From Cell to System: Palonova's Six-Layer Safety Architecture Delivers 200 Million Hours of Zero-Accident Performance

SARATOGA, CA, UNITED STATES, July 25, 2025 /EINPresswire.com/ -- As demand for reliable energy grows in mission-critical infrastructure like data centers and telecom networks, safety remains paramount. Palonova has introduced a groundbreaking six-layer safety architecture for its lithium-based distributed power systems (DPS), setting a new standard for reliability in critical infrastructure. Thisspeical design ensures robust performance and safety, evidenced by 200 million

From Cell to System: Palonova's Six-Layer Safety Architecture Delivers 200 Million Hours of Zero-Accident Performance

hours of zero-accident operation across diverse applications. The architecture integrates advanced materials, engineering, and intelligent systems to deliver unmatched resilience and sustainability.

The system is built to address the demanding needs of critical infrastructure, such as data centers, telecommunications, and AI clusters. By combining scientific precision with operational excellence, Palonova's approach minimizes risks while maximizing efficiency and environmental responsibility.

Core Features of the Six-Layer Safety Architecture

Palonova employs A-grade LiFePO□ cells with thermal runaway thresholds exceeding typical cells by over 40°C, featuring reduced internal resistance and a compact 15Ah capacity to limit stored energy and prevent thermal propagation. The 4th-generation PACK design incorporates liquid-immersive containment with dielectric coolant for thermal regulation and module isolation, enhanced by gold-plated terminals, tool-less interconnects, and flame-retardant enclosures.

Each module is equipped with a high-resolution Battery Management System (BMS) utilizing edge-level AI analytics, maintaining ±2mV/cell voltage accuracy, <1°C temperature deviation, and providing predictive analytics for State of Health (SoH), internal resistance trends, and

temperature anomalies. The DPS leverages N+1/N+X modular redundancy for high availability, with a Mean Time Between Failures (MTBF) exceeding 100,000 hours, supporting hot-swappable modules and dynamic current balancing.

A three-tier fire mitigation strategy includes dielectric immersion coolant for primary suppression, FK-5-1-12 clean-agent systems for secondary suppression, and container-level liquid cooling as a tertiary failsafe. The systems feature front-access designs and cloud-connected telemetry, logging over 128 real-time parameters, with full-cycle reuse and recycling processes for sustainability.

Proven Deployments and Impact

Palonova's architecture powers over 20,000 DPS units with a total capacity exceeding 15GWh. Key deployments include the Beijing–Tianjin–Hebei Cloud Park, with over 2,000 systems and zero thermal alarms in three years, Xinjiang Mobile's "2+14" cluster, and various AI inference clusters. This six-layer safety architecture establishes a new benchmark for safety and reliability, with 200 million hours of incident-free operation reflecting Palonova's commitment to advancing safety and sustainability in critical energy applications.

www.palonova.com

Bentley Xu
Palonova Company
email us here

This press release can be viewed online at: https://www.einpresswire.com/article/833928185