Envision
Net Zero Tech Partner

How Modular, Software-Defined Energy Storage Improves the Yield of Renewable Assets

Envision
Solve the Challenges for a Sustainable Future

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Envision Digital
Global Director - Storage

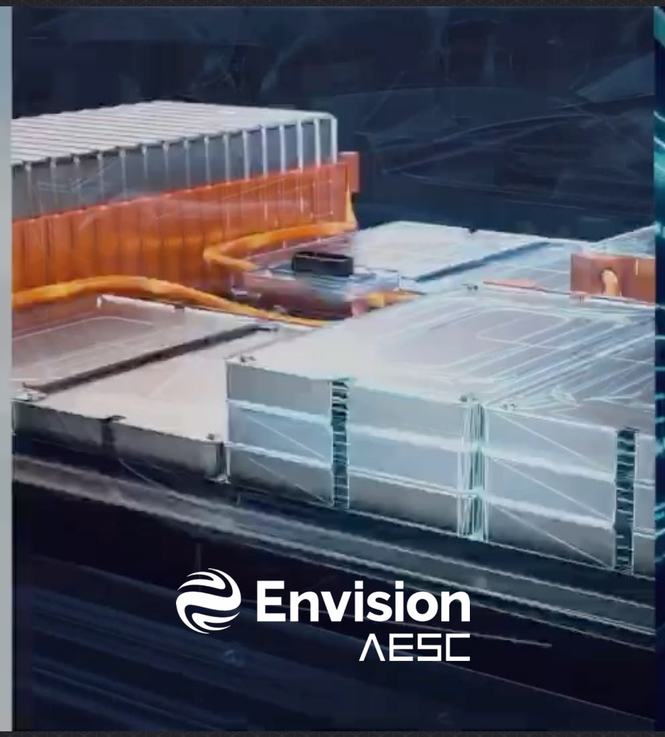
Thursday 23rd February 2023

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Envision aspires to solve the challenges for a sustainable future…

Envision









Integrated solution

Wind turbine
Utility storage
Hydrogen electrolyzer

EV battery
Utility battery

EnOS ™

operating system for all renewables
568+GW of green energy

$1.52 bn USD*

carbon neutral technonlogy fund
with SEQUOIA CAPITAL



Generate

Envision Energy



Store

Envision AESC & Energy



Use

Envision Digital

*One example of many Venturing activities

… For example the world's first net zero industrial park

Envision

Initiated: Dec, 2020
Pilot built: April, 2022
Investment attracted:

$16 billion USD

Pilot Green grid built:
Wind + Solar + ESS

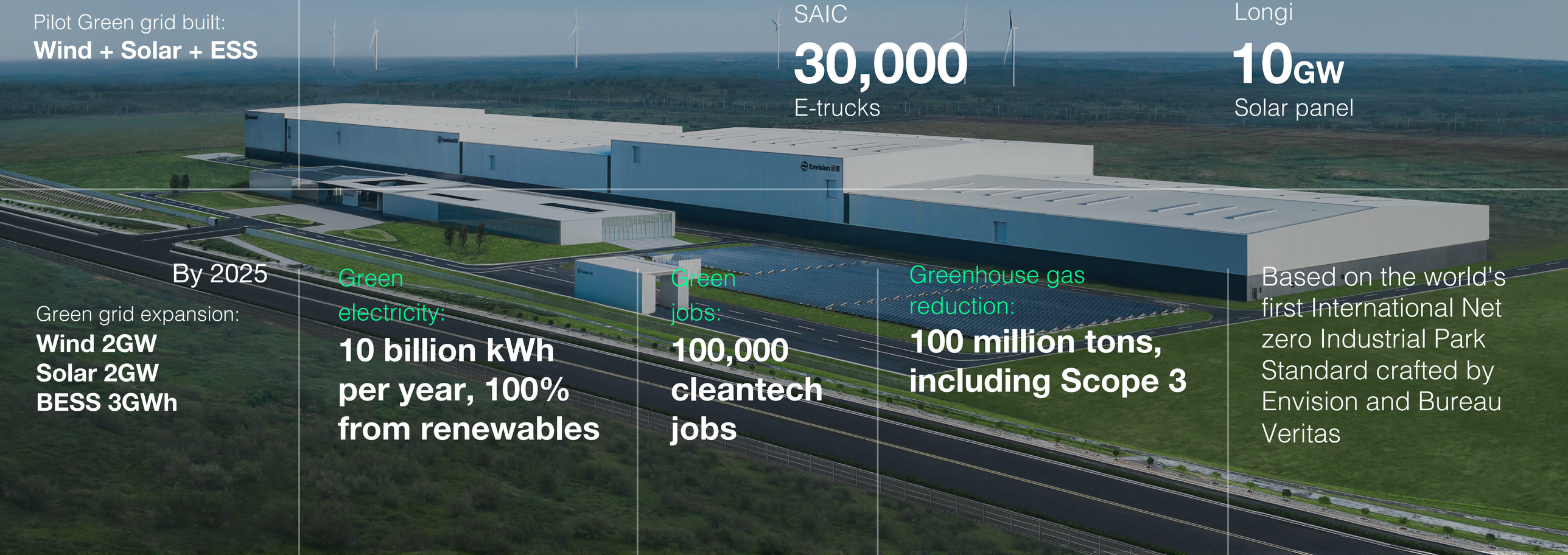
The Green Industrial Clusters, with global leading players:

Envision
100GWh
Li-ion battery gigafactory

Huayou
400,000 ton
Cathode material

SAIC
30,000
E-trucks

Longi
10GW
Solar panel



By 2025

Green grid expansion:
Wind 2GW
Solar 2GW
BESS 3GWh

Green electricity:
10 billion kWh per year, 100% from renewables

Green jobs:
100,000 cleantech jobs

Greenhouse gas reduction:
100 million tons, including Scope 3

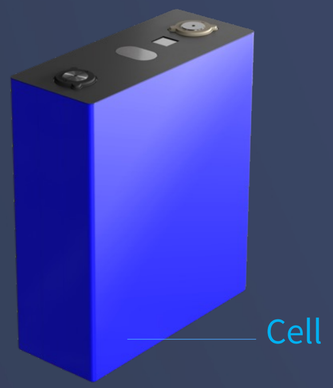
Based on the world's first International Net zero Industrial Park Standard crafted by Envision and Bureau Veritas

Smart BESS Liquid-cooling Rack

1 Efficient to run

2 Safe to operate

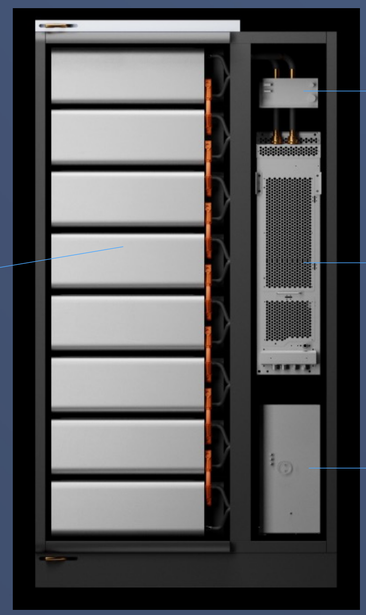
3 Easy to maintain



LFP Prismatic
280Ah
305Ah



Liquid Cooling Pack
46kWh (1P52S)
50kWh (1P52S)



Liquid-cooling Rack
372kWh (1P416S)
406kWh (1P416S)

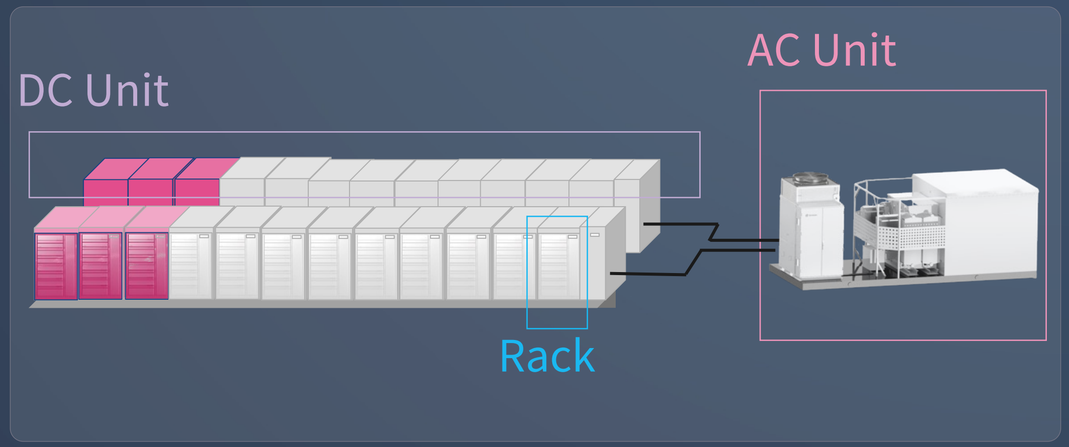
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Modular ESS Approach for Utility Scale BESS

Example for a 2-hour 280Ah based system ready for configuration based on customer requirements

System Component	ENSS-L3350/6700 BESS	Unit	Notes
Rack	372	kWh	Nominal DC capacity excl. losses
DC unit	3.35	MWh	9 racks per DC for 2-hour system at commissioning
AC unit	3	MW	LV side, PCS with 3.45 MVA rating
BESS unit	6.7 / 3	MWh / MW	2 DC units and one AC unit (nominal DC capacity)

BESS Unit



Potential augmentation during LTSA period (3)	Racks at commissioning (9)

x9 racks per DC unit and x2 DC units is just one option for a 2 hour system

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Value Chain powered by Envision Digital Software

Focused on business value we have a flexible, modular, end-to-end suite of software, which is completely agnostic of OEM and relevant for all stakeholders, it also integrates with existing solutions as needed

Device & Site | **Portfolio** | **Market & VPP**

Stacking of value pools to create new business value for investors and asset owners

Battery Energy Storage System

Battery | BMS | EMS | SCADA

Asset Management → **Trading** → **Ancillary Services**

Edge Platform

EnOS™

Cloud Platform



Energy Storage | Renewables | Load | Grid & Markets

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With EnOS™ we provide a comprehensive software platform

Leverage Envision know-how in our Software and the EnOS™ platform to connect and extend

Portfolio & Trading (Cloud)



EnOS™ Fleet Monitoring



EnOS™ Advanced Analytics



EnOS™ Flex AI Microgrid



EnOS™ Flex AI Trading

Site (Edge)

EnOS™ EMS

Forecast Scheduling
Ancillary Services
Real-time Control for Grids & Trading



EnOS™ EMS

EnOS™ SCADA for Storage

Data Management
Monitoring
Alarm



EnOS™ Flex Microgrid Controller

Co-optimization
Real-time Control
Monitoring

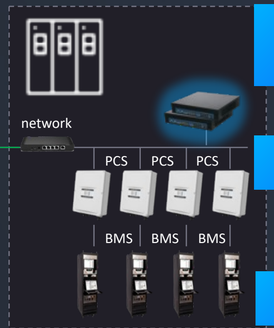


EnOS™ EMS for Storage

EnOS™ EMS for Wind

EnOS™ EMS for PV

Device (Edge)



EnOS™ Edge BESS

Reliable Data Acquisition for Cloud Integration

Edge Analytics (i.e. SoX estimation)

BESS Controller

BESS OEM provided

BMS

BESS OEM provided



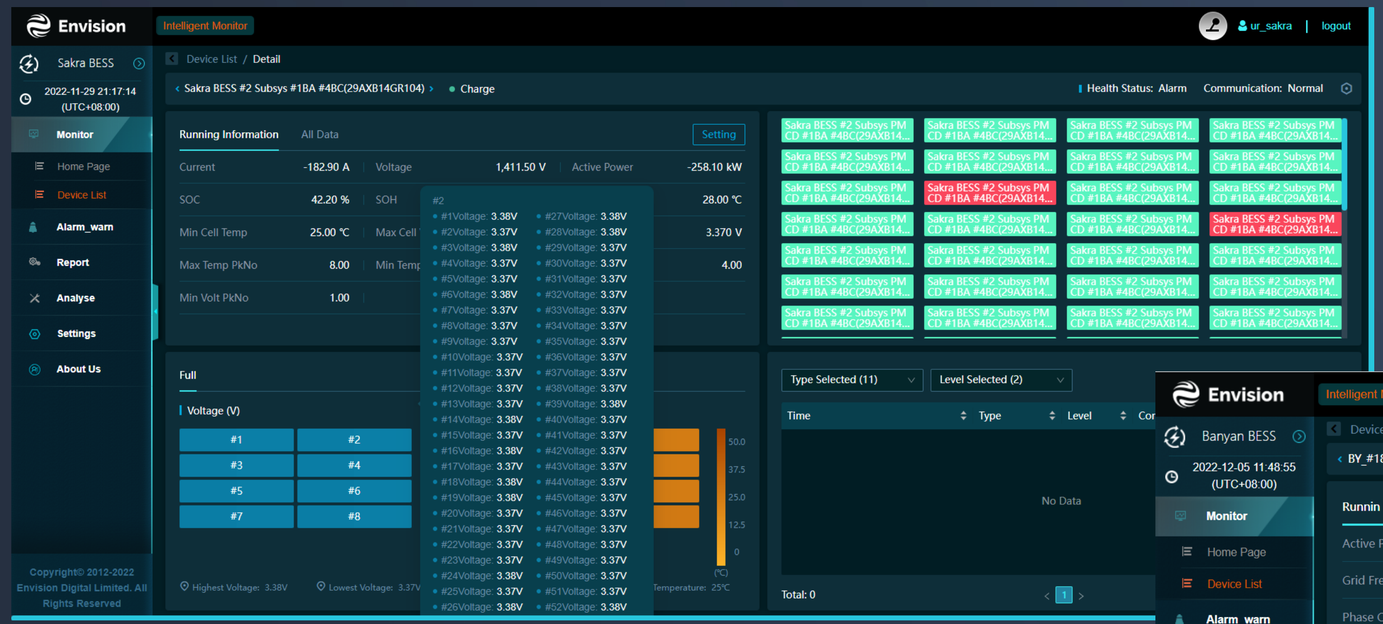


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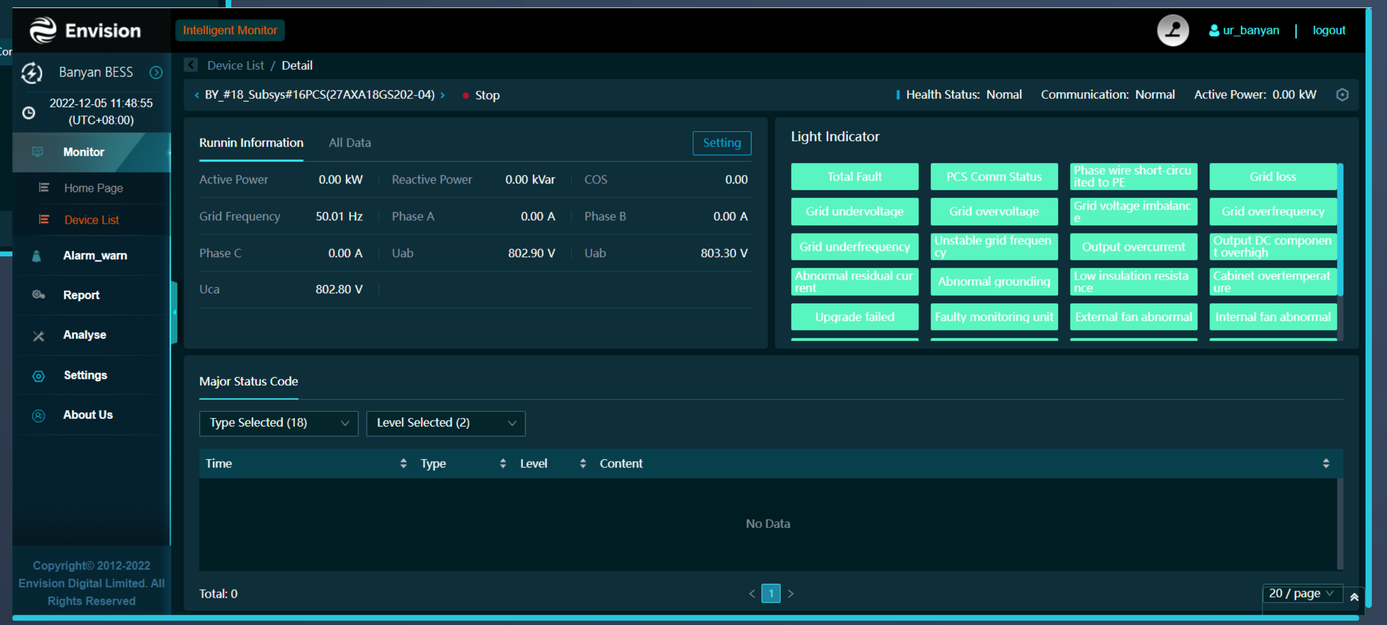
EMS & SCADA in action at Singapore Jurong Island

A project developed by Sembcorp for the EMA with 200MW/285MWh of BESS connected to the Grid

BESS 1 monitoring and control functions



BESS 2 monitoring and control functions

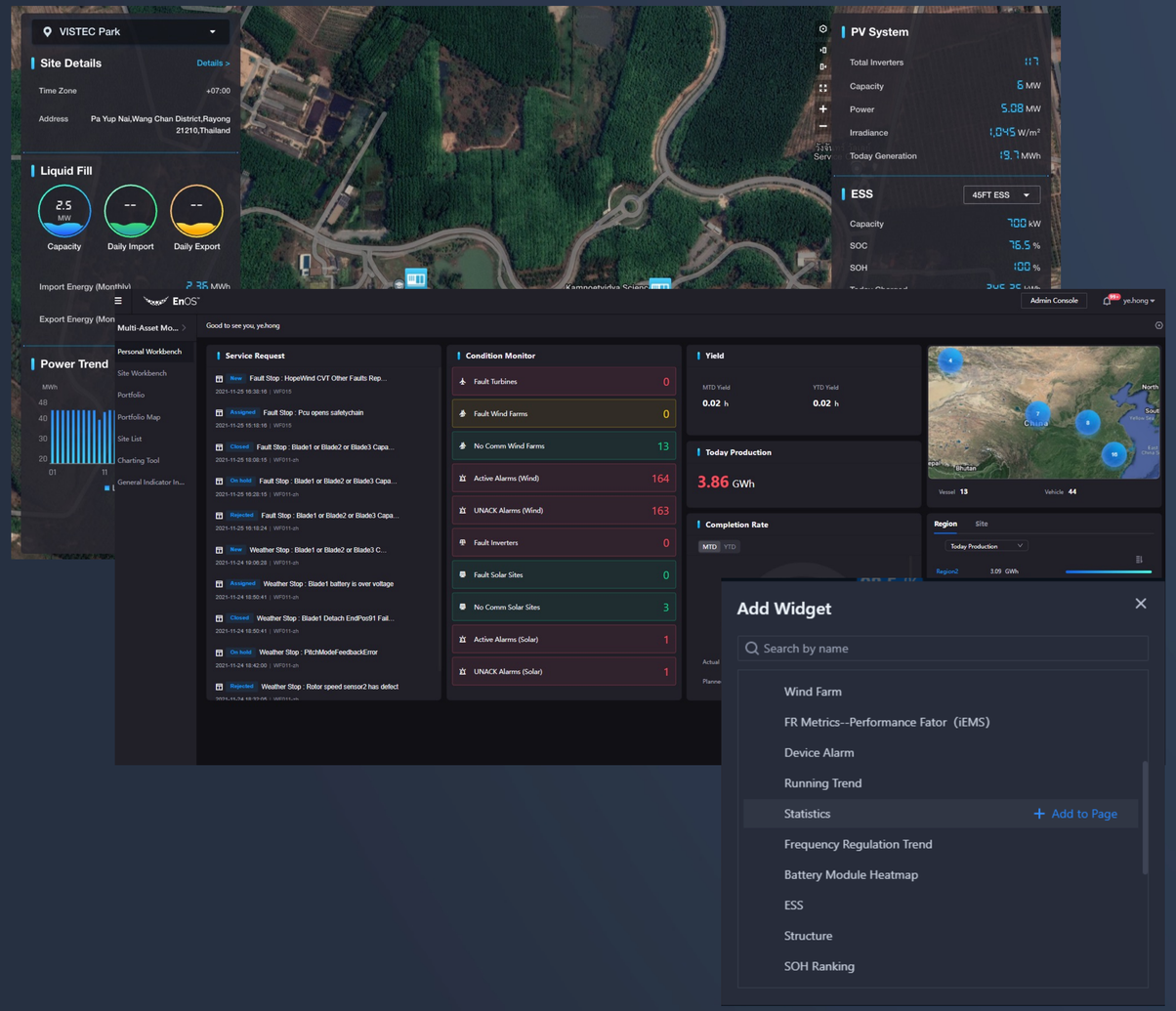


Energy Storage News article on Feb 2nd 2023

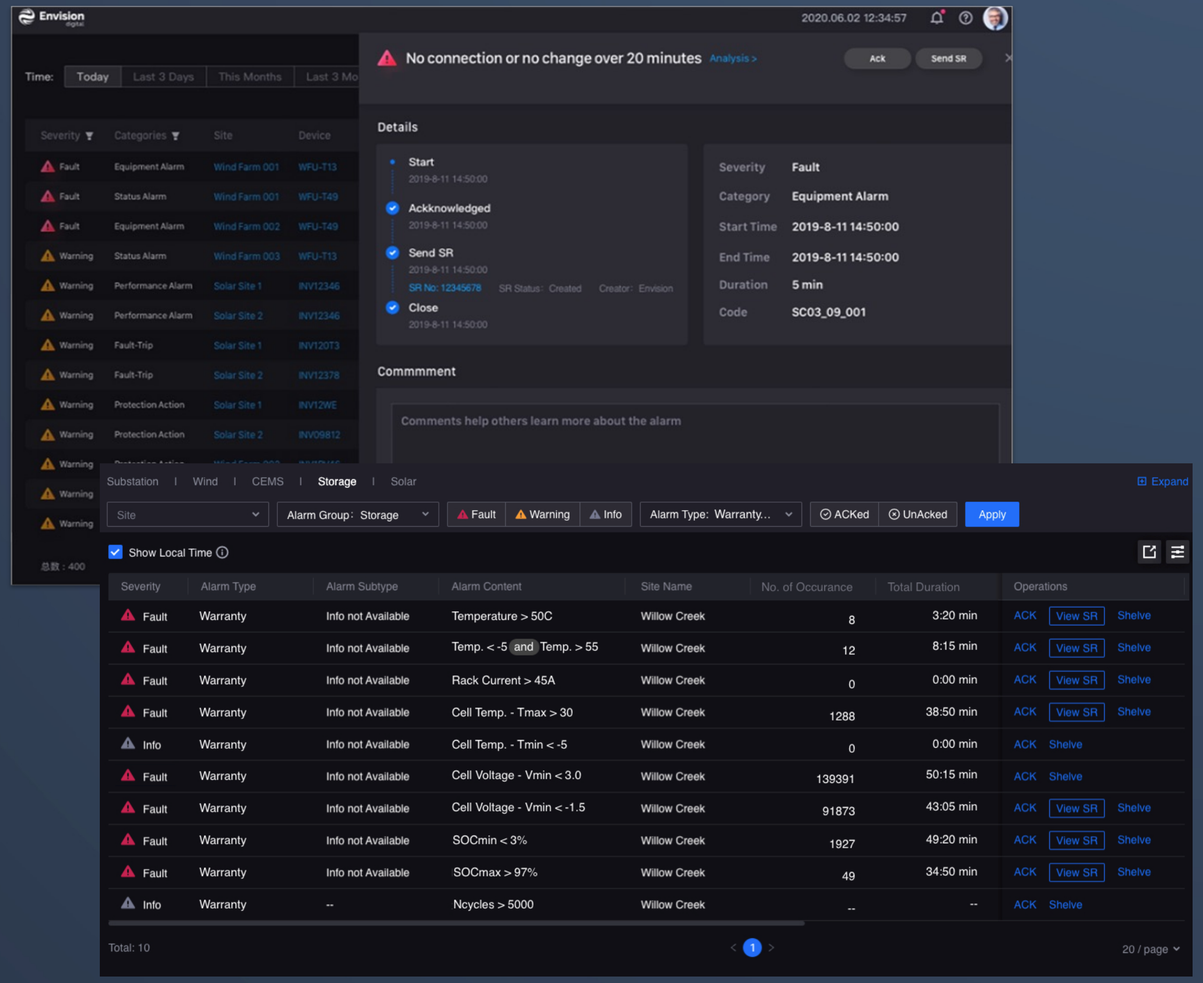
Cloud Monitoring and Control for BESS Fleets

Operational views of the entire BESS Fleet for all OEMs/Integrators remotely provided from the Cloud

Flexible Customisation using Widgets



Customisable Alarms, KPI's, Reports, Warranties…



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Cloud Analytics & Advanced Analytics for Storage

From simple KPIs and Statistics to Advanced Analytics and Algorithms to improve SoX

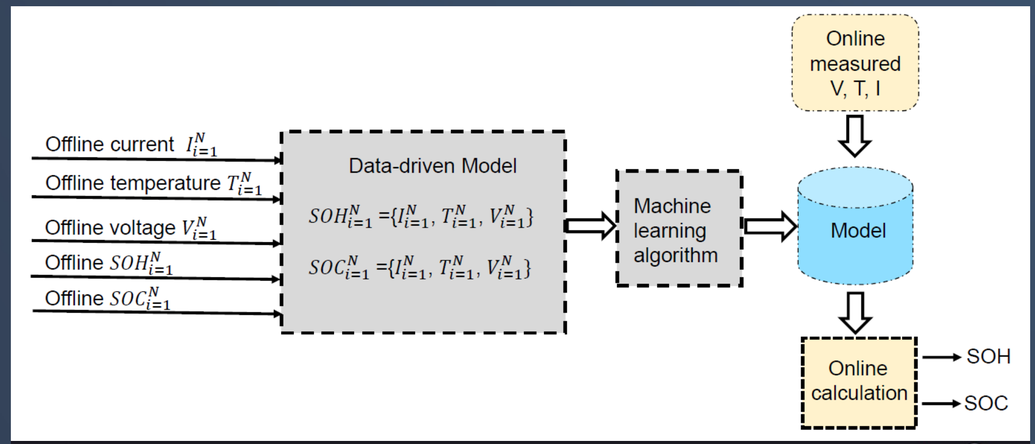
- Voltage
- Current
- Temp
- Power
- Insulation
- Capacity
- Internal Resistance
- Self-discharge rate
- …

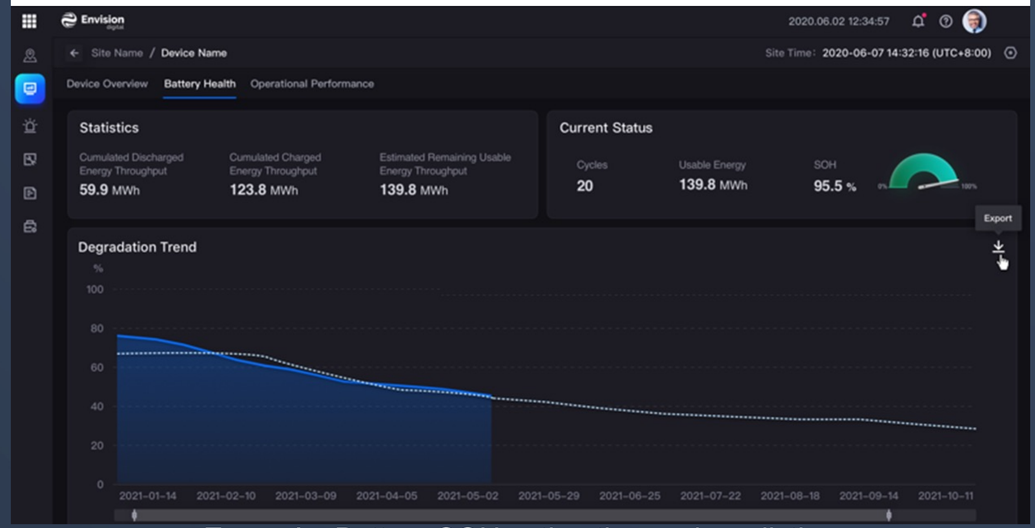
Battery Heatmaps and Statistical Distributions



Example: Battery Module/Rack Temperature Spatial and Temporal distribution

Fault Detection & Diagnostics (FDD), Enhanced FDD, Prognostics & Health Management (PHM)





Example: Battery SOH estimation and prediction

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