

The economic benefits of cloud-based battery analytics for energy storage assets



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PowerUp at a glance

PowerUp

Spin-off of:



15+ years of research on Li-ion batteries

200+ researchers dedicated to batteries

- **CEA spin-off founded in 2017**
- **35+ employees** including data scientists and battery experts
- **10+ patents** on non-intrusive battery analytics solutions
- **Embedded SW and Cloud analytics solutions** for BESS, EV fleet management, and Backup systems & UPS

Difficulties in operating battery assets

01

02

03

Hurdles

Uncontrolled battery fire risk

Sudden & inexplicable battery performance loss

Poor battery degradation prediction capacity

Associated Challenges

- Absence of reliable tools for early battery hazard detection
- Reactive **VS** Predictive maintenance

- Access to battery operation data and ability to process / share it
- BMS measurement's reliability issues

- Overcome cost-benefits trade-offs and facilitate decision-making:
- Battery Degradation **VS** Revenues

Meeting expected battery project performance



SAFETY

- Protect battery assets against safety issues



PERFORMANCE

- Maximize available battery capacity



ENDURANCE

- Predict battery degradation and maintenance

| ENTREPRENEURS BY NATURE

Independent global renewable energy power producer and developer



Wind



Solar



Hydro

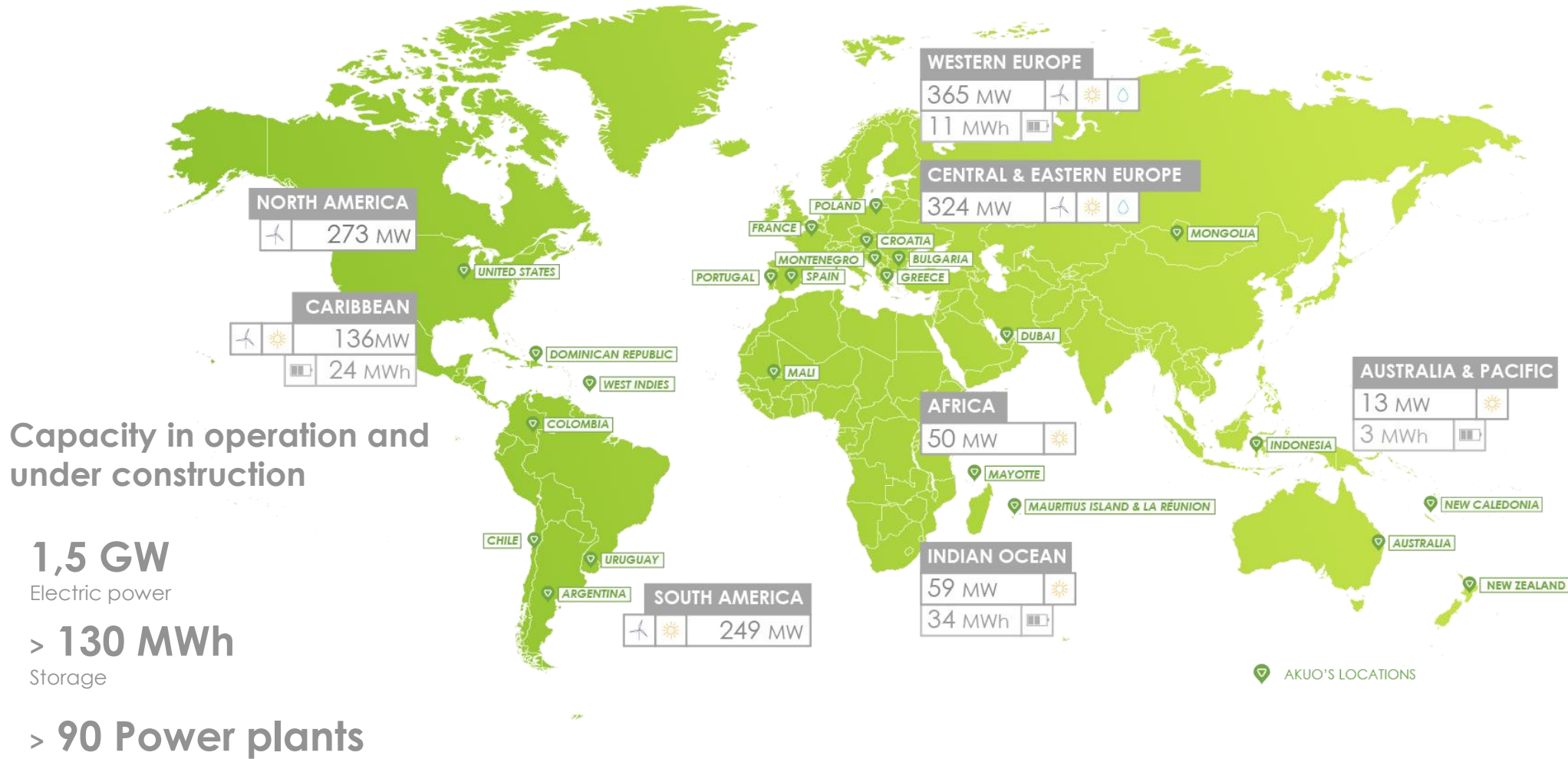


Storage

* ICG Infra is an infrastructure fund of ICG, a global alternative asset manager.



GLOBAL PLAYER, LOCAL PRESENCE



Note : Figures at the end of 2022



| AKUO'S SPECIAL ATTENTION TO BATTERY SAFETY



BESS installed capacity
continues surging

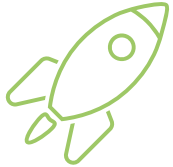


Li-ion batteries are a
newer technology



Predictive maintenance to
enhance safety and performance

| AKUO'S WORK WITH POWERUP



August 2022 - POC



Akuo - PowerUp live test :

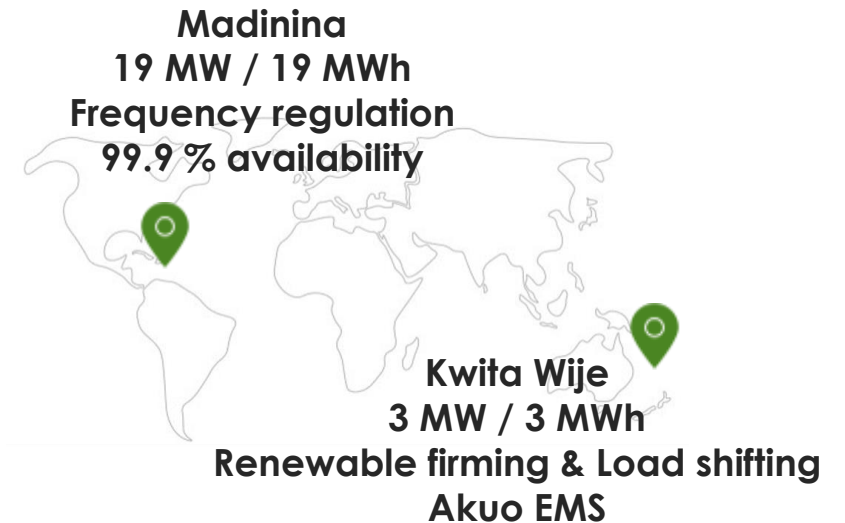
- 1 year
- 2 assets
- Historical data & Live data
- State of Safety indicators



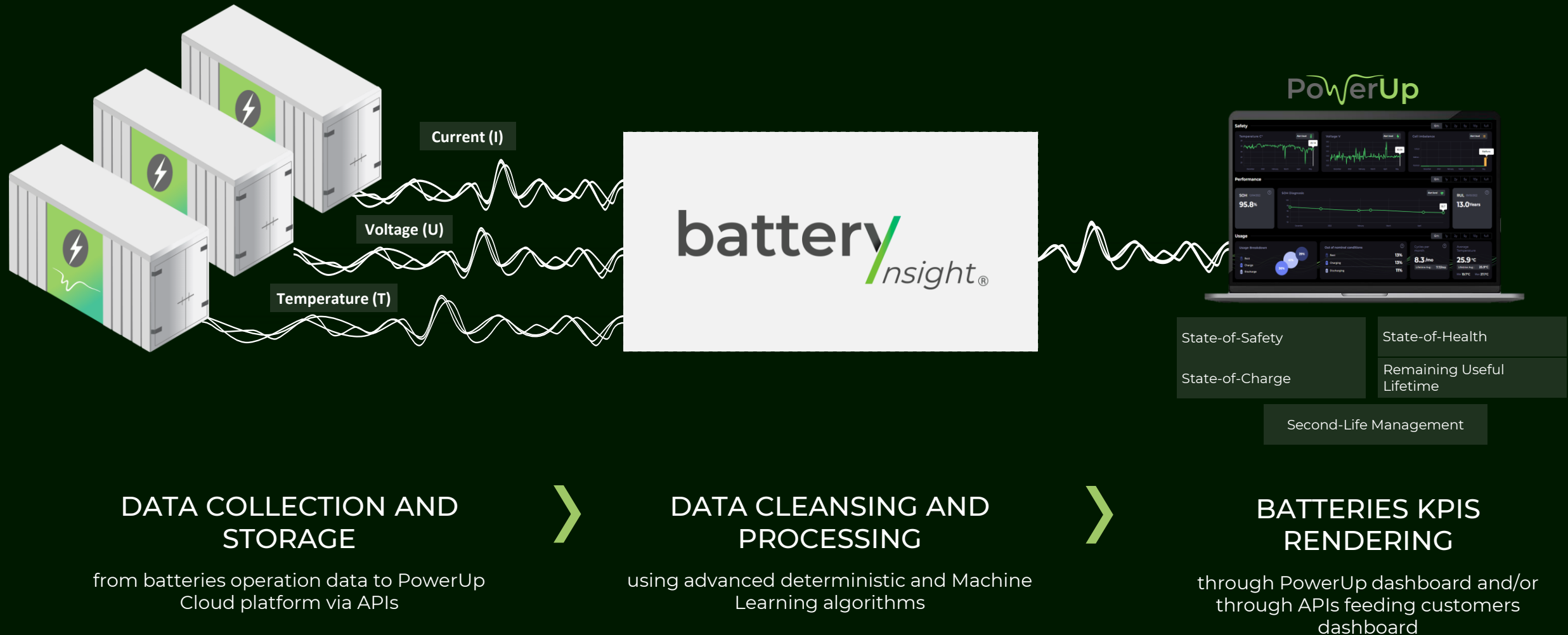
Daily update on Battery Insight platform



Evaluate PowerUp's ability to detect potential battery safety failures on our plants



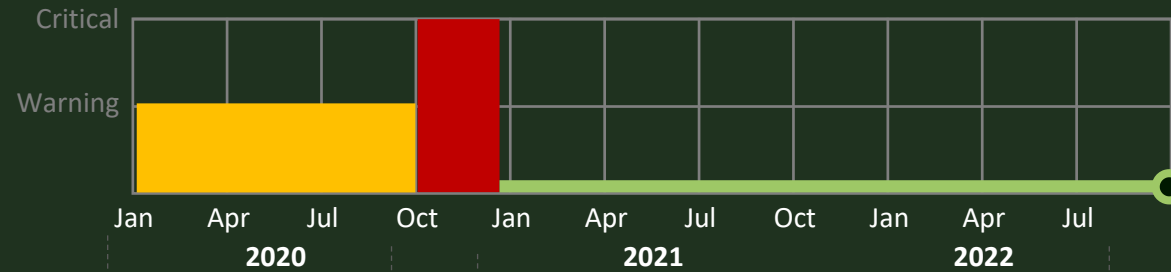
From battery **data** to battery **insights**



Use case 1: **Avoid** service interruption & associated **revenue loss**

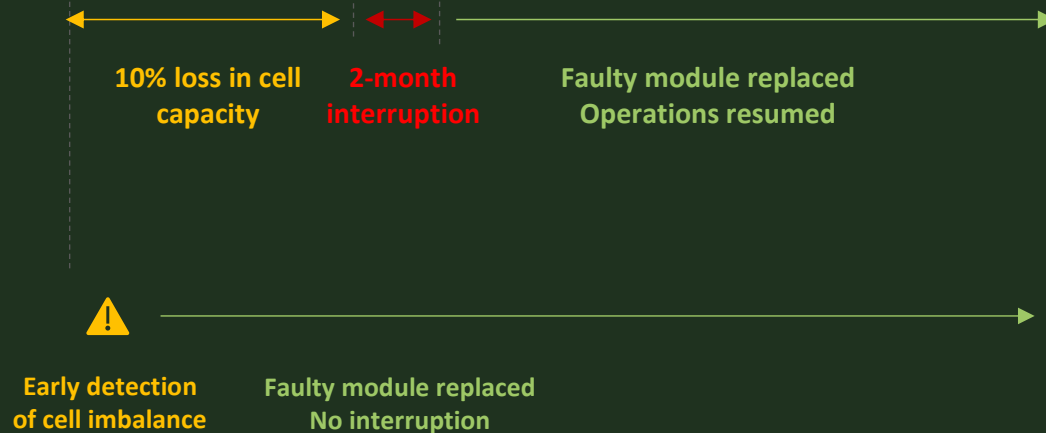
Case study: faulty modules identification on a 35MWh BESS

Without PowerUp



- ! 9 months of unused capacity
- ! 2 months of service interruption
- ! Near miss (fire incident)

With PowerUp
(retrospective analysis)



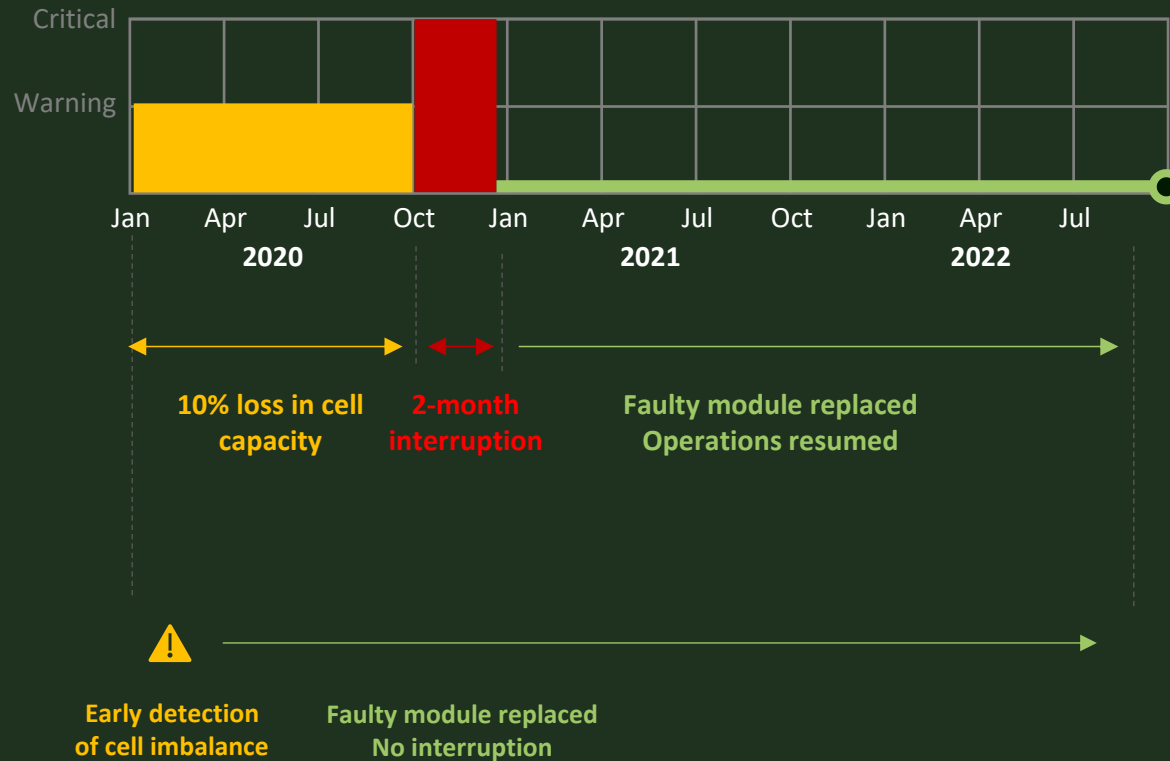
- ✓ Optimized battery usage
- ✓ No service interruption
- ✓ Safety hazard prevented 9 months in advance

Use case 1: **Avoid** service interruption & associated **revenue loss**

Without PowerUp

With PowerUp
(retrospective analysis)

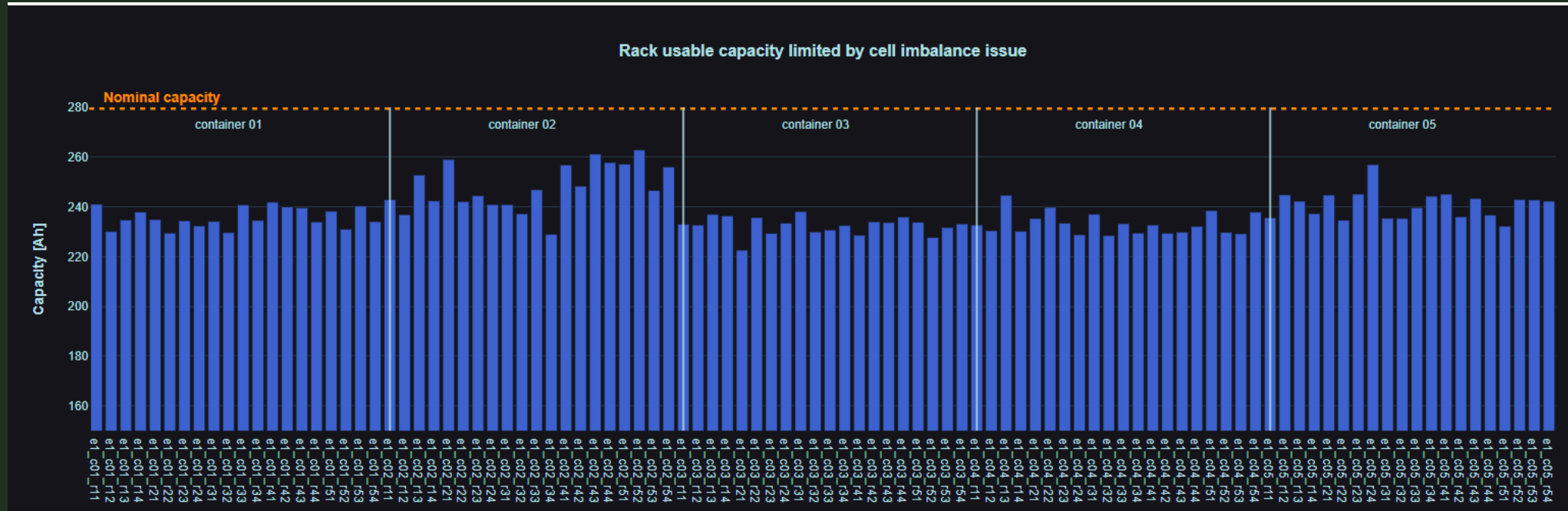
Case study: faulty modules identification on a 35MWh BESS



- ~75k€ cost of downtime (3 MWh container stopped + manpower on site)
- ~15k€ loss associated to a 10% loss of useful capacity on that container for 9 months
- Further loss associated to potential contractual penalties, insurance premiums and customer dissatisfaction

Use case 2: Maximize available battery capacity and revenues

Case study: capacity limitation on a 32MWh BESS used for Frequency Regulation



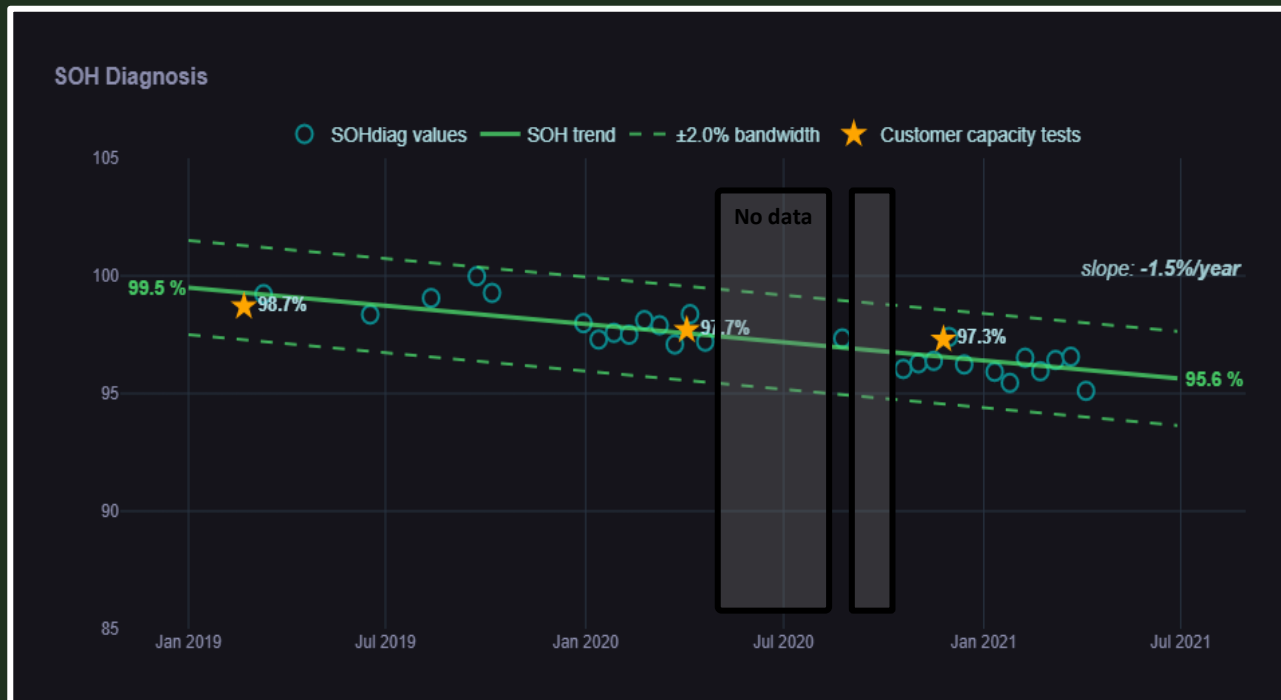
Entire BESS limited to ~84 % of its nominal capacity due to cell imbalance issue

~270k€ untapped revenue per year

Further potential loss associated to a risk of contractual penalties

Use case 3: Replace costly capacity checks with remote SOH diagnosis

Case study: frequency regulation BESS



- Validation of warranty commitments including analysis of battery usage out of recommended values (heatmaps)
- Accurate monitoring of battery health evolution and maximum available capacity
- Remote and more frequent alternative to on-site capacity test without need for service interruption

A capacity test for a 200MW/800 MWh asset can cost up to 200k€

- Alerting system for knee-point detection

Use case 4: Reduce maintenance costs with controlled SOC calibration procedure

Case study: BMS SOC measurement inaccuracy

Typical existing solutions:
Frequent and blind recalibration needed
to avoid high deviation, especially for
LFP



**Recalibration only when required, whenever BMS SOC
deviation increases**

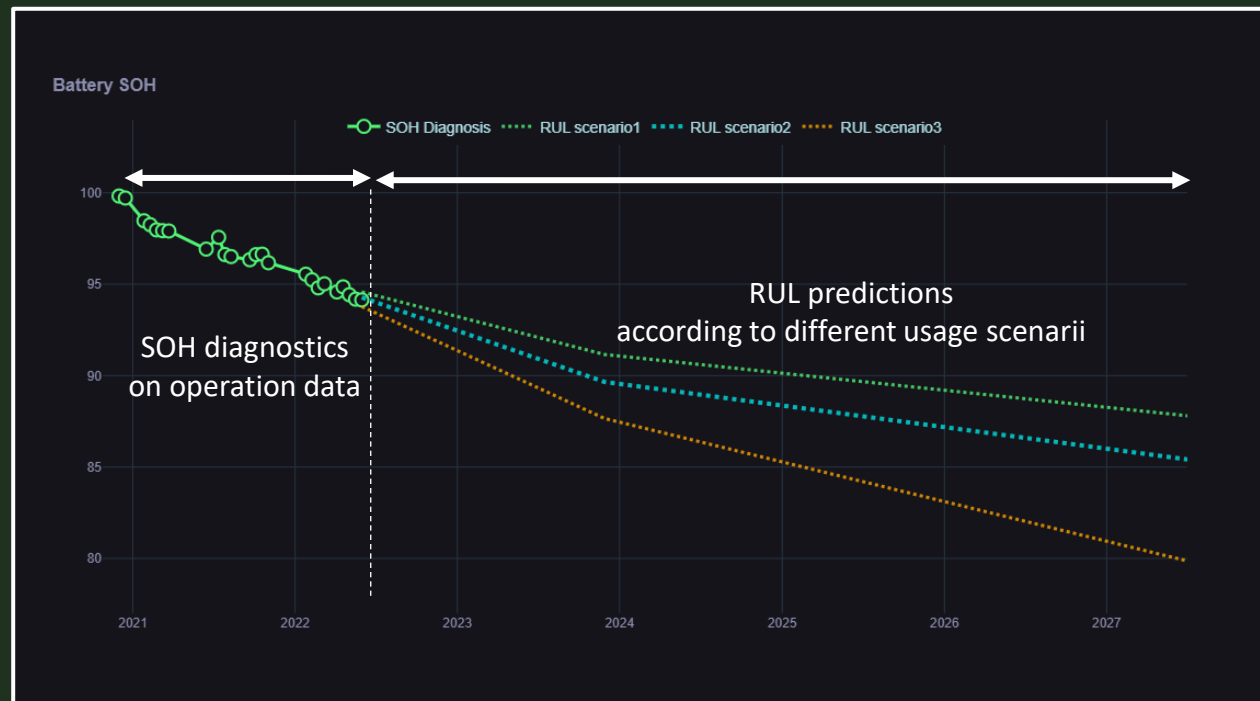
- Early identification of BMS deviation, enabling faster recalibration and more accurate knowledge of available battery power status
- Recalibration done whenever required – no longer systematically and blindly – , leading to cost and revenue savings

*OEMs recommend BMS
recalibration frequencies
every month or less*

- Better overall accuracy of the available energy/power levels, combining more precise SOH and SOC measurements and avoiding loss of service

Use case 5: Extend battery life and generate new revenues

Case study: 30 MWh BESS used for Energy Shifting service



- Extend battery asset lifetime, through a fine-tuned warranty management (1.5 years extension of a 30MWh asset translates into ~1.1M€ additional revenue)
- Optimize revenues by considering other energy services to take benefit from market volatility or T&D deferral requirements
- Better monetize battery for second life and overcome cost-benefits trade-offs

From battery **data** to battery **insights**



Let us talk batteries.

Let us show you their full potential.



Smarter E – Munich
16 – 18th June

Booth B1.376

philippe.delafortelle@powerup-technology.com



MOVE – London
21-22nd June

Booth 72

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