Battery Lifecycle Digital Management

Unleash The Maximum Value Of Batteries

Benefits

Enable management efficiency

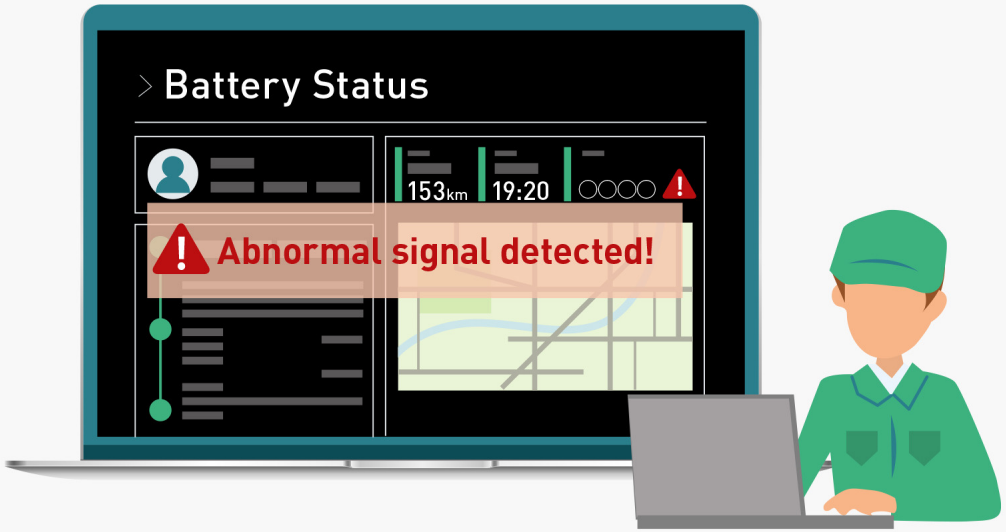
- Bring intelligence into battery asset management by visualizing the battery data.
- Promote a cost-effective asset management decision-making foundation through accurate life prediction algorithms embedded in our platform.

Ensure operation safety

- Diagnose battery health status externally & internally by applying battery analysis technology.
- Identify earlier abnormal signals inside the battery before fire and explosion occurs by data detection technology.

Improve profitability

- Extend the battery useful life time to improve profitability of battery assets.



Battery Lifecycle Digital Management

Unleash The Maximum Value Of Batteries

Technical Advantages

Estimate various batteries' SOH(state of health) fast and easily

- Estimate accurate SOH by computing SOC(state of charge)-OCV(open circuit voltage) curve automatically on limited charge/discharge data.
- Suitable for multiple types of batteries, LFP(LiFePO4), NCM(NiCoMn) etc.

High detection accuracy, low false alarm rate & early security warning

- The abnormality detection sensitivity of BetteRRRy, the battery analysis platform we built on Panasonic's deep industrial Knowhow and AI technology, is 20 times* than others.
- Detect batteries' status comprehensively, including overcharging, over discharging, abnormal temperature, overcurrent, and notably identify cell level internal short circuit at early stage.
- Prevent capacity imbalance detected faults in battery degradation stage using regularization technology.

Intelligent aging control strategy

- Estimate varying battery types' degradation characteristic accurately on Panasonic's cumulative DB x AI (operation history learning).
- Adjust the depredation imbalance of positive and negative terminal to moderate battery aging trend with understanding of the unipolar characteristics.
- Slow cell's depredation by customized control strategy under storage, charge and discharge conditions.

*By Panasonic research

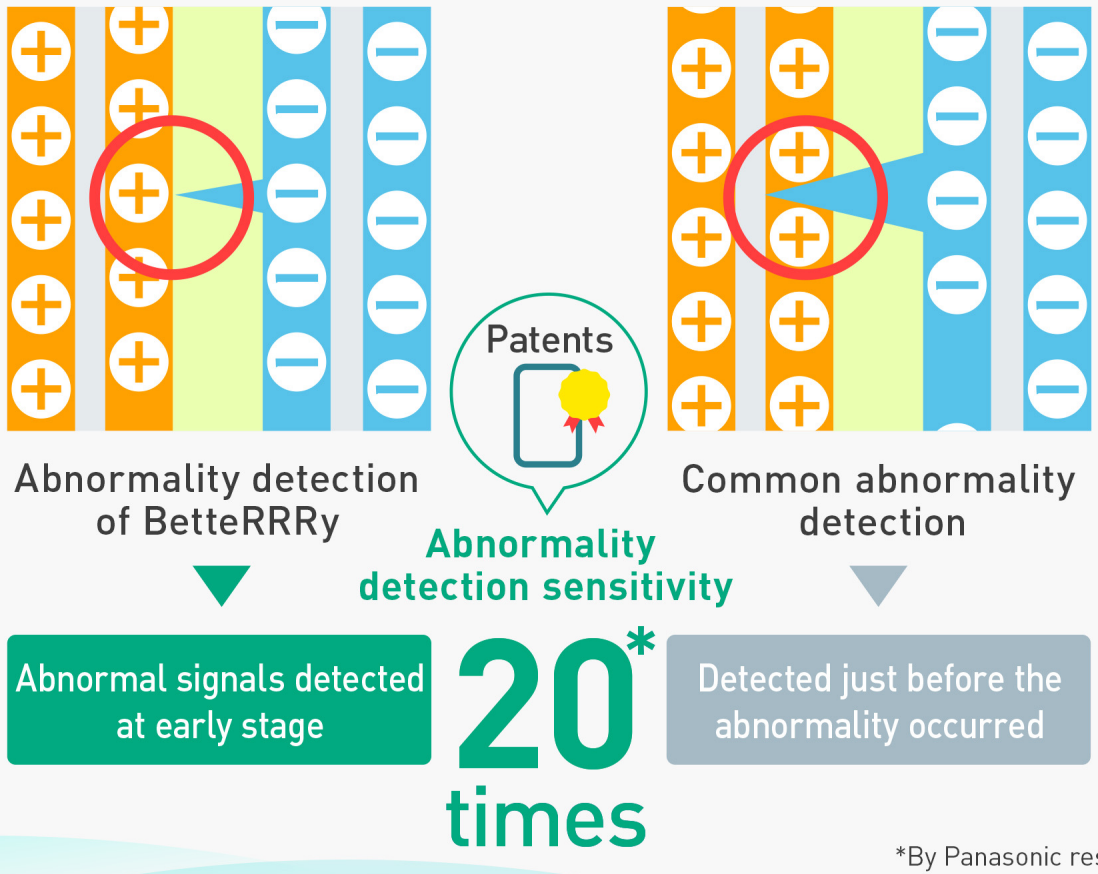
Battery Lifecycle Digital Management

Unleash The Maximum Value Of Batteries

Technical Advantages

High detection accuracy, low false alarm rate & early security warning

BetteRRRy can detect abnormal signals at early stage



*By Panasonic research

Battery Lifecycle Digital Management

Unleash The Maximum Value Of Batteries

Applications

For Battery Bank

Battery status visualization creates the foundation of intelligent operation:

- Early abnormality detection to empower safety.
- Customize life extension strategy integrated in real scenarios.
- Asset disposal suggestion with battery lifetime prediction.

Battery Lifecycle Digital Management

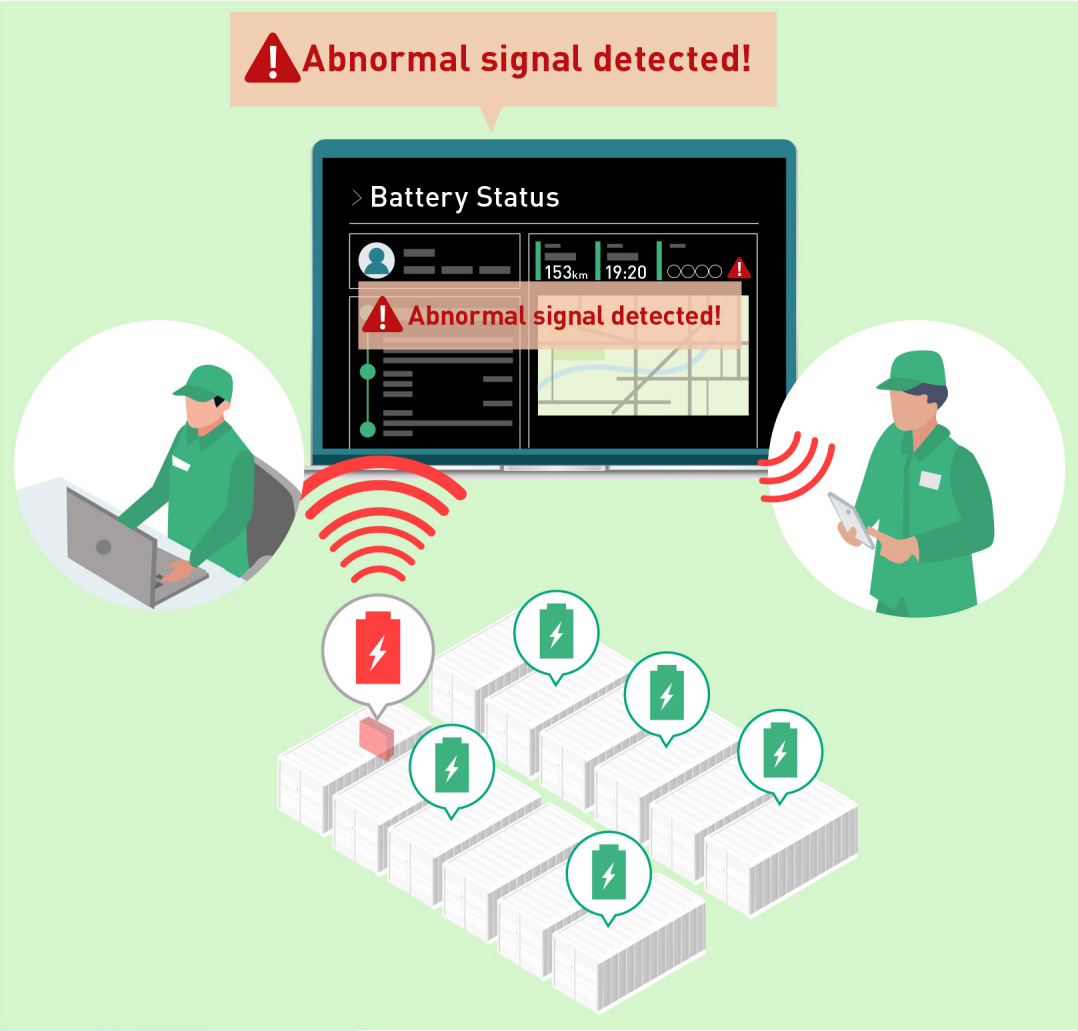
Unleash The Maximum Value Of Batteries

Applications

For Energy Storage

With integrated abnormal warning platform, the ESS (energy storage system) safety management escalates to the next level – proactive protection.

The management of battery cell heath analysis, abnormality prognostic, accurate identification of risks, in order to make up for lack of active digital preventive safety system during the period of Energy Storage Station's operation and maintenance.



Battery Lifecycle Digital Management

Unleash The Maximum Value Of Batteries

Applications

For Battery Insurance

Varied of insurances coverage for battery lifecycle:

- Visualize the realistic status of batteries beneath the exterior & raw data to support quantifying the probability of future risk.
- Support the development of new insurance products designed for stakeholders throughout the battery value chain.
- Support the battery warranty extension product for operators that in possession of battery assets to maximize the value.

Battery Lifecycle Digital Management

Unleash The Maximum Value Of Batteries

Our Mission Empowering

Insurance & Reuse

Make immature market mature, accelerating battery circular economy