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Accure Battery Intelligence

25 January 2023

9:00 am – 10:00 am | PST, Los Angeles
12:00 pm – 1:00 pm | EST, New York City
6:00 pm – 7:00 pm | CET, Berlin

pv magazine
webinars

Hindsight to foresight: Applying lessons from solar to battery storage



Tristan Rayner
Editor
pv magazine



Ray Szylo
Chief Strategy Officer & Co-founder
Omnidian



Ted L. James
Head of North America
Accure Battery Intelligence



Mark Mirek
Senior Managing Director
Brown & Brown Risk Solutions

Welcome!

Do you have any questions? ? 

Send them in via the Q&A tab.  We aim to answer as many as we can today!

You can also let us know of any tech problems there.

We are recording this webinar today. 

We'll let you know by email where to find it and the slide deck, so you can re-watch it at your convenience.  

Applying Lessons from Solar to Battery Storage

Presenter: Ray Szytko

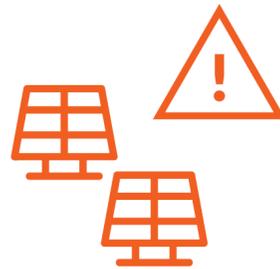
January 25, 2023

Performance Assurance

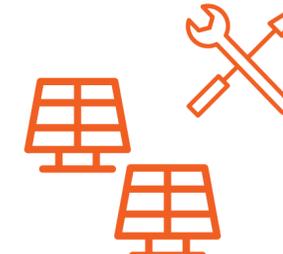
Omnidian delivers lower cost of ownership, reduced risk and a transformational customer experience for approximately 2 GWs of DG Solar



CONTINUOUSLY MONITOR AND
DETECT PERFORMANCE ISSUES



PROGRAMMATICALLY DIAGNOSE
ROOT CAUSES AS THEY OCCUR



PROACTIVELY REMEDIATE
LEVERAGING ROBOTIC
WORKFLOW AUTOMATION

“Unsolicited by me, they noticed a problem with my system and fixed it. Then they informed me of what happened. I feel like they care that they are delivering a solid product.”
—John P.

4.7 STAR RATING
ON GOOGLE





Today's Presentation

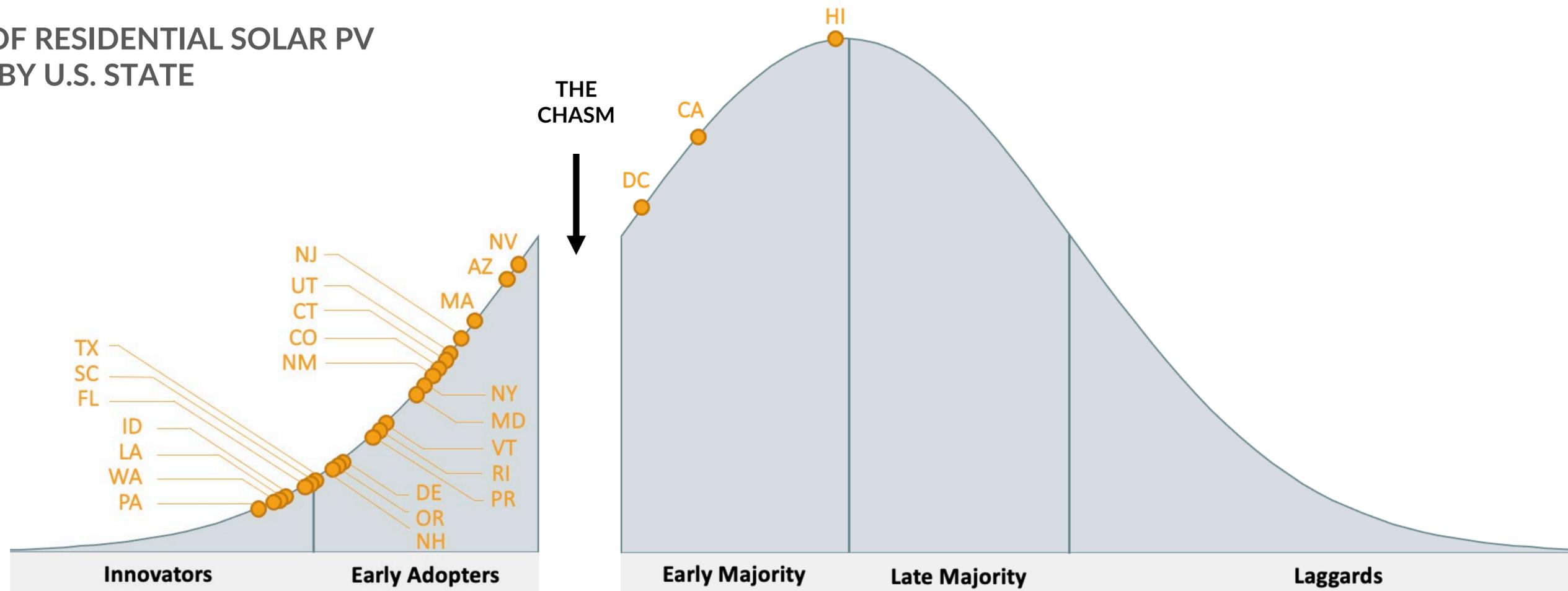
1. Energy Transition – Parallels to Solar
2. Solar Coaster Welcomes Storage
3. Data, Data and OPEN DATA



The Energy Transition is on the path to going mainstream

Solar is leading the charge; storage just beginning its journey

ADOPTION OF RESIDENTIAL SOLAR PV BY U.S. STATE



Source: U.S. Census and Wood Mackenzie Power & Renewables. Based on the Technology Adoption Lifecycle ('Crossing the Chasm' by Geoffrey Moore). Percentage of solar adoption in each state calculated as the estimated cumulative count of residential PV systems at the end of 2020 (U.S. Solar Market Insight Report 2020 Year in review) divided by the estimated number of owner-occupied single-unit residential buildings as of 2019 (U.S. Census - American Community Survey 2019) discounted by 10% to remove buildings that are not suitable for solar.



What do the different client segments want....

Transforming energy asset investments into a hassle-free annuity

HOMEOWNERS

SET IT &
FORGET IT

COMMERCIAL
OWNERS

TIME
TRANSPARENCY
CONTROL

RESIDENTIAL &
COMMERCIAL
DEVELOPERS

DIFFERENTIATION
CUSTOMER
ACQUISITION
CUSTOMER
EXPERIENCE

INSTITUTIONAL
CAPITAL
PROVIDERS

ROI
RISK MITIGATION
INVESTMENT
VELOCITY



Solar Storage Coaster

The Solar Coaster welcomes Storage to the ride



1. Market players will change
2. Disaggregation / Disintegration will occur
3. Policy impacts
4. Post installation client experience
5. Industry / Client education
6. Open data
7. Performance

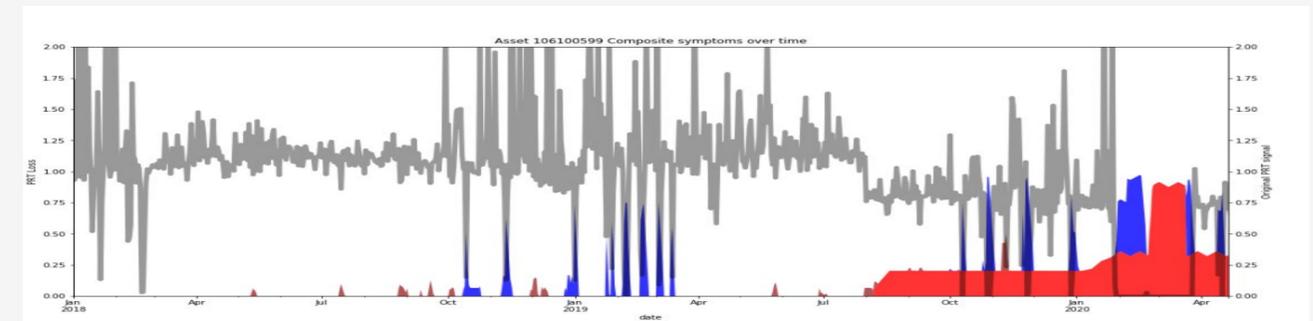


Case Study – Benefit of Open Data

Machine learning continuously optimizes performance; and...

REAL-LIFE PERFORMANCE

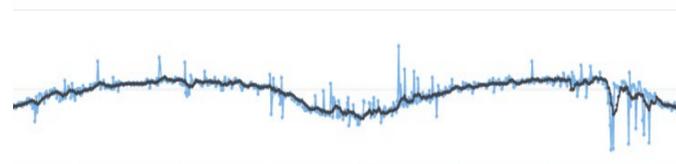
- Multiple conditions overlap
- Our technology identifies and tracks each condition
- With Omnidian, one issue cannot hide behind another



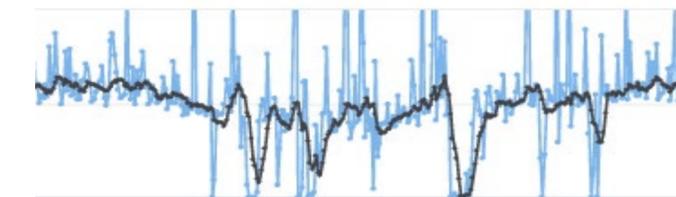
HARDWARE FAILURE



ABNORMAL SHADING



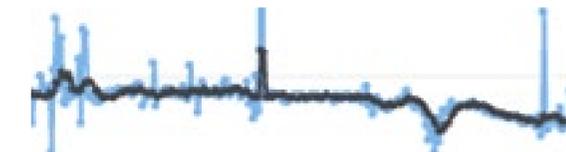
SNOW



EXCESSIVE SOILING



UNDER-PERFORMANCE

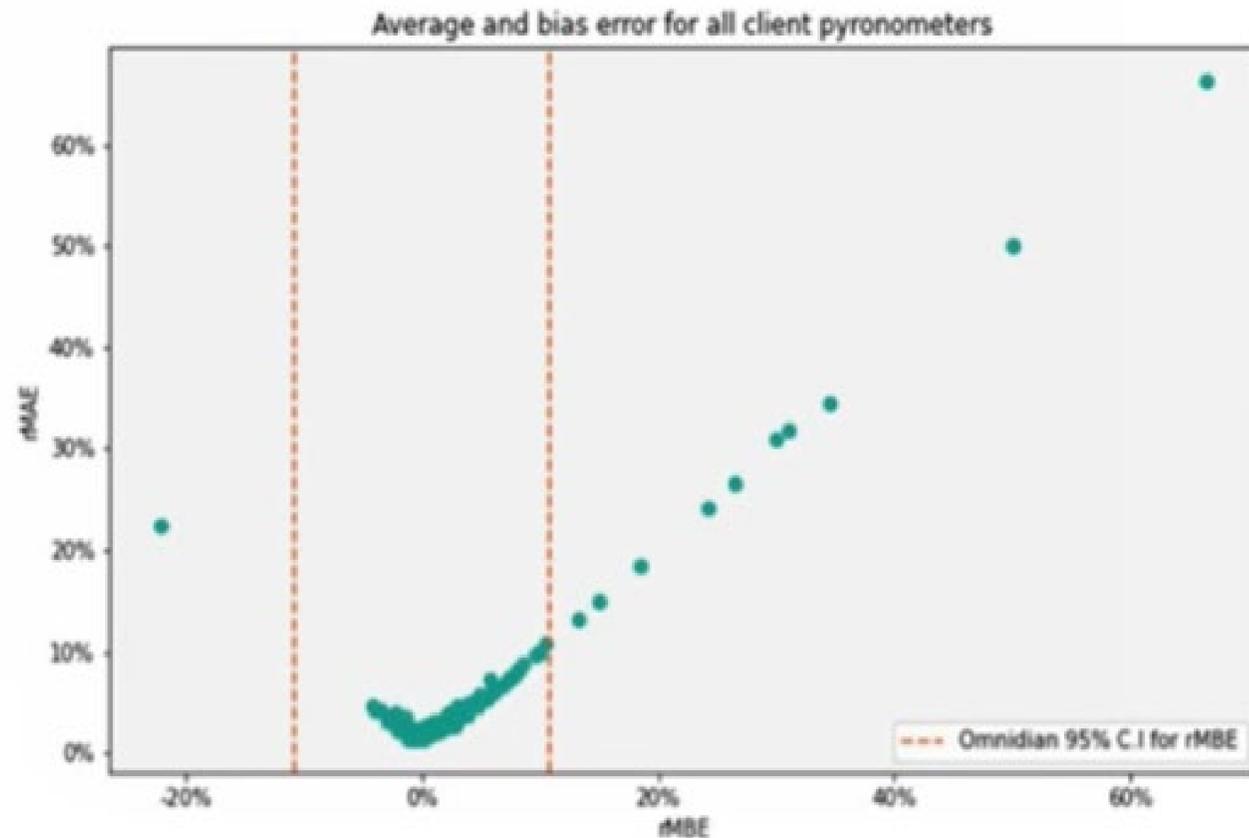


MODULE DEGRADATION



Case Study – Benefit of Open Data

...avoids costly repairs and installation decisions



1. 125 weather stations scanned automatically
2. Of those, 8% (11) were identified as having unreliable data
3. Our client now trusts our weather estimates more than their on-site data
4. Saved client hundreds of thousands of dollars in O&M and future installation costs





Thank You

Ray Szylko

Chief Strategy Officer

rszylko@omnidian.com

510-967-1557



HINDSIGHT TO FORESIGHT:

Applying lessons from solar to battery storage

Presenter: Ted L. James

JANUARY 25, 2023 | 9 AM PST, LOS ANGELES | 12 PM EST, NYC | 6 PM CET, BERLIN

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We make batteries **safe, reliable, and sustainable** with next-gen analytics.



Our
Offices



USA



GERMANY



Scalable, data-centric
approach



Prevent safety
incidents



Ensure reliable
operations



Extend battery
lifetimes



Manage warranties
seamlessly



Set the stage for
2nd-life usability
and more



TODAY'S PRESENTATION

- 01 **Navigating Rapid Growth**
- 02 **Asset Management**
- 03 **Case Studies: New Analytics Tools**

How it Works

How to Get Started

INDUSTRY SNAPSHOT

The solar industry benefits from specialized services

Early days



Situation and incidents

- Lacking experience > no protective gear
- Wrong tools > watering an electric power plant
- More risks > standing in a puddle, no EH boots

Today



The industry at large

- Experienced professionals & best practices
- Specialized tools
- More value

INDUSTRY SNAPSHOT: EARLY DAYS

Battery operations are more complex than solar

Battery failure in Arizona, 2019 (2 MWh)



- Thermal runaway initiated by one battery cell
- No "safety valves" – gassing without ventilation
- Insufficient monitoring and analytics capabilities

Victorian Big Battery fire, 2021 (450 MWh)



- Major fire during plant construction
- ***"Could likely have been mitigated had monitoring services not been switched to an offline mode."***

- Blake Matich, pv magazine, 2022

INDUSTRY SNAPSHOT

Batteries are performing,
but risk management varies



Findings:

- The frequency of activities and parties involved with BESS O&M vary widely.
- 62% of sites surveyed have “not filed a warranty claim yet.”

COMPANIES OFTEN FOCUS ON:



Safety and fire
prevention



Managing range of
degradation rates



Warranty
management



Correcting system
under-performance

CHALLENGES AND SOLUTIONS

Industry-wide focus to improve systems and products

CHALLENGES

- “Batteries are a black box”
- Many different battery types and suppliers
- New battery generations every 18 months

SOLUTIONS

- Production quality
- System designs
- Operations
- **Battery data**



Field data + novel cloud-based analytics are
becoming the industry standard



ACCURE CASE STUDY No. 1

We identified safety issues during a rapid fleet assessment

SITUATION

- Battery fires severely damaged three homes in March 2022.
- 65,000 batteries placed into “standby mode”.
- Senec paid customers €25 per week during the response.

SOLUTIONS

- ACCURE’s toolkits quickly assessed the fleet’s state of health.
- Assets with safety-critical issues were identified & replaced.
- **Senec now uses ACCURE’s continuous monitoring software.**

pv magazine

Senec in final preparations to restart its photovoltaic storage

By Sandra Enkhardt | April 7, 2022



According to the company, the comprehensive analysis has been carried out. Final preparations are underway, including a certification process with an external expert.

ACCURE CASE STUDY No. 2

We discovered BMS failures impacting a commissioning process

SITUATION

- Owner-operator having problems with imbalanced racks.
- Partnered with ACCURE; started with one month of data.
- ACCURE identified BMS failures causing faulty state estimation.

SOLUTIONS

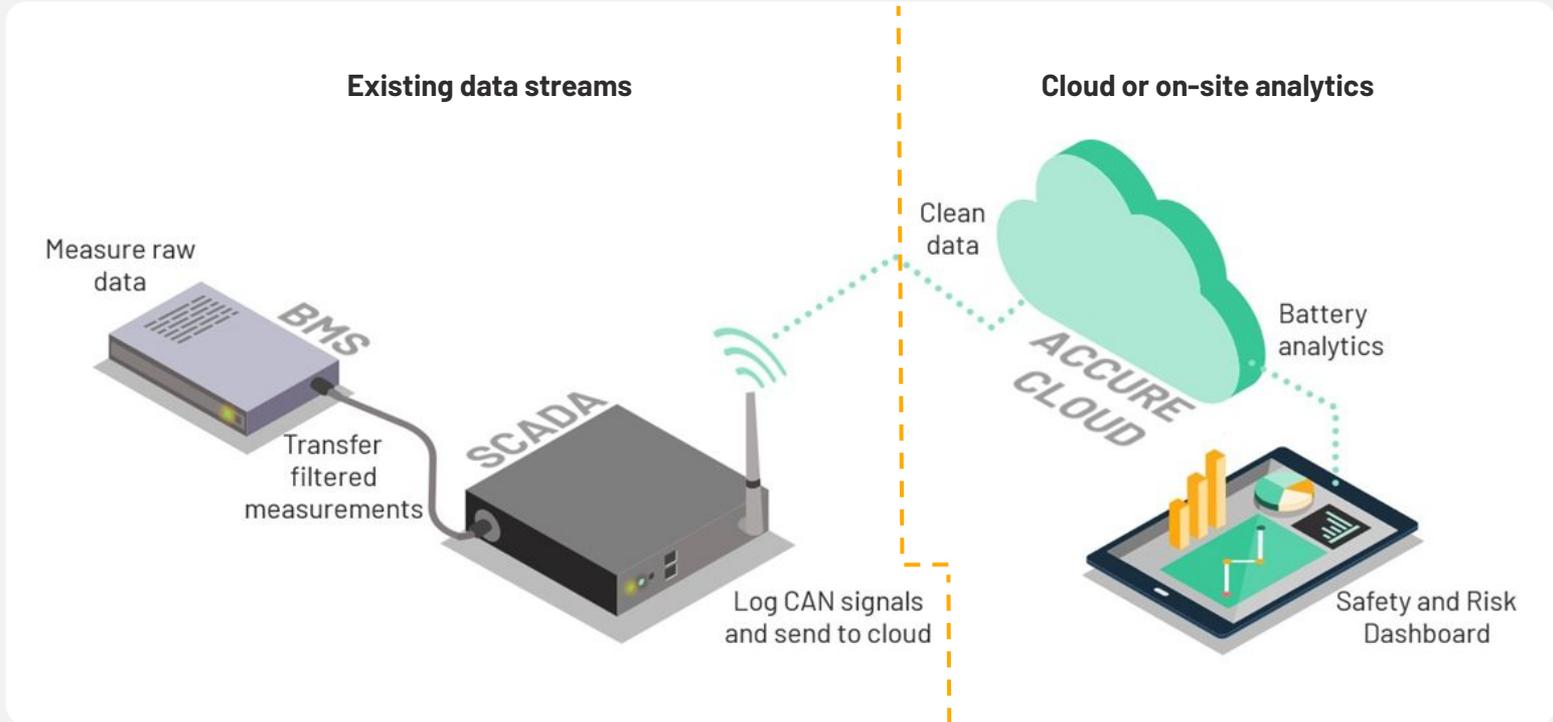
- ACCURE's findings validated & hardware replacements explored.
- The system integrator successfully recalibrated.
- **The owner-operator requested ACCURE's continuous monitoring.**



U.S. solar-battery hybrid facility
(>100 MWh battery)

ACCURE ANALYTICS

Generate more value from existing data with analytics



PATH DEPENDENCE

Identify and track the distinct paths of battery aging

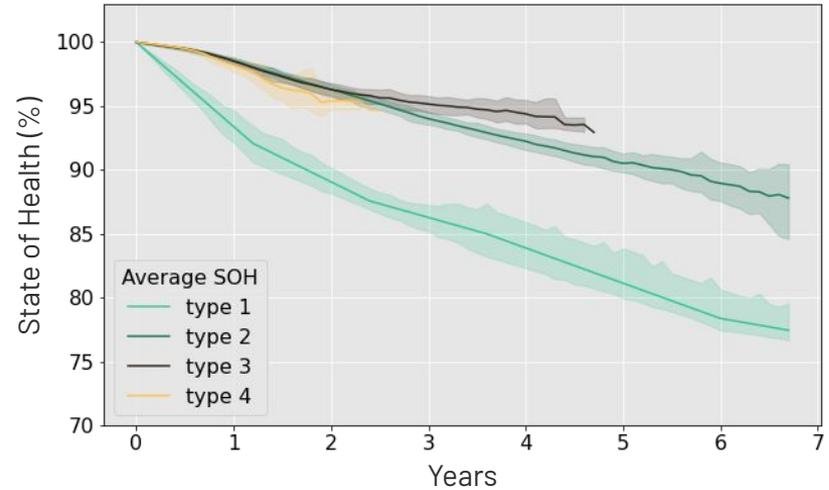
Aging factors include:

- Cell chemistry
- Production quality
- Thermal profile
- System design
- Operating strategy
- Maintenance practices
- Environmental conditions



Batteries have different aging curves, even when used in similar conditions

Aging of stationary batteries



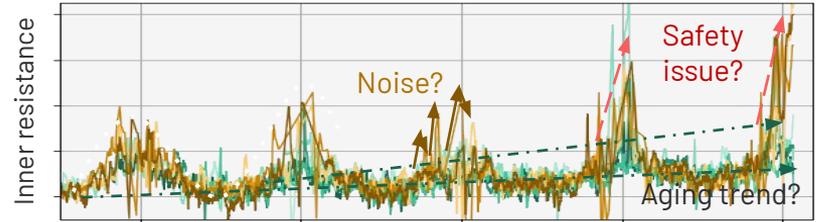
ACCURE'S SAFETY MANAGER

Detect cell failures before it is too late

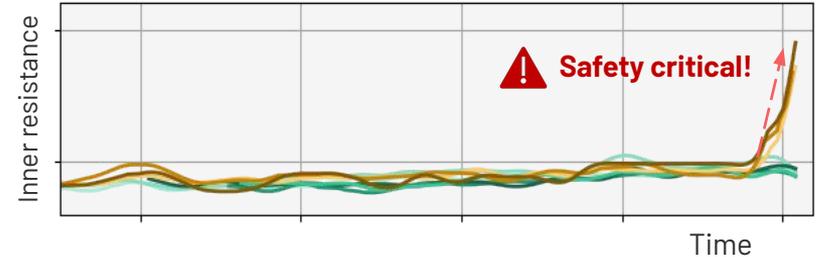
ACCURE detects safety relevant patterns and anomalies with continuous monitoring. Our numerous indicators, developed with our robust internal databases, support owners and operators to proactively avoid safety risks.



Last year, ACCURE successfully predicted more than 50 critical battery failures.



ACCURE's systems clean and filter extraneous information



INSURANCE

Risk management services

The value of third-party analytics

- ACCURE is recommended by 4 insurance groups as a risk-reducing measure
- 12-month diligence process with HDI

Safe & reliable assets

- Insurance for new products
- Differentiated terms and conditions
- Property damage coverage

HDI

“The data provided by ACCURE not only creates transparency in assessing the condition of the batteries, but also mitigates the risk of future performance losses, breakdowns and fire damage.”



Dr. Verena Brenner
Managing Director of HDI TH!NX

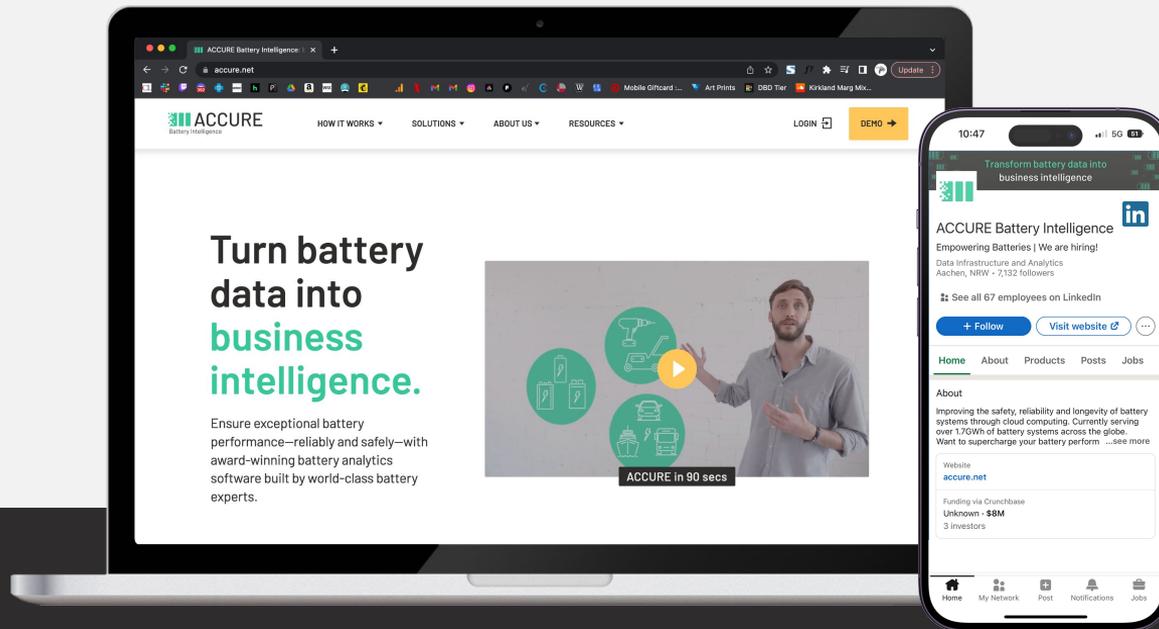
HDI TH!NX makes battery reliability insurable using ACCURE analytics

Press release | December 15, 2022



ACCURE BATTERY KNOWLEDGE

Get started: download our free online resources



Schedule a meeting with our team at accure.net/contact

Turn battery data into business intelligence



2 **GWh**
A growing portfolio

> 100 **Million cells**
Actively monitored

> 1 **Petabyte**
Managing big data

100+ **Battery types**
Diff. Chemistries, models, & formats

Thank you.

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T.james@accure.net



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Thank you to pv magazine, powermag, Getty Images, NREL, and HDI Global

Slide 4. *Left image:* Ladanifer / Getty Images. (2022). [Link](#).

Right image: Powermag. "Solar PV O&M Best Practices." (2016). [Link](#).

Slide 5. *Left image:* pv magazine. "New reports detail cause of APS battery explosion." (2020). [Link](#).

Right image: pv magazine. "Case study: Victorian Big Battery." Blake Matich presentation. (2022).

Slide 9. *Right image:* NREL Image Gallery. 56316.jpg. (2019).

Slide 14. HDI press release. (2022). [Link](#).

RISK SOLUTIONS

Hindsight to Foresight

Applying lessons from solar
to batteries

PV Magazine Webinar

Presented By:
Mark Mirek

Beecher Carlson Insurance Services, LLC



Presentation Agenda

1

Project Finance Concerns

2

Project Sitting Issues

3

Monitoring of Performance Data

4

Personnel Training



Risk Solutions

Optimize the way you identify, quantify, mitigate and finance risk

Delivering integrated insurance and risk management solutions to some of the largest and most respected companies in the world, Brown & Brown's Risk Solutions team aims to create value beyond placing your insurance. Your service team will be comprised of engaged professionals who will work to understand your values, goals and objectives. Using evidence-based insights, our team will help you better understand how different risk management decisions could impact your business.

We are built on industry specialization and are passionate about providing a unique experience that goes beyond traditional, transactional service. We utilize innovation to focus on total cost of risk and aggressively pinpoint areas of your business to drive down cost. We embrace accountability and strive to build strong relationships by blending your unique needs with our knowledge and resources.



Ranked by Business Insurance as the 5th largest broker in the U.S.



Employ a combined 12,000+ teammates with 450+ locations globally



Revenues of \$3B and more than \$25B of premium placed



Partner with correspondents in > 100 countries



Pre-underwrite submissions that result in an above average quote-to-bind ratio



Project Finance Concerns



Proven vs Prototypical technology

- Know your project technology vs accepting commercially available products at the start of construction
- Insurance impact (Solar Panel Certification vs Battery Storage UL certification for Cells, Modules, Racks, Systems, Etc.)



Financial Model Impact:

- Know your projected revenue streams & provide proof of funding (PPA versus merchant market applications)
- Refine asset useful lifetime milestones for system maintenance, component replacement and end-of-life (including disposal)
- Insurance market impact on year-over-year cost estimates (Hard vs. Soft insurance market conditions)



Application of building Code requirements vs insurance company guidelines

- Know which building/fire codes apply to your project, on a site basis (International Building Code, International Fire Code, State & City Code Amendments, International Code Adoption)
- Determine which insurance company guidelines apply to your projects (NFPA Standards vs FM Data Sheets vs Others)

Project Siting Issues

→ Geographic Issues

- Natural Hazards (Flood, Wildfire, Winter Storms, etc.)
- Mitigation Programs

→ Man-Made Issues

- Roof top exposure to surrounding sensitive occupancies (hazardous operations, day care and assisted living facilities are examples)
- Ground mount exposures to adjacent man-made exposures (hazardous operations which avoid ignition sources)

NFPA
855

Standard for the Installation of
Stationary Energy Storage Systems

2023





Data & Training

MONITORING OF PERFORMANCE DATA

- ➔ **Deriving intelligence from raw data**
- ➔ **Application of artificial intelligence and known algorithms to diagnose system distress conditions**
 - Pre-thermal runaway condition monitoring
 - Post thermal runaway response protocols

PERSONNEL TRAINING

- ➔ **Project operator with remote operation center (ROC) support**
- ➔ **Natural hazard response plans (Earthquake and Wildfire response plans for example)**
- ➔ **First responders**



THANK YOU!



Mark Mirek
Senior Managing Director
214.458.2157
Mark.Mirek@bbrown.com



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Q&A



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[Virginia governor kills Ford-CATL battery plant, calling it a “front for the Chinese Communist Party”](#)
by John Fitzgerald Weaver



Most-read online!

[Soiling – a multibillion-dollar issue for the solar industry](#)
by Mark Hutchins



Coming up next...

Tuesday, 31 January 2023

9:00 am – 10:00 am GMT, London

10:00 am – 11:00 am CET, Berlin, Paris, Madrid

Thursday, 2 February 2023

2:00 pm – 3:00 pm GMT, London

3:00 pm – 4:00 pm CET, Berlin, Paris, Madrid

Many more to come!

**Kicking off the
heterojunction
era**

**Responsible solar:
enabling true
supply chain
transparency
through
comprehensive
due diligence**

In the next weeks, we will continuously add further webinars with innovative partners and the latest topics.

Check out our pv magazine Webinar program at:

www.pv-magazine.com/webinars

Registration, downloads & recordings are also be found there.



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Editor
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**Thank you for
joining today!**