs:**
Centralised design leads to expensive replacements and downtime

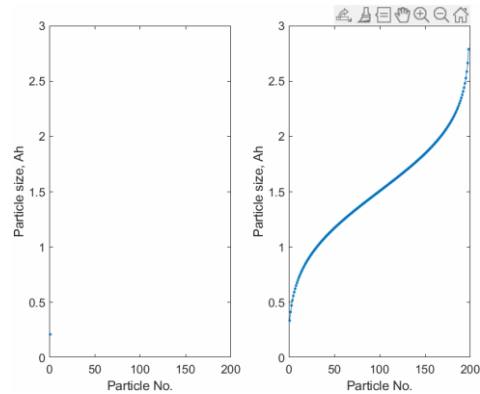
SineTech

- ✅ **Module Fault Tolerance:**
System continues operating in the event of a module failure.
- ✅ **Flexible Power Distribution:**
Can optimize charge and discharge across modules in real-time.
- ✅ **Lower Operational Costs:**
Reduced maintenance needs with built-in redundancy and self-balancing.

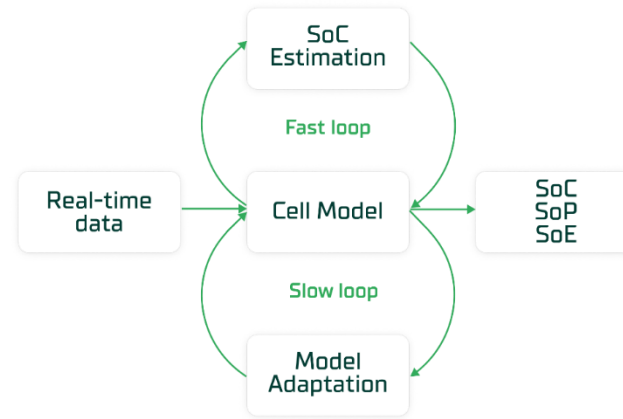


Summary – How Do We Extract More Energy From Every Cell

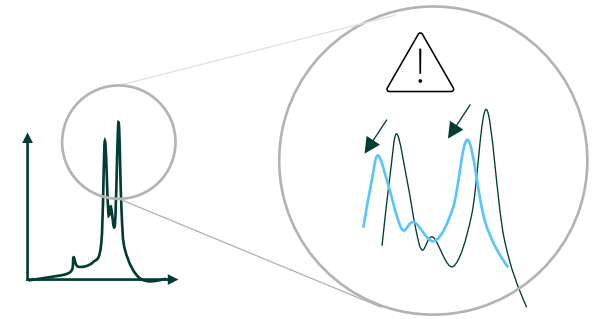
In-depth Electrochemical Insight



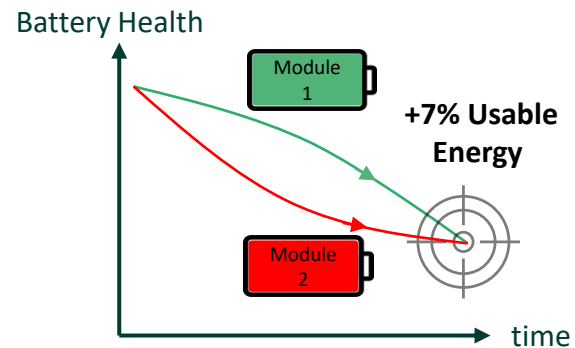
Real-Time SOC Calibration



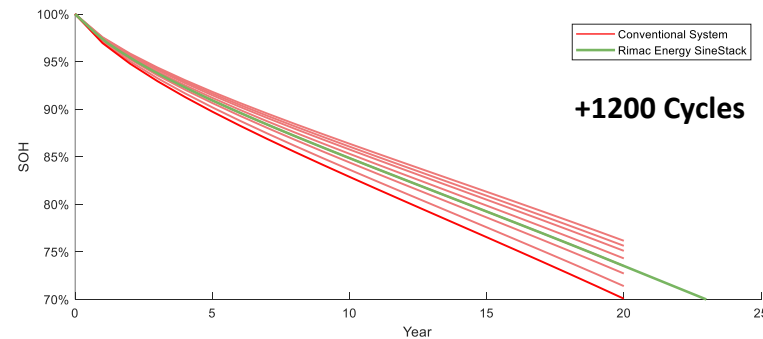
Advanced State of Health Tracking



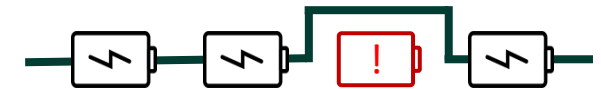
Smart Power Control



Extending Product Longevity



Maximising BESS Availability



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THANK YOU

Rimac Technology d.o.o.
Ljubljanska 7
10431 Sveta Nedelja

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