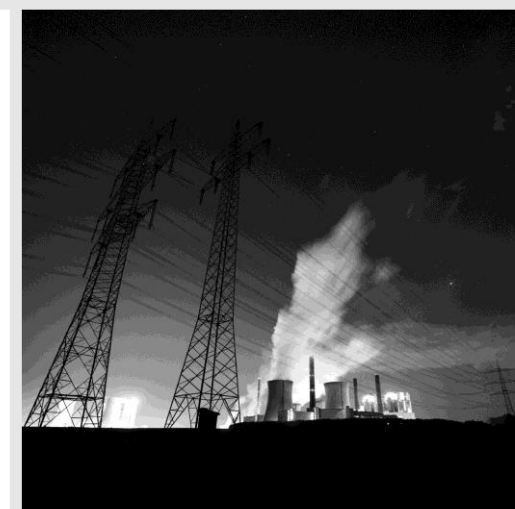




Hybrid energy

version
February, 2016



What is a Telecom Hybrid Solution?

A solution that provides integrated management of multiple energy sub-systems to support a telecom site, irrespective of where it is deployed

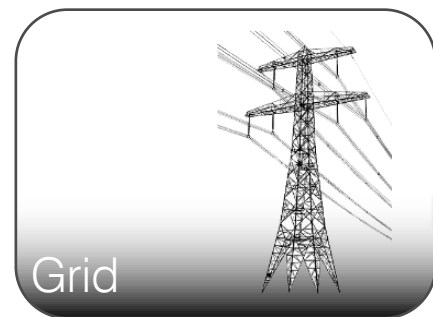


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Telecom Hybrid Solution

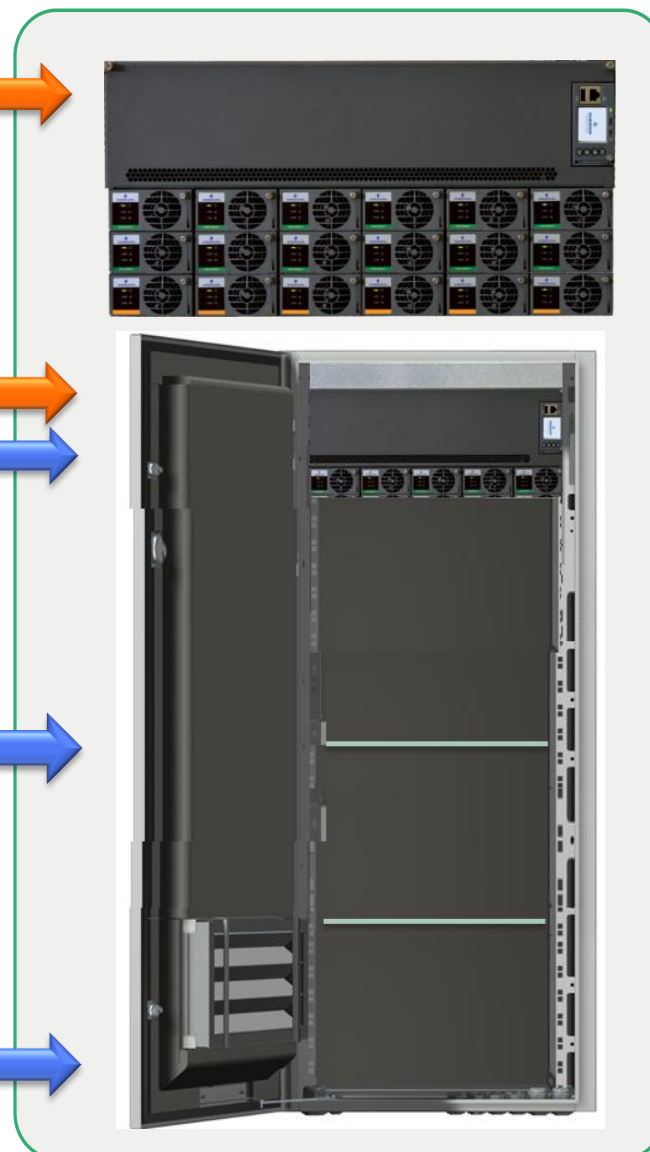
A solution that provides integrated management of multiple energy sub-systems to support a telecom site, irrespective of where it is deployed

Energy sources

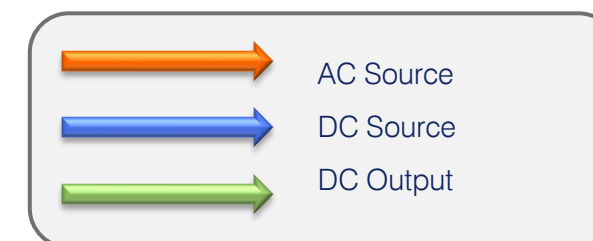
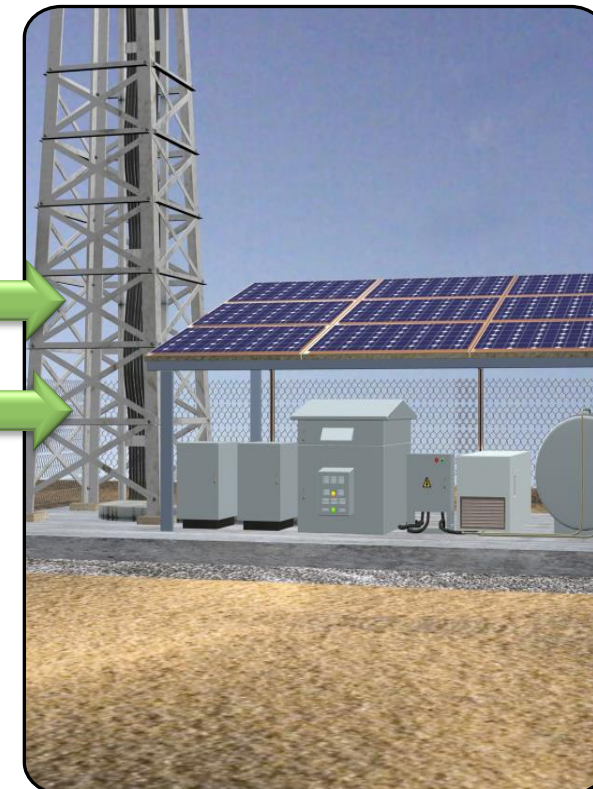


DC Power System

(intelligence that manage the energy source, power conversion and distribution)



Radio Equipment, transmission, backhaul



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When a hybrid solution is suitable?

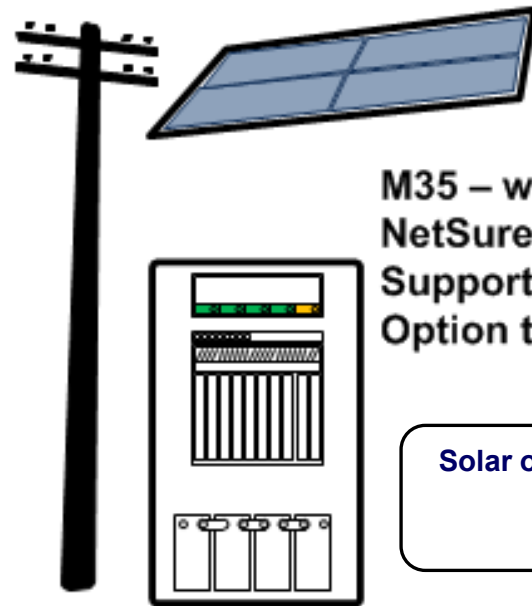
- Traditional AC (utility) energy sources are not in place or reliable
- Reduce energy (operating) costs – initial cost goes up, but long term costs go down
- Trying to extend the life of the batteries (by not completely discharging them)

Why update an existing hybrid solutions?

- To increase operational savings.
- Provide greater cost controls – improve cost forecasting, reducing the impact of fuel costs fluctuation

Hybrid Applications – typical representations

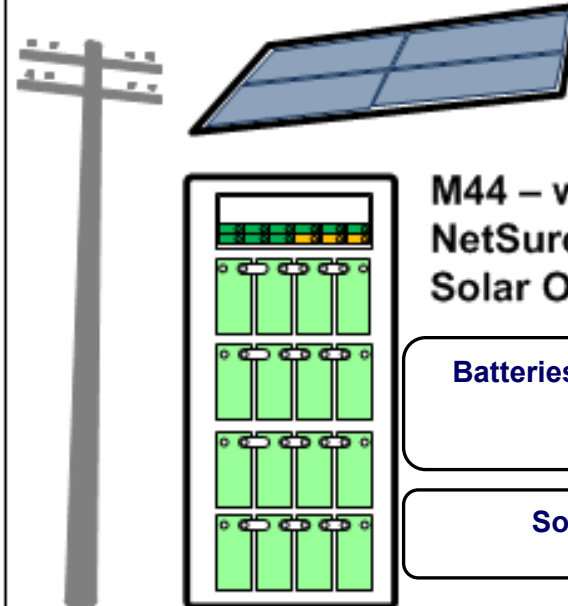
On-Grid



M35 – with Standby Batteries
NetSure 5100-10
 Support Customer Equipment
 Option to add on Solar

Solar opportunistic, supports load when possible

Bad-Grid



M44 – with Fast Recharge Batteries
NetSure 5100-24
 Solar Option

Batteries supporting high cyclic demand and fast recharge

Solar support load during the day

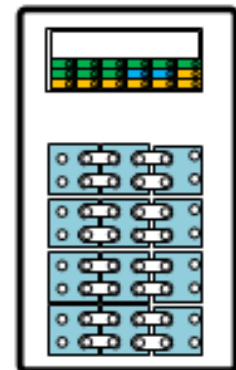
CDC

Solar to reduce Generator Runtime – reduce fuel and maintenance cost



Solar Array – Option

DUO



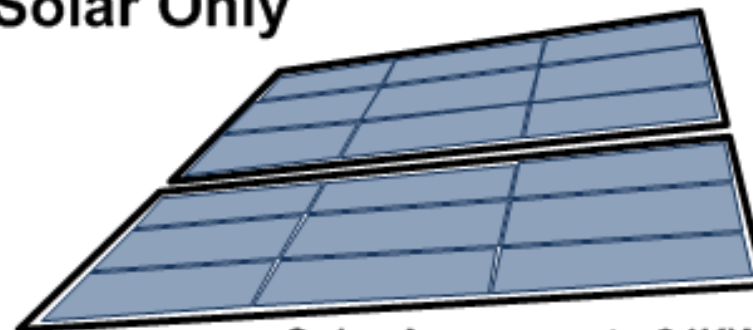
DUO 701H Cabinet Family
 Option to add on Solar

Cyclic Batteries – focus on financial performance of Generator Usage



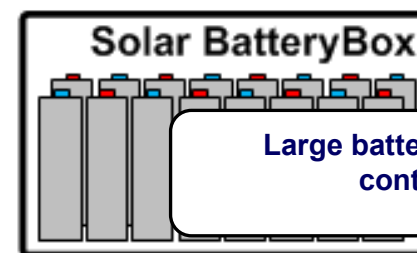
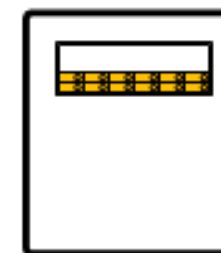
Prime Generator

Solar Only



Solar Array – up to 24KW

M20
NetSure 5100-24

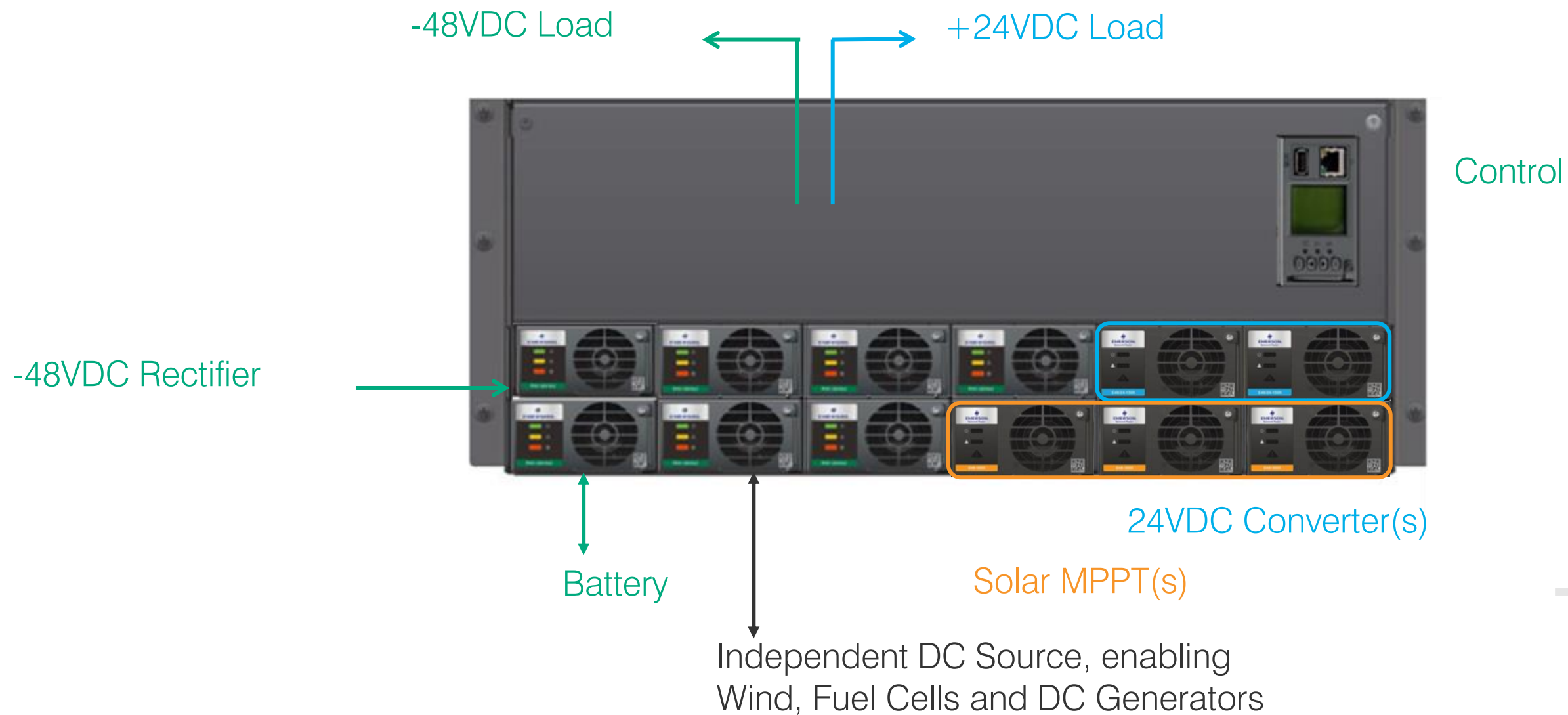


Large battery plant – durability under continuous use - PSOC

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The backbone – a Unified DC Platform

Access Investment Protection – a common solution with multiple plugs supporting the changing requirements to deliver reliable service



Unified platform with universal plug-in slots (not bolt on)!

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Pluggable Power Modules

2 kW AC-DC Rectifier (R48-2000e3)

- Industry-leading power density at 37.4 W/in³
- High environmental endurance (Full output power up to +65°C)
- High efficiency across operation range (96.2% peak)

2 kW Solar Converter (S48-2000e3)

- Efficient conversion (96.4+ % peak) with precise MPPT
- Low Current Array– Reduced Wireline Losses and enable quick connect cabling for quick-simple installation
- Wide Voltage Input – Increased array flexibility and reduced losses due to shading
- High environmental endurance (Full output power up to +65°C)

1.5 kW 48VDC to 24VDC Converter (C4824-1500)

- Support transition of legacy +24VDC equipment to -48VDC
- High efficient converter (nearly 95%).
- Ease of management, by maintaining one energy-battery solution for all.



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NetSure Control Unit (NCU)

Monitors and manages

- Power Delivery to the Load
- Status and Charge of the Battery
- Priority of Energy Delivery – Grid, Generator, Solar or Battery

User friendly display

- Expanded Language Support – French, Italian, German, Spanish, Chinese (Simplified and Traditional), beyond English

Provides 4 alarm relays / 4 digital inputs with expanded support with

- IB2 board for extended alarm relays (8) & digital inputs (8)
- EIB board for midpoint or block voltage monitoring
- IB4 board for permanent Ethernet connection
- 2 Fuel Sensors

Communication Protocols

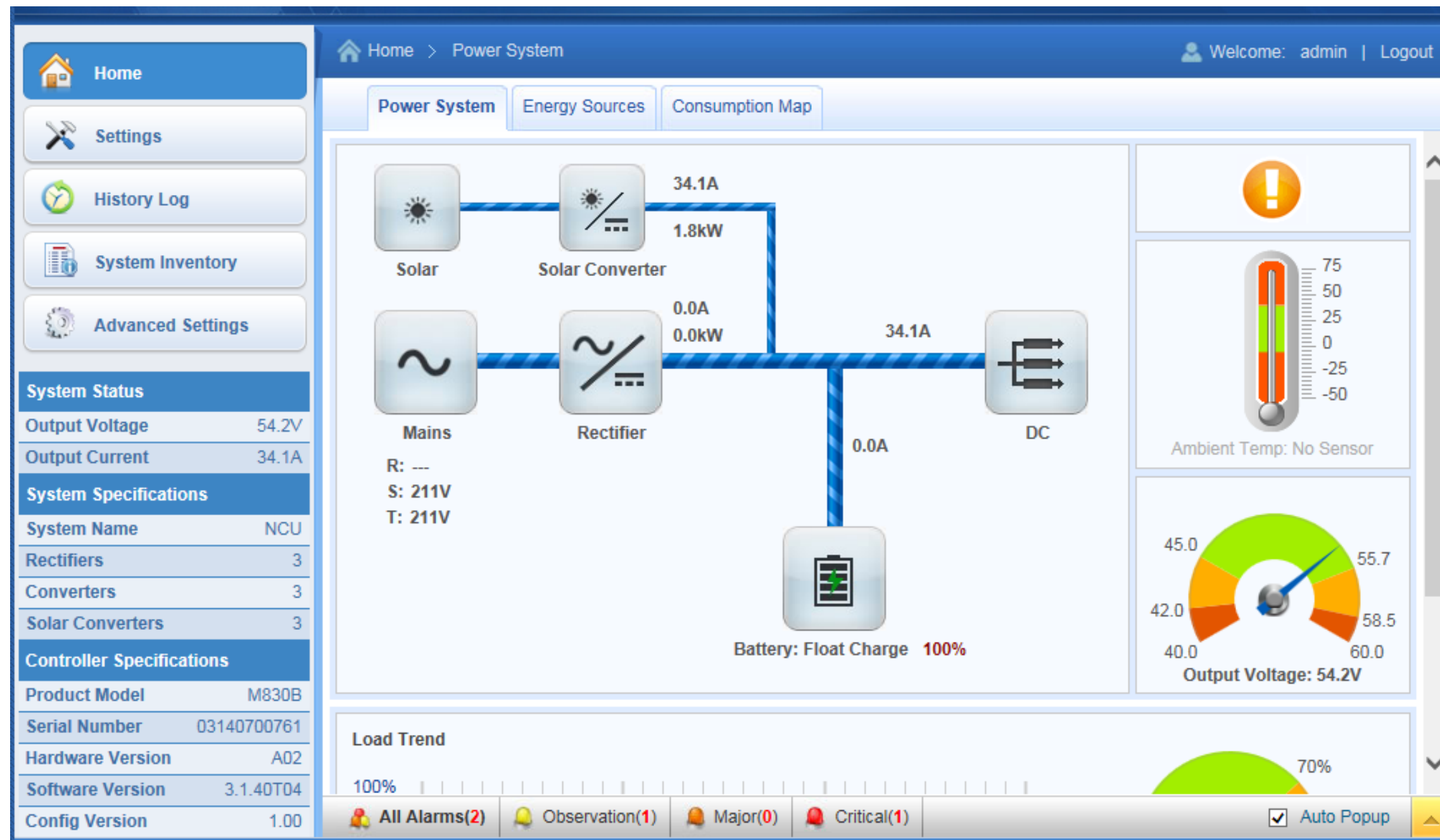
- SNMP V2 and V3
- IPv6
- Modbus (upstream and downstream)



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User Friendly Web Interface

Web Interface supporting Chrome, Safari, Firefox and IE with language support for English, French, German, and Spanish



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Outside Plant Solution - it is more than power

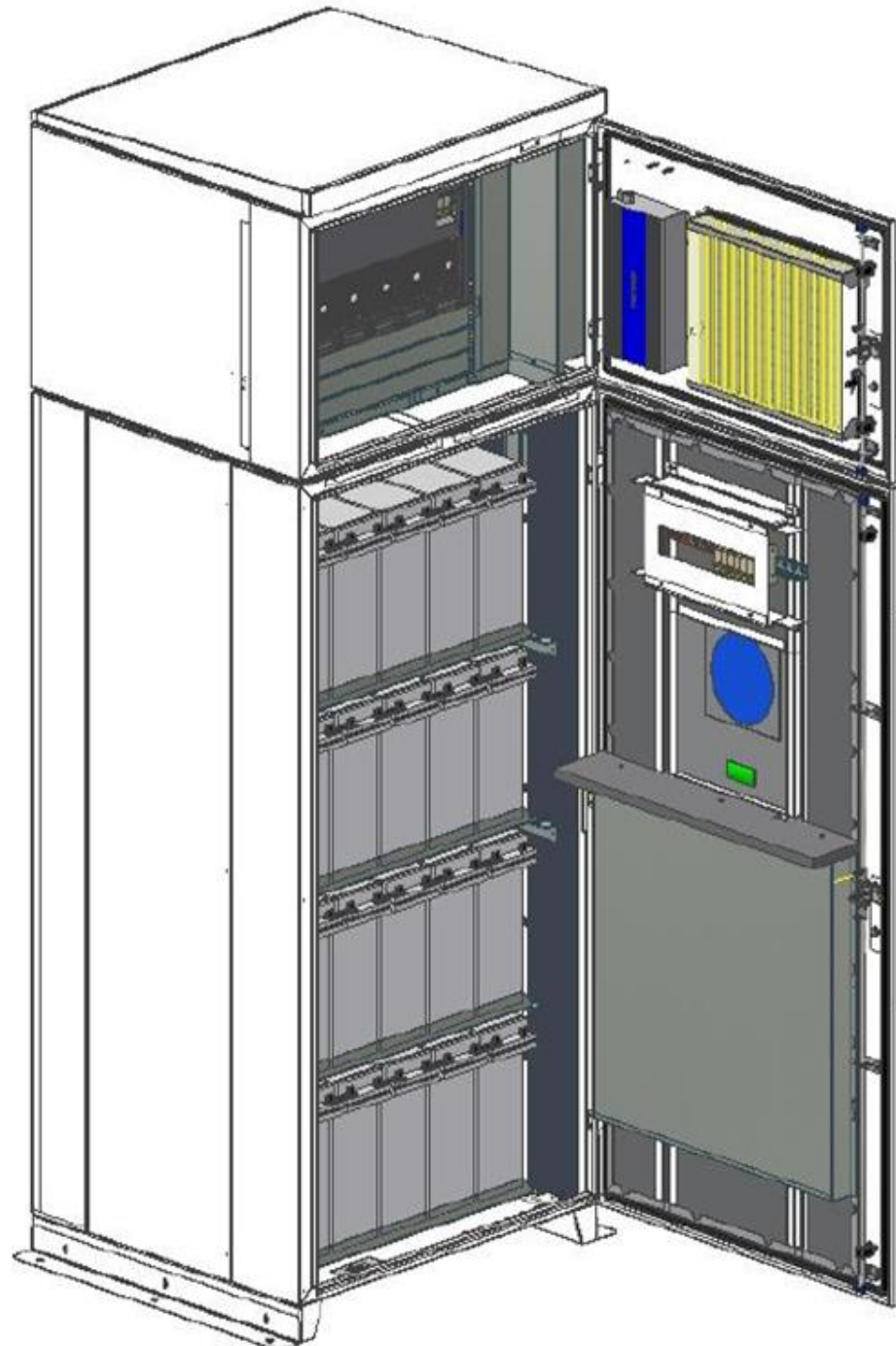
NetXtend M-Series provides the complete infrastructure required to deploy and protect power, batteries and customer equipment



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Outside Plant Solution – Proven Solutions

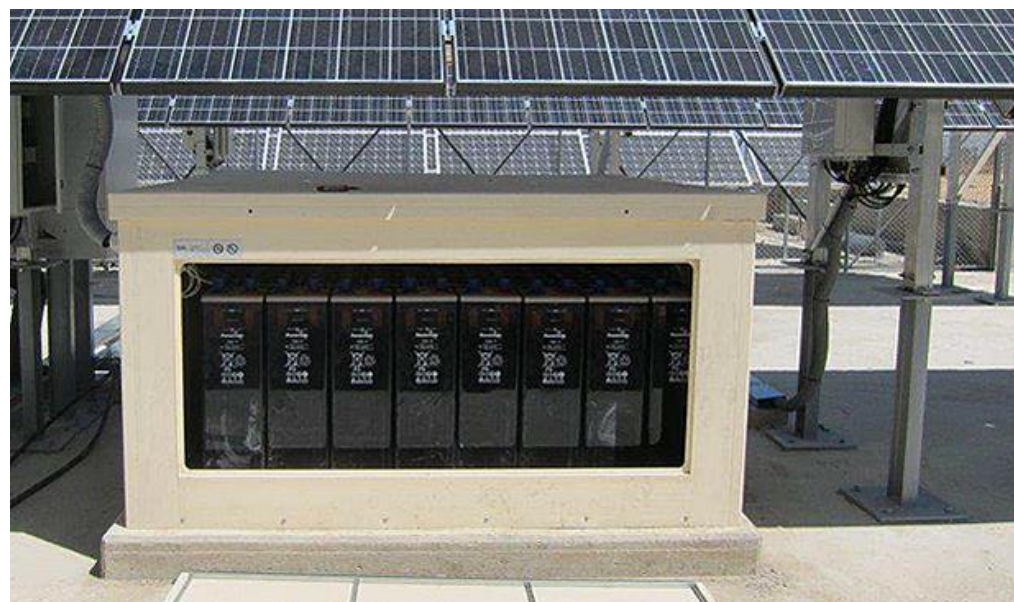
NetXtend DUO-Series proven solution for CDC – generator-battery focus solutions.



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One battery or one technology does not suit all applications, as such our portfolio addresses the demands of the application to provide operational value for.

- On-Grid – Cost effective standby batteries
- Bad-Grid – Rapid recovery and performance under stress
- Off-Grid – CDC - Reduce Generator Fuel Consumption
- Off-Grid – Solar – Large Capacity & provide durability under PSOC



Family of (Solar) Battery Boxes supporting 600 to 6000+ AHr.

Boxes provided as a flat-pack assembly and include battery racks.

Solar – Global Solution

Quality solution from recognized leading global providers:

- Solar Panels and IEC Surge Protection
- Quick connect (MC4) Cabling from Array to Power Cabinet
- Solar Framing - Open Area (place equipment under the array)
- Standard solutions at 12°, 22° and 32° in 2KW and 4KW Blocks



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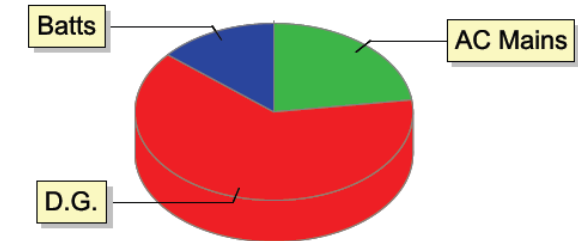
Software / Hardware/ Remote Services

Energy insight:

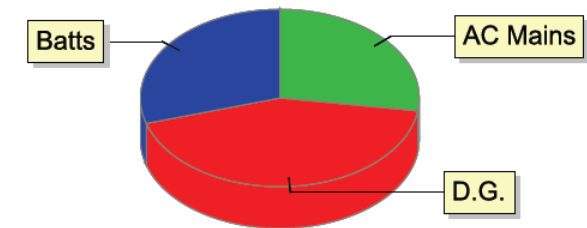
- Energy production distribution per site and network
- Energy consumption distribution per site and network
- Adjust and fine tune settings remotely to optimize solar, fuel and battery operation
- Energy KPI analysis

Diesel tracking

- Refueling and billing of fuel tracking
- Fuel theft warning



AC mains running hour ratio (%) = 22.834
D.G. running hour ratio (%) = 63.347
Battery running hour ratio (%) = 13.819



AC mains running hour ratio (%) = 27.339
D.G. running hour ratio (%) = 43.042
Battery running hour ratio (%) = 29.619

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Consultation – Example: Asia

THE NEED

Improve network efficiency of multiple off-grid sites and increase visibility of site performance. Despite investment in hybrid technologies, anticipated reduction of energy, fuel & maintenance cost was not realized.

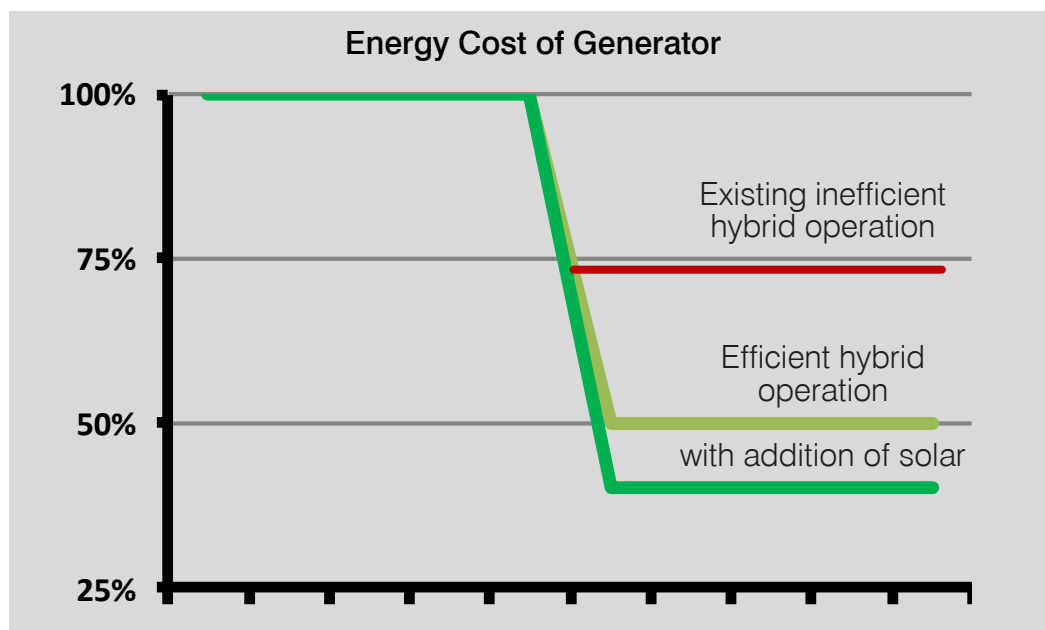
THE SOLUTION

Joint site audit followed by expert analysis resulted in setting corrections & hardware upgrades.

- Added remote supervision & control
- Sized battery & diesel to match load
- Added rectifiers to optimize use of existing generator capacity
- Recommended addition of solar panels

THE BENEFIT

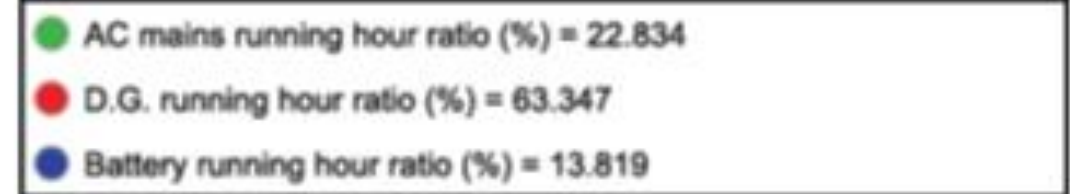
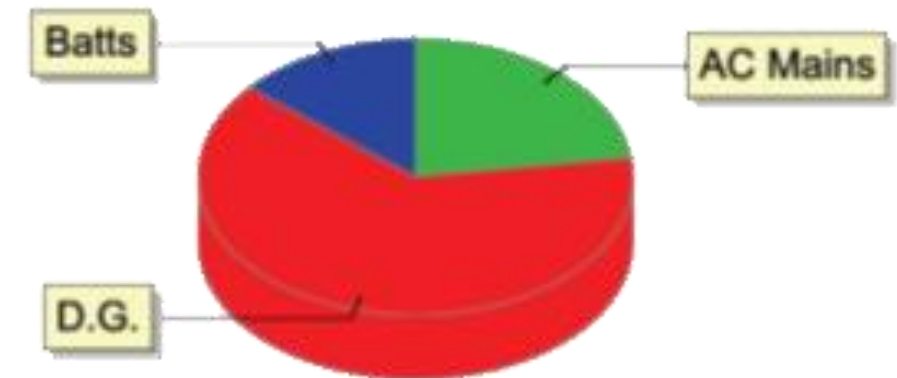
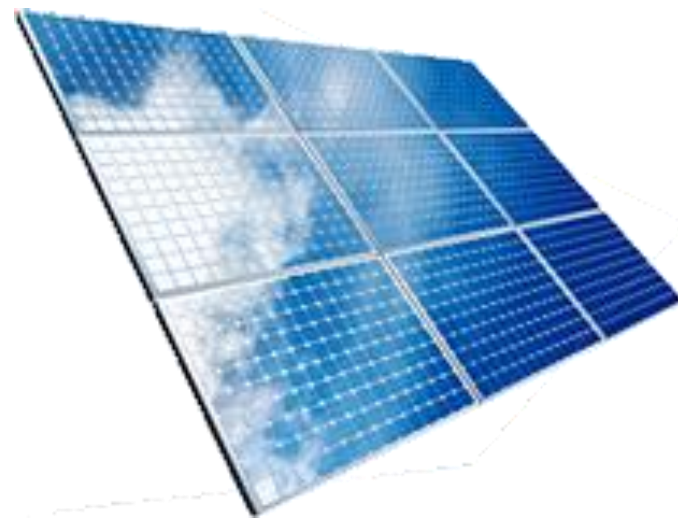
- Fully remote, live visibility of site performance
- Improved energy efficiency
- Reduced OpEx >50%
- Implementing solar solution for further OpEx savings



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What can Telzas Provide?

Energy Platform (5100), Cabinets, Batteries, Solar (and Frames) Support, Maintenance, Monitoring, Analysis and Training



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