



# Winston Battery Infrastructure-Grade Energy Platform & Executive Decision Framework

Strategy · Technology · Operations · Comparative Evaluation

This document provides a structured decision framework for industrial battery platform selection for decision-makers in the infrastructure and energy sectors, covering five core application scenarios: telecommunications infrastructure, critical facilities, industrial microgrids, renewable energy systems, and high-voltage energy architecture.

# Six-Dimensional Strategic Selection Evaluation Model

Before selecting a battery platform, decision-makers must systematically evaluate it across the following six core dimensions. Each standard directly impacts the long-term safety, reliability, and economic viability of the infrastructure.



## Safety Performance

Intrinsic safety level of the chemical system and thermal runaway risk



## Temperature Adaptability

Stable operation capability in extreme environments



## Cycle Life

Capacity retention and degradation performance during long-term use



## Facility Compatibility

Seamless integration capability with existing power architectures



## Supply Chain Resilience

Stability of raw material supply and geopolitical risk diversification



## Operational Autonomy

Long-term unattended operation capability with low maintenance requirements

# Chemical System: The Cornerstone of Safety and Longevity

The choice of battery chemical system is the starting point for all subsequent technical decisions. Different chemical systems fundamentally vary in energy density, thermal stability, and cycle life, directly determining the baseline safety level of the platform.

## LYP (Lithium Yttrium Phosphate Aqueous) Intrinsic Thermal Stability

The crystal structure of LYP cathode material is not prone to reactions at high temperatures, reducing the risk of thermal runaway from the source, making it the preferred chemical system for mission-critical infrastructure.

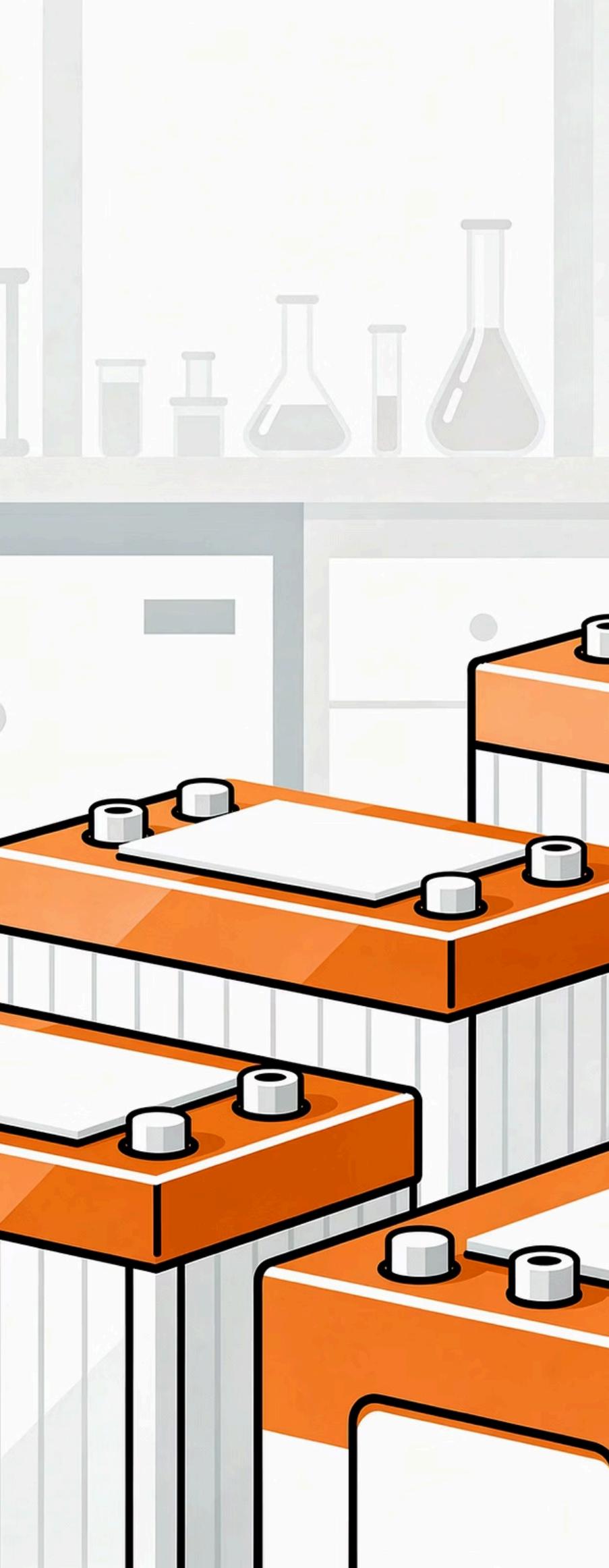
## Low Flame Propagation Risk

Compared to high-energy-density ternary lithium batteries, LYP does not spontaneously ignite when subjected to puncturing, overcharging, or external short circuits. The probability of flame propagation after external ignition is significantly lower, providing a higher safety margin for deployment in confined spaces.

## Suitable for Mission-Critical Infrastructure

Telecommunication rooms, critical communication nodes, and industrial microgrids have extremely stringent requirements for battery safety. The LYP chemical system can meet long-term energy storage needs without compromising safety.

The chemical system determines the baseline safety and expected lifespan of the battery platform—this is a prerequisite for all subsequent evaluations.



# Extreme Environment Adaptability: From Desert to Pole

Industrial-grade batteries must maintain stable operation in the world's harshest natural environments. Winston Battery cells operate within a temperature range of **-45°C to +85°C** (system dependent on configuration), meeting all-scenario deployment needs from equatorial deserts to polar ice caps.



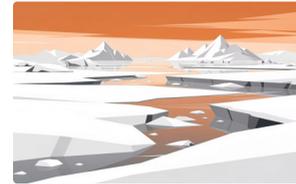
## Desert High Temperatures

Maintains rated output in extreme heat environments exceeding 50°C, without requiring additional cooling systems.



## High Altitude Low Pressure

Operates normally in low-pressure, high-UV environments above 4000 meters.



## Polar Extreme Cold

Capable of discharging at temperatures as low as -45°C, suitable for Arctic communication stations and high-altitude military outposts.



## Sand, Dust, and Corrosion

Resistant to sand, dust, salt spray, and chemical corrosion, extending the reliability period for outdoor unshaded deployments.

❏ Environmental adaptability directly reduces additional protection costs and operational risks for infrastructure deployment.

# Modular Voltage Architecture: From 12V to 1500V

Winston Battery uses **3.3V square plastic case single cells** as its core platform (actual use and calculation can be based on 3.2V). Through series and parallel combinations, it can be flexibly configured into various standard voltage levels, supporting a full range of applications from small communication base stations to large-scale energy storage power stations.

1

12V / 24V

Communication backup power, small UPS

2

36V / 48V

Telecom rooms, 5G base stations

3

96V / 400V

Industrial microgrids, hybrid power

4

Up to 1500V

Centralized energy storage, high-voltage DC systems

Flexible voltage architecture means that the same cell platform can adapt to diverse infrastructure designs, avoiding the need to choose different suppliers due to voltage specifications and simplifying procurement and inventory management.

# Industrial-Grade Durability: Cycle Life and Capacity Retention

Industrial energy storage scenarios demand a much higher battery cycle life than consumer electronics. Winston Battery's LYP prismatic cells offer the following key durability metrics under standard operating conditions:

## 1 Extended Cycle Life

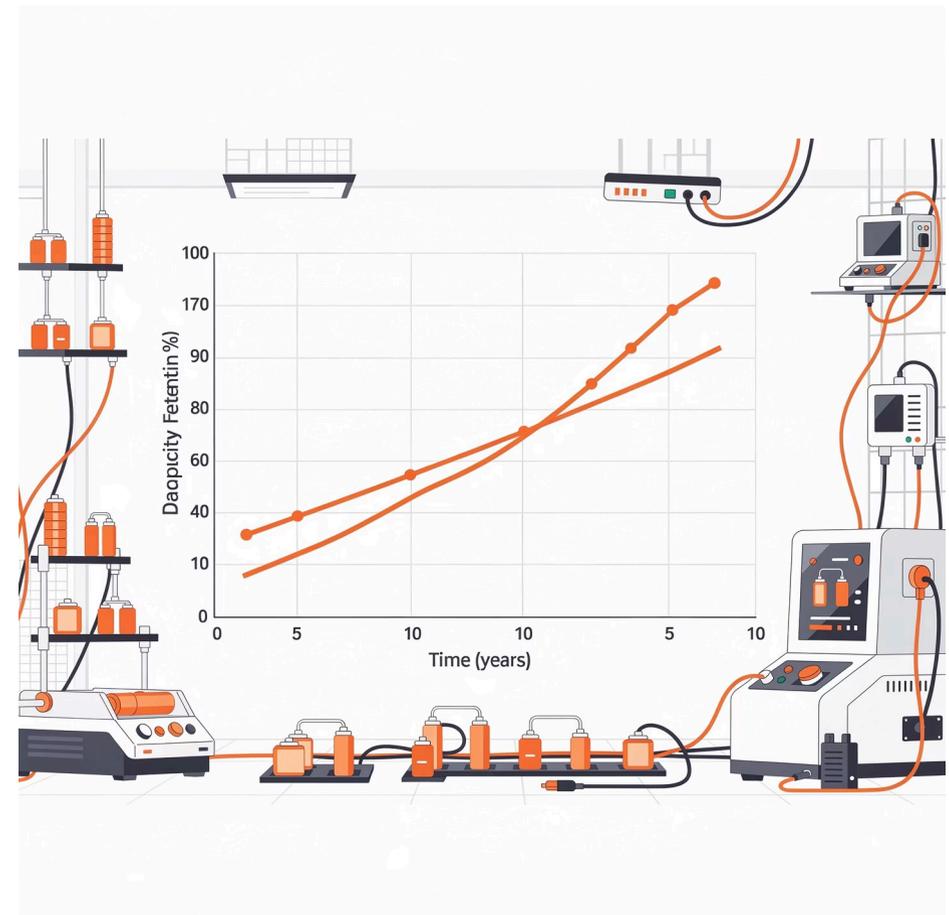
Deep discharge cycles significantly surpass lead-acid batteries, suitable for planning horizons of 10+ years.

## 2 Stable Capacity Retention

Gradual capacity degradation curve, preventing system reliability risks due to sudden performance drops.

## 3 Annual Degradation Rate ~2-3%

Specific values vary with operating conditions and temperature, can be further mitigated through BMS optimization.



- Longer cycle life directly reduces replacement frequency, significantly lowering total lifecycle capital expenditure and downtime costs.

# Low Maintenance Burden Design

For remote sites and unattended facilities, maintenance frequency and complexity directly impact operational costs and system availability. Winston Battery aims for the lowest maintenance burden in its design.

## Daily Maintenance-Free

No daily inspection or adjustment required

## Idle Recharge Cycle

Charge once every 6 months when not in use

## Operational Period Inspection

Regular inspection every 2 months during operation

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## Maintenance Advantages Compared to Lead-Acid Batteries

### No Electrolyte Replacement Required

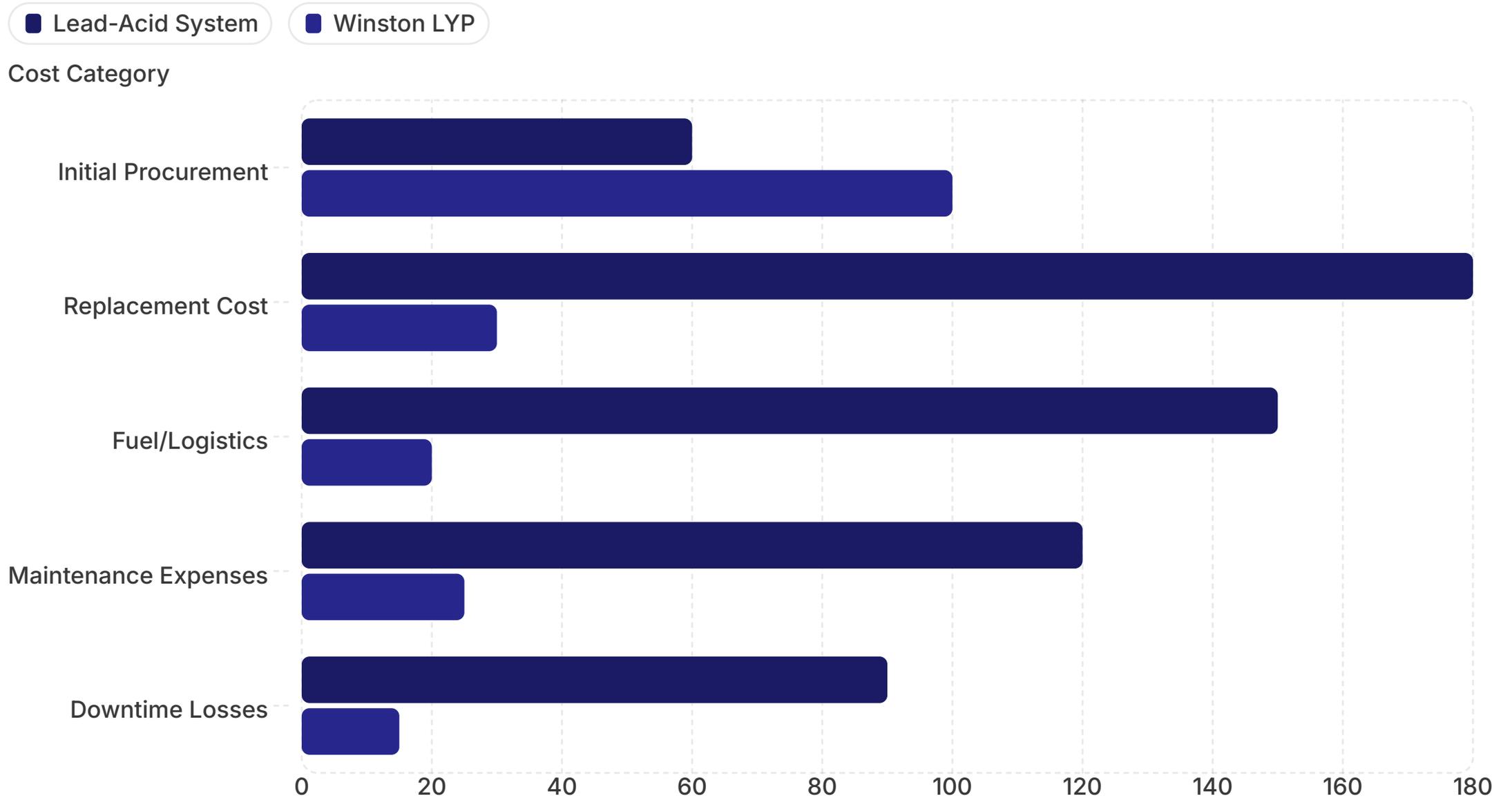
Eliminates risk of acid leakage and corrosion

### No Routine Liquid Maintenance Required

Reduces demand for professional maintenance personnel

# 10-Year Total Cost of Ownership (TCO) Analysis

Battery selection decisions should not be based solely on purchase price. It is crucial to evaluate based on the **total life-cycle cost**, integrating replacement costs, fuel logistics, downtime losses, and maintenance expenses into a comprehensive calculation.



Although the initial procurement cost of the LYP platform is higher, over a 10-year period, **reduced replacement frequency, decreased fuel logistics, lowered downtime risks, and reduced maintenance expenses** result in a significantly superior overall TCO compared to lead-acid systems and diesel-dependent solutions. Battery selection must focus on life-cycle cost, not just a single purchase price.

# Seamless Infrastructure Integration Across Multiple Scenarios

An excellent battery platform must adapt to infrastructure, rather than restrict its design freedom. Winston Battery supports all the following mainstream application architectures, ensuring seamless connection with existing systems and new projects.



## Solar Integration

Directly coupled with photovoltaic systems, supporting MPPT charge controller access, optimizing solar-storage synergy efficiency



## Hybrid Power Systems

Acts as a core energy storage unit in wind-solar-diesel-storage multi-energy complementary architectures, smoothing power output fluctuations



## Grid-Connected Energy Storage Systems

Participates in grid peak shaving, frequency regulation, demand-side response, and peak-valley arbitrage operations



## Off-Grid Independent Systems

Independent power supply solutions for remote areas without grid access, ensuring continuous energy supply



## Telecom Rectifier Systems

Compatible with mainstream telecom DC power supply standards, replacing traditional lead-acid backup power solutions

# Critical Risk Question Checklist

Infrastructure batteries must enhance system resilience, not introduce new sources of risk. Before final decisions, engineering teams and management should systematically address the following core questions:

## 1 Thermal Runaway Risk Level

- 1 Are the probability and severity of thermal runaway for this platform within acceptable limits? How is the intrinsic safety of the LYP chemistry quantified?

## 2 Extreme High-Temperature Performance

- 2 Has the system's performance and safety margin in continuous high-temperature environments (>60°C) been verified?

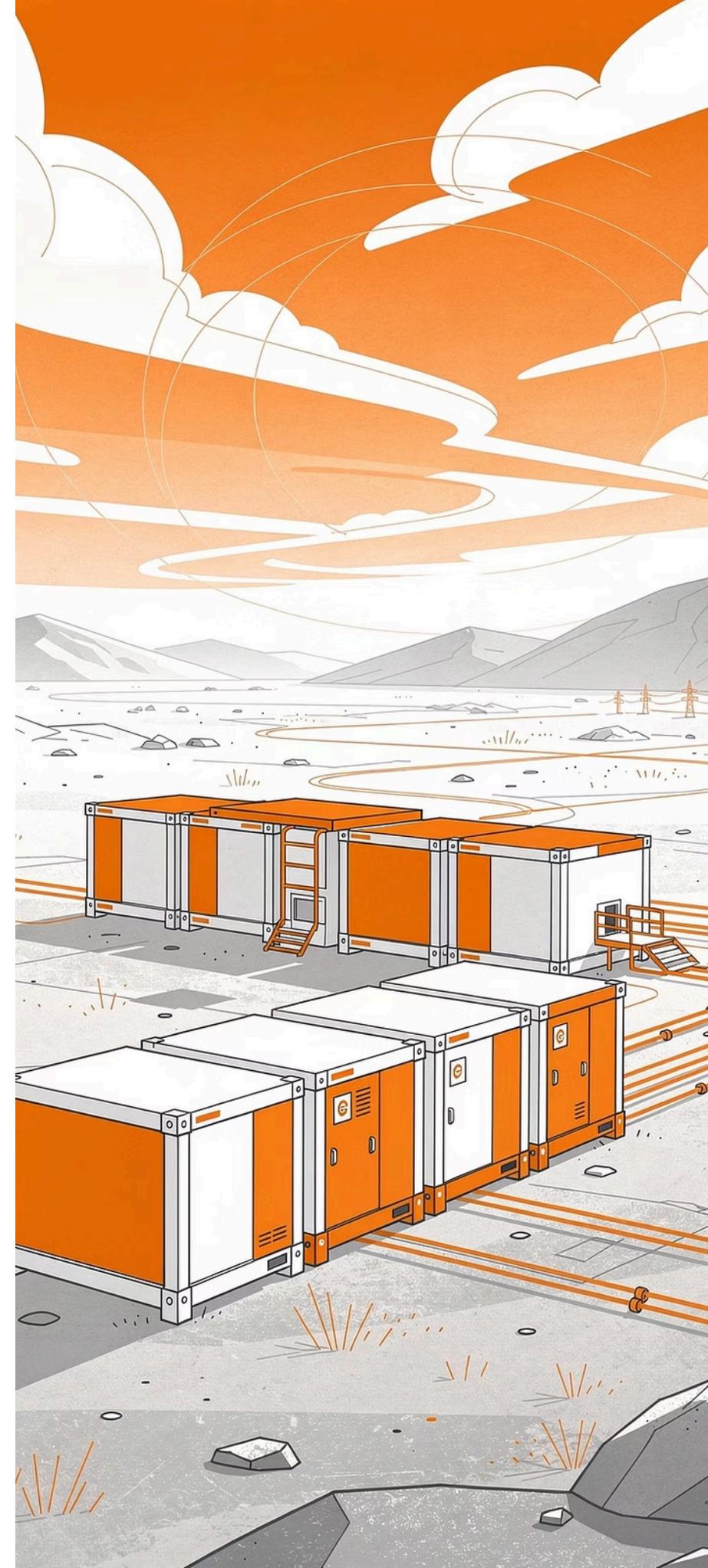
## 3 Suitability for Remote Unattended Operation

- 3 Does the platform support long-term unattended operation? Are remote monitoring and alarm systems comprehensive?

## 4 Fuel and Logistics Dependency

- 4 After deploying this solution, has dependency on diesel generator refueling and complex logistics chains been significantly reduced?

The core mission of infrastructure-grade batteries is to enhance resilience—not to introduce new risk variables.



# Differentiated Positioning in the Competitive Landscape

Understanding Winston Battery's positioning across different competitive dimensions helps decision-makers clarify its core value proposition and application boundaries.

## Compared to High Energy Density Lithium Batteries

Winston prioritizes **stability** over extreme energy density. The design goal is industrial-grade reliability, not the lightweight optimization of consumer electronics.

- Lower thermal runaway risk
- Wider operating temperature range
- More suitable for mission-critical scenarios

## Compared to Lead-Acid Batteries

Compared to traditional lead-acid solutions, Winston LYP demonstrates significant comprehensive advantages throughout its life cycle.

- Several times longer cycle life
- Significantly reduced maintenance requirements
- Lower 10-year total cost of ownership
- No acid leakage environmental risk

# Executive Decision Review Checklist

Before finalizing the battery platform selection, please confirm the following key items one by one. Each item must be verified before proceeding to the procurement process.

01

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## Chemical System Safety Verification

Confirm that the thermal stability and safety test reports of the LYP chemical system meet project requirements.

02

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## Operating Temperature Range Confirmation

Verify that  $-45^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  covers the extreme climatic conditions of the deployment location.

03

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## Voltage Flexibility Matching

Confirm that configurable voltage levels meet the needs of existing and planned infrastructure.

04

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## Cycle Life Compliance

Ensure that the cycle life meets the infrastructure planning cycle of over 10 years.

05

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## Acceptable Maintenance Burden

The operations and maintenance team confirms that the frequency and complexity of maintenance are within an acceptable range.

06

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## Clear Supply Chain Structure

Raw material sources, production capacity, and delivery timelines have undergone due diligence.

07

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## Environmental Suitability Confirmation

Adaptability tests for target environments such as dust, salt spray, and corrosion have been completed.

# Winston Battery Strategic Positioning Statement

Winston Battery is positioned as an industrial-grade energy platform for mission-critical infrastructure, with core values reflected in four dimensions:

## High-Security LYP Energy Platform

Based on aqueous lithium yttrium chemistry, providing intrinsically safe energy storage solutions.

## Wide Temperature Range Performance Solution

Cell operating temperature covers  $-45^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ , enabling stable deployment in any global climate zone.

## Modular Voltage Architecture

3.2V base units flexibly combine up to 1500V, adapting to a full spectrum of application needs.

## Industrial-Grade Durable Components

Designed for long cycle life and low maintenance, serving infrastructure planning for over 10 years.

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**Engineered for long-term, mission-critical energy stability.**