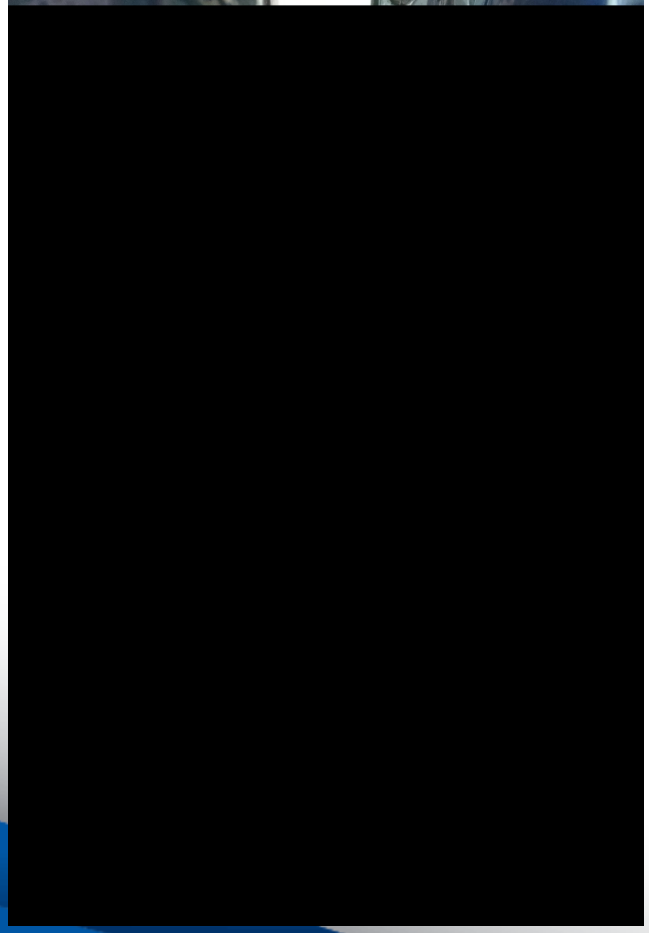
Remote Monitoring and Control of DC Power Systems

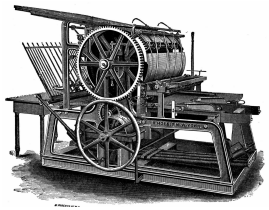
Alan Greene

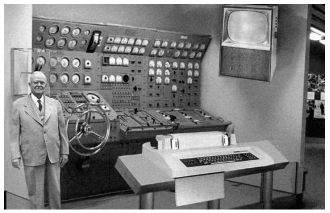
EnCharge Power Systems

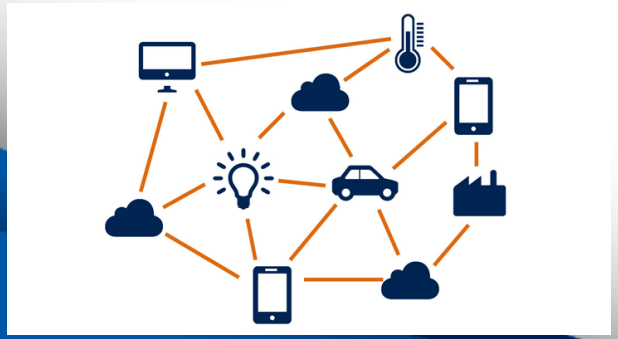


SAFT

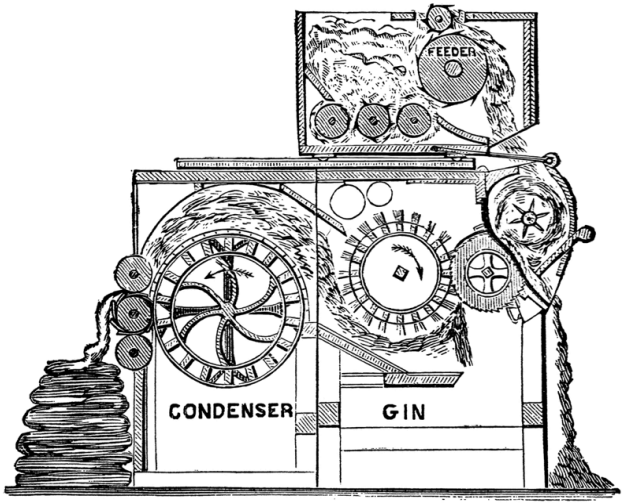
Industrial Shifts







Industrial revolution



- Shift from people to machines
- Faster
- Safer

Assembly Line

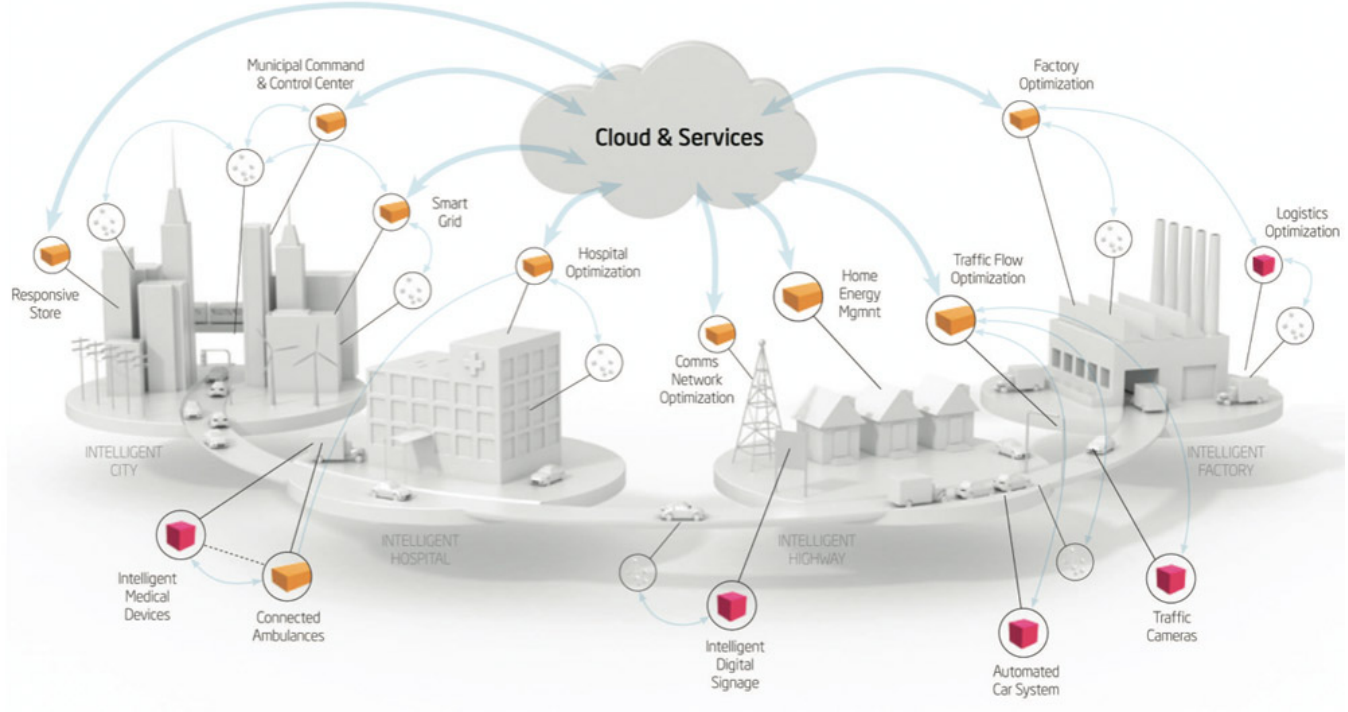
- Machines linked together
- Streamline production
- Remove another layer of human interaction

Computer Age

- Vastly Increased calculating power
- Enabled dramatic changes in productivity
- Advances in Science

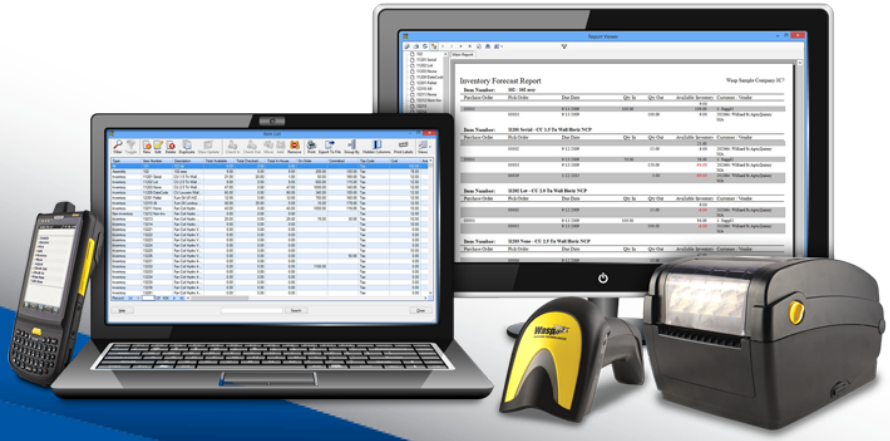
Internet/World Wide Web

Connectivity of Objects/Internet of Things



DRINKS
FOOD
GAMES & APPS
EMAIL CLUB
TABLE 150
ziosk

nest
AIRWAVE
74


Inventory Forecast Report

- Data is Safer
- Accessible from anywhere

How do these technologies relate to Batteries?

Batteries are the center of all critical power applications

Utility

- New smart grids make utility switchgear more important than ever

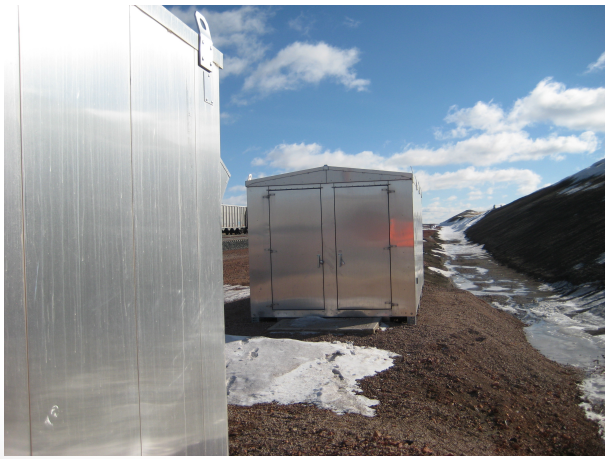
Renewables

- Storage-fluctuating demand
- Mobile assets- batteries for other applications
- Remote locations

Telecom

- Cellular technology is a fact of life
- Many towers are in remote locations
- Monitoring reduces truck rolls

Rail



- Rail Crossings
- Switch machines
- Switch heaters
- Very remote locations

UPS

- Near Instantaneous emergency backup power
- Computers, data centers

Manufacturing

- Communication
- Backup
- Switchgear

Hospitals

- Generators are not always operational
- Not just lights, but also lab tests and life support

When batteries fail, time, money, and even lives can be lost

Why Monitor?

- Timeliness
- Accuracy
- Safety

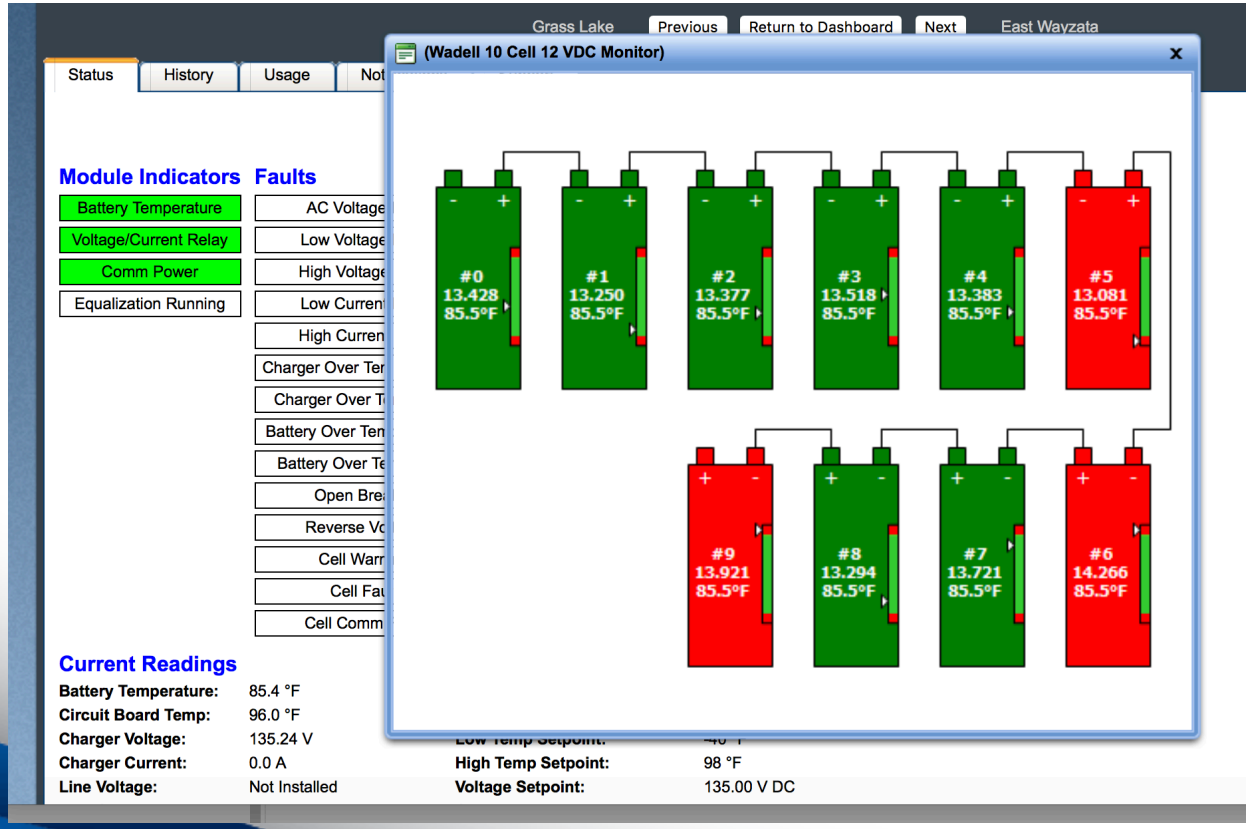
What exactly does remote battery monitoring do?

Precise Information

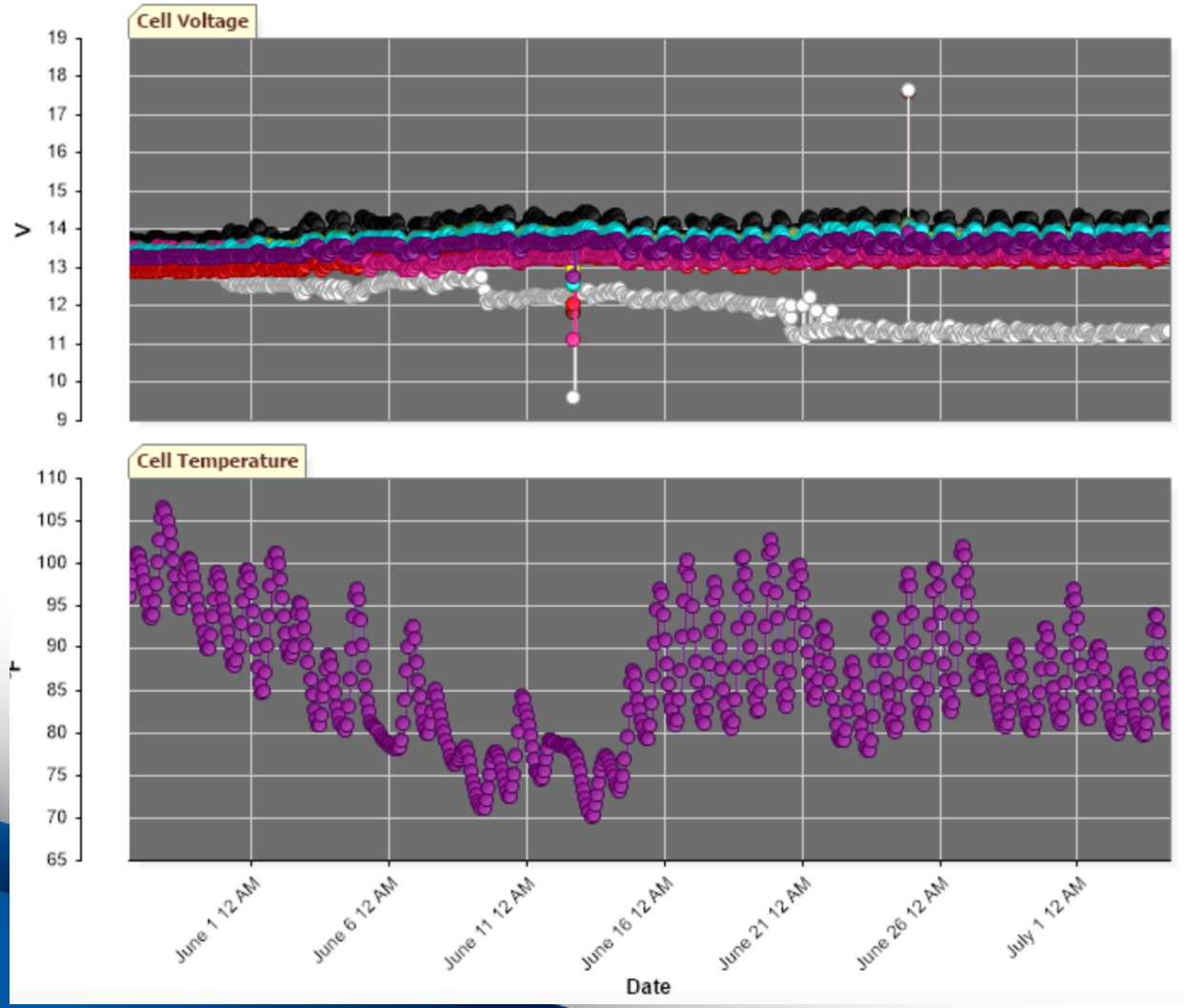
Past
Present
Future

Cloud Hosted

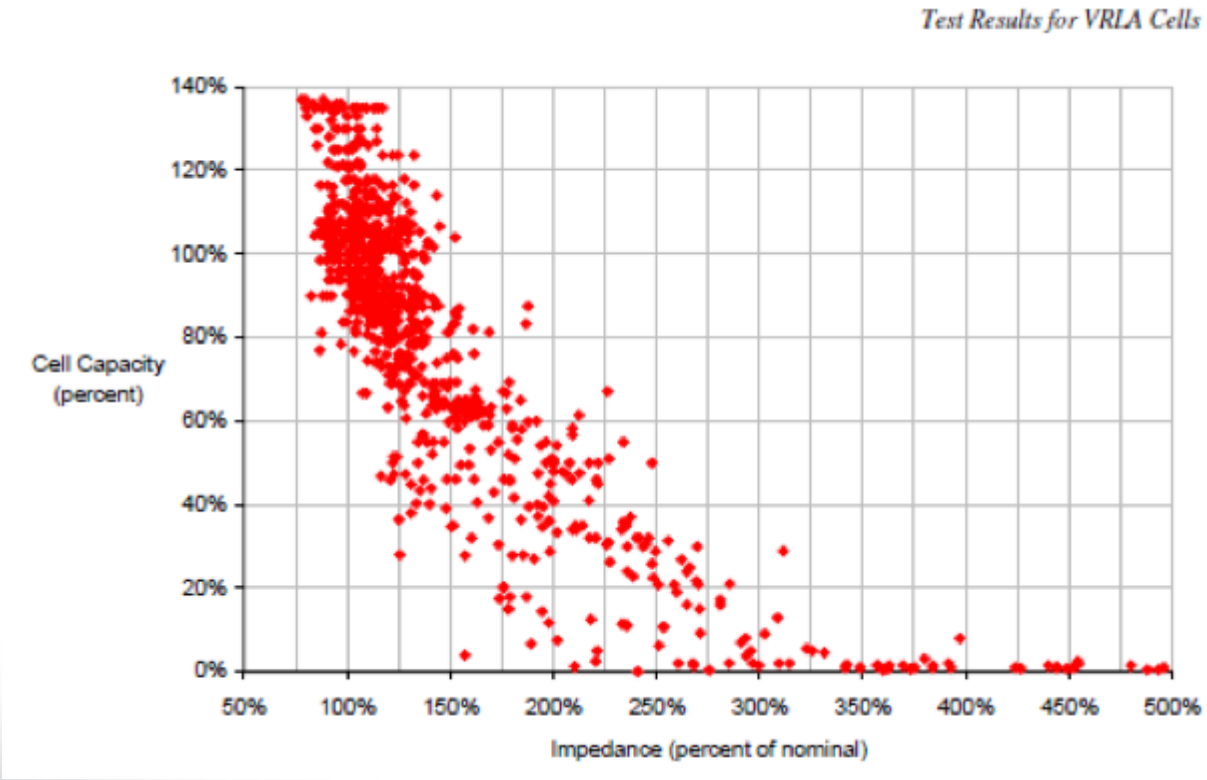
Present


Grass Lake
Previous
Return to Dashboard
Next
East Wayzata
Status
History
Usage
(Wadell 10 Cell 12 VDC Monitor)
#0 13.428 85.5°F
#1 13.250 85.5°F
#2 13.377 85.5°F
#3 13.518 85.5°F
#4 13.383 85.5°F
#5 13.081 85.5°F
#9 13.921 85.5°F
#8 13.294 85.5°F
#7 13.721 85.5°F
#6 14.266 85.5°F
Module Indicators
Battery Temperature
Voltage/Current Relay
Comm Power
Equalization Running
Faults
AC Voltage
Low Voltage
High Voltage
Low Current
High Curren
Charger Over Ter
Charger Over T
Battery Over Ten
Battery Over Te
Open Brea
Reverse Vo
Cell Warn
Cell Fau
Cell Comm
Current Readings
Battery Temperature: 85.4 °F
Circuit Board Temp: 96.0 °F
Charger Voltage: 135.24 V
Charger Current: 0.0 A
Line Voltage: Not Installed
High Temp Setpoint: 98 °F
Voltage Setpoint: 135.00 V DC

Past


Cell Voltage
V
19
18
17
16
15
14
13
12
11
10
9
Cell Temperature
T
110
105
100
95
90
85
80
75
70
65
June 1 12 AM
June 6 12 AM
June 11 12 AM
June 16 12 AM
June 21 12 AM
June 26 12 AM
July 1 12 AM
Date

Future

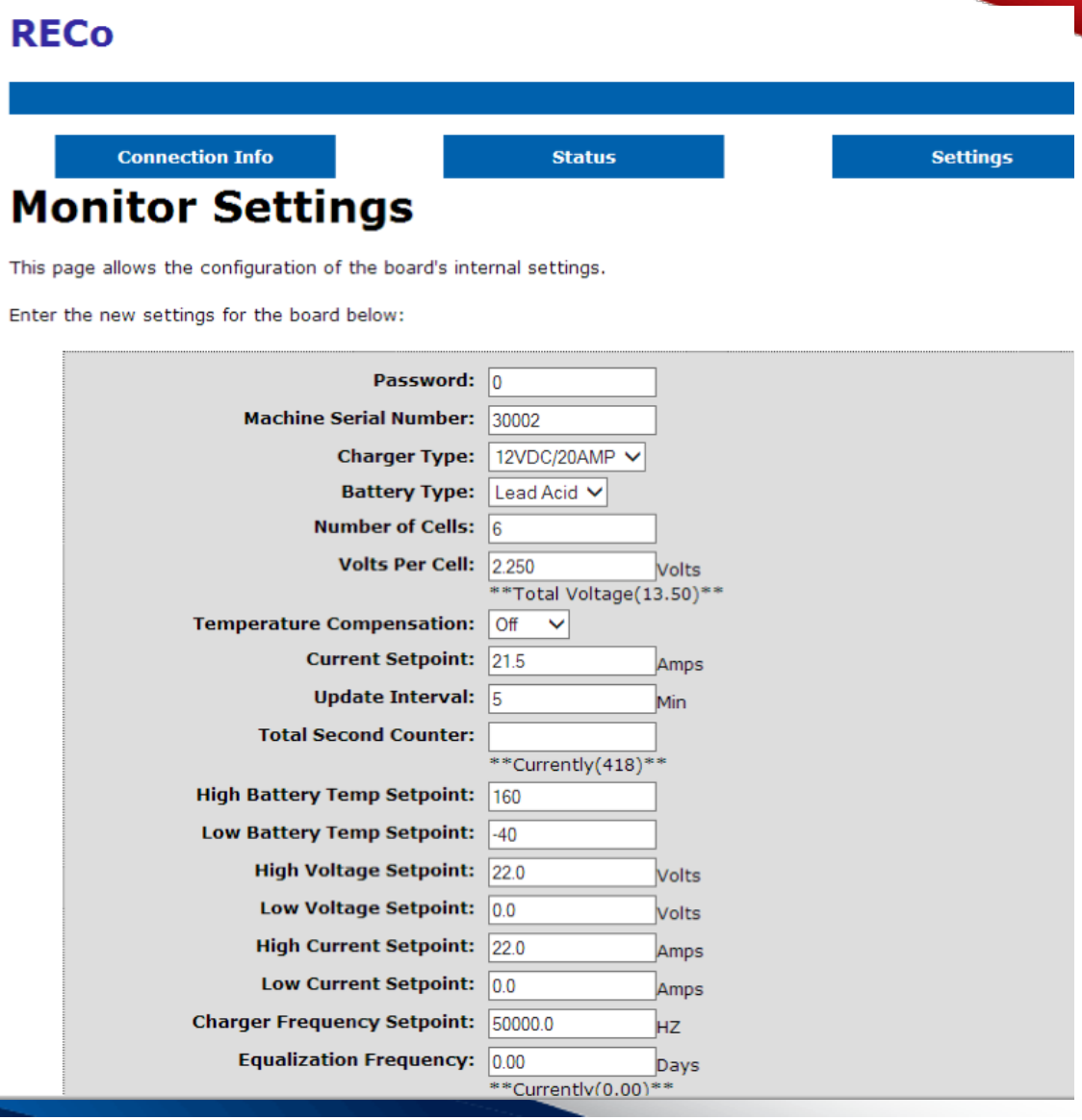


Bart Cotton, IEEE, EPRI

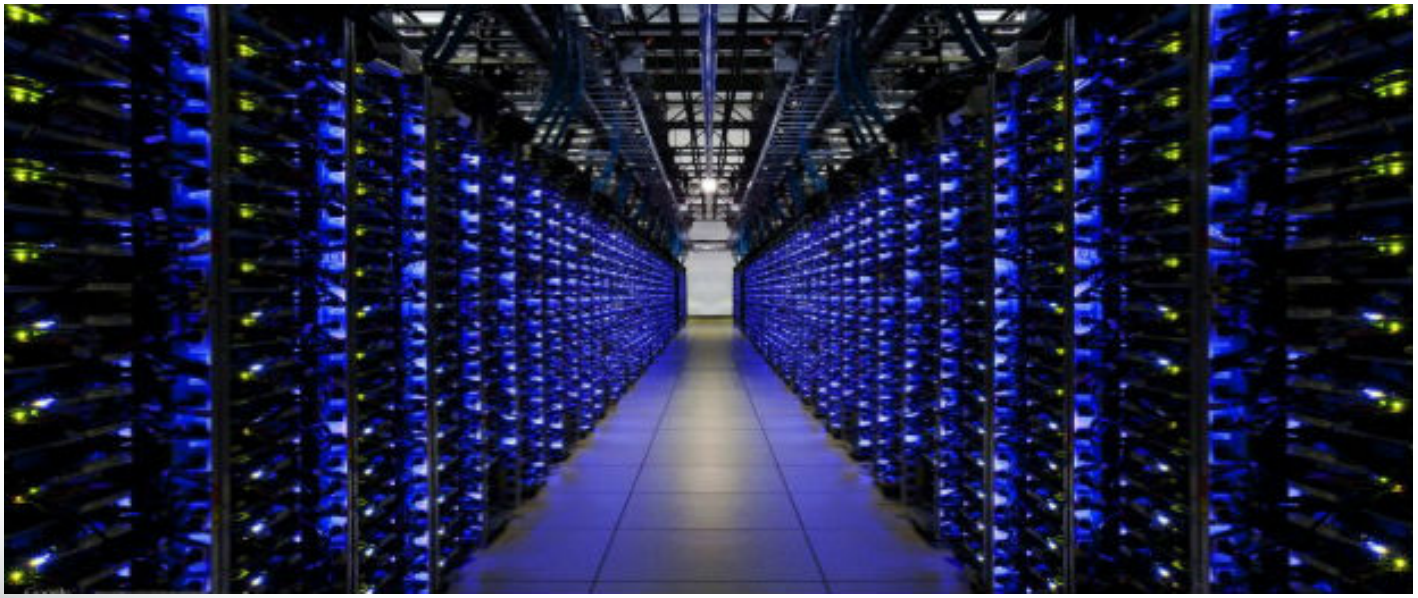
What can this information prevent?

- Thermal runaway
- Preventable large thermal events (fires, explosions)
- Undercharge
- Injury or death

Control


RECo
Connection Info
Status
Settings
Monitor Settings
This page allows the configuration of the board's internal settings.
Enter the new settings for the board below:
Password: 0
Machine Serial Number: 30002
Charger Type: 12VDC/20AMP
Battery Type: Lead Acid
Number of Cells: 6
Volts Per Cell: 2.250 Volts
Total Voltage(13.50)
Temperature Compensation: Off
Current Setpoint: 21.5 Amps
Update Interval: 5 Min
Total Second Counter:
Currently(418)
High Battery Temp Setpoint: 160
Low Battery Temp Setpoint: -40
High Voltage Setpoint: 22.0 Volts
Low Voltage Setpoint: 0.0 Volts
High Current Setpoint: 22.0 Amps
Low Current Setpoint: 0.0 Amps
Charger Frequency Setpoint: 50000.0 HZ
Equalization Frequency: 0.00 Days
Currently(0.00)

Cloud storage of data



- Accessible
- Safe
- No software to install/maintain

Motive Power Applications

- Voltage
- Current
- Fluid levels

Regulatory Environment

- NERC PRC-005
- FRA

Conclusion

- Immediate and constant data
- Historic data
- System projections
- Tremendously safer
- Prevents downtime
- Reduces truck rolls
- Bottom line, save money and in some cases, lives.
- Regulations are changing so that these technologies will not only help with compliance by in many cases be necessary

Questions to you