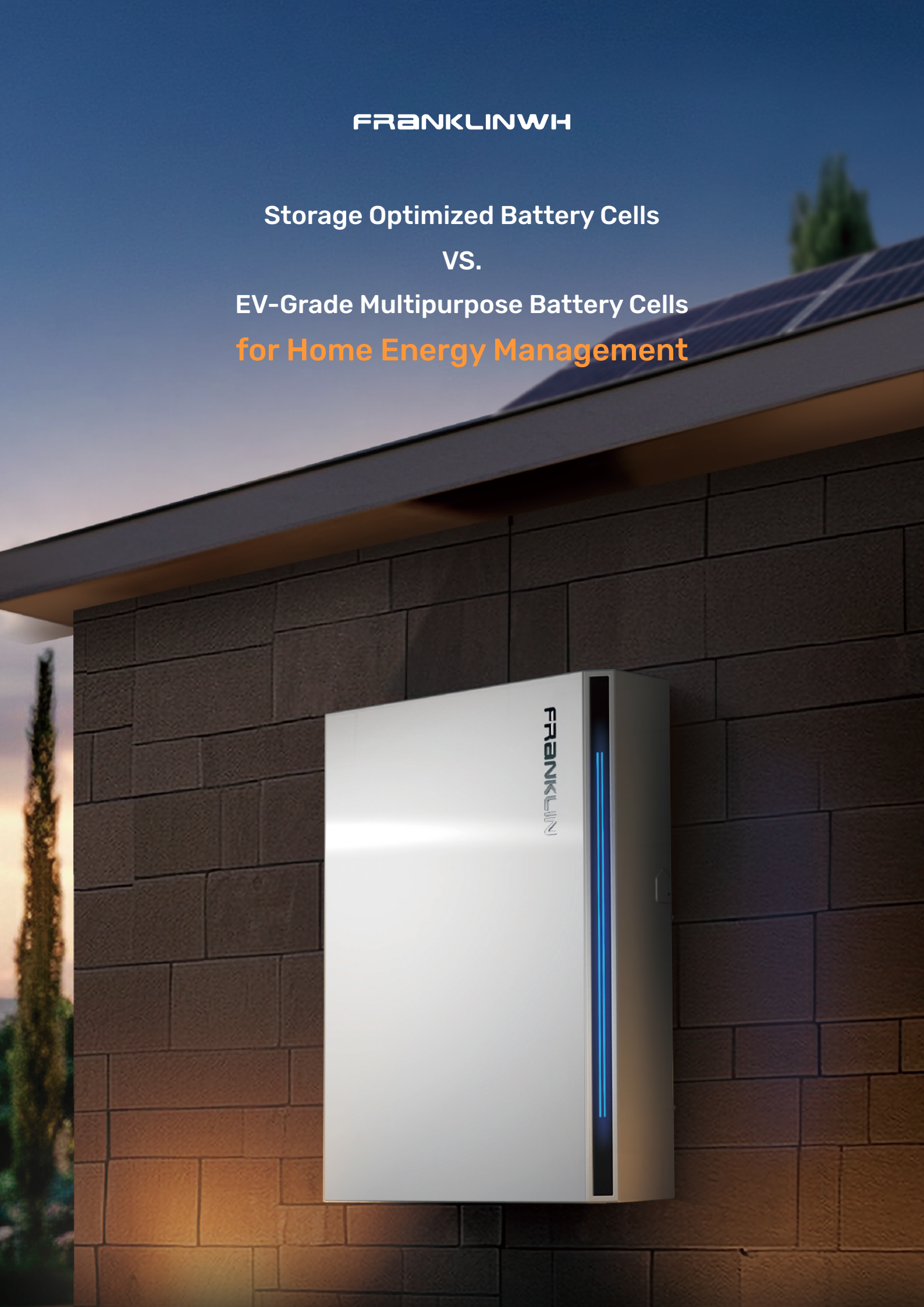
FRANKLINWH

Storage Optimized Battery Cells
VS.
EV-Grade Multipurpose Battery Cells
for Home Energy Management



With an increasing number of homeowners owning electric vehicles (EVs), many are exploring the option of using their EVs for Vehicle-to-Home (V2H) power instead of investing in dedicated energy storage systems (ESS).

However, depending on EV battery usage for home energy storage can impact driving range and accelerate battery wear. It is not yet fully known how these use cases will impact EV battery warranty term compliance. In contrast, 314 Ah LFP storage batteries provide notable benefits in terms of performance, safety, and longevity within a known landscape for warranty compliance.

Performance Comparison

Energy Density

- **EV Batteries:** Built to prioritize high energy density for optimal driving range, EV batteries typically use nickel manganese cobalt (NMC) chemistry. EV batteries are optimized for high output at certain periods for vehicle acceleration and they rarely discharge 100% during a single drive. Response characteristics are optimized for high peak output with short durations. However, this can compromise safety and longevity.
- **Storage Batteries:** ESS batteries, on the other hand, generally use lithium iron phosphate (LFP) chemistry, which is known for its stability and durability. LFP batteries are safer, longer lasting, and better suited for handling daily charge cycles without significant degradation, making them ideal for residential energy storage. Storage focused cells are optimized for sustained full daily charge and discharge at predictable rates. Slow and steady response characteristics.

Cycle Life

- **EV Batteries:** Typically, EV batteries last around 3,000 cycles or about 10 years with occasional charging. While this is sufficient for transportation, it is not optimized for the heavy daily cycling required in V2H applications with Time of Use operation.
- **Storage Batteries:** ESS batteries are designed for high cycle life, with most systems capable of handling 6,000 cycles or more. Advanced storage solutions, such as FranklinWH's aPower, can provide up to 8,000-10,000 cycles, ensuring over a decade of reliable and consistent performance for home energy storage.

Charging and Discharge Rates

EV batteries are designed to deliver high power output for quick acceleration and fast charging, often reaching a full charge in about 30 minutes due to their high charging rates. In contrast, ESS batteries are engineered for more gradual energy release, typically taking 1-2 hours to charge. This slower charging process is ideal for maintaining a steady, long-term energy supply and ensuring stability over extended periods.

Key Features of FranklinWH's Energy Storage System Cells

FranklinWH's energy storage solution utilizes high-capacity 314 Ah LFP cells, offering several key benefits for residential applications:

- **Advanced LFP Chemistry:** The 314 Ah LiFePO4 cell uses advanced LFP chemistry, designed for enhanced energy storage systems. It delivers exceptional safety, durability, and long-term reliability, with high energy density, providing over 7,000 cycles of stable performance to make it ideal for residential energy storage.
- **High Capacity:** Each cell offers 314 Ah, a substantial improvement over previous designs, with an energy density of 180 Wh/kg.
- **Extended Cycle Life:** With a cycle life of up to 10,000 cycles at 65% State of Health (SOH), this system significantly outperforms typical EV batteries and most ordinary LFP batteries.
- **Superior Thermal Performance:** The system operates within a temperature range of -4° F to 131° F, automatically adjusting the battery temperature to maintain an optimized level for consistent high performance in various environments, ensuring a reliable and worry-free power supply for the home.
- **Global Compliance:** Certified under international safety standards such as IEC62619, UL9540A, UL1973, and UN38.3.

Benefits of 314 Ah Cell: Next Generation Ultra High-Capacity Battery

The 314 Ah LFP cell is a breakthrough in energy storage, offering a capacity of 314 Ah and a nominal voltage of 3.2 V. With a cycle life of over 7,000 cycles at 70% State of Health, it delivers high energy density, exceptional reliability, and superior safety, making it ideal for long-term, high-performance applications.

Compared to the traditional 172 Ah LFP cells, the 314 Ah cells are a true game-changer. By adopting these 314 Ah LFP cells, FranklinWH is paving the way for the industry to enter a new era that brings significant benefits to end users.

Key Benefits

- **Higher Energy Density & Cost Efficiency**
  The large 314 Ah cell reduces the number of components needed per pack, offering cost savings and higher volumetric energy density. This makes it a more efficient choice for residential energy storage.
- **Increased Capacity at Same Voltage**
  Larger cells allow for higher energy capacity without increasing system voltage, making it easier to scale up storage while maintaining voltage consistency.
- **Improved BMS Accuracy & Safety**
  With fewer connections, the 314 Ah cell enhances Battery Management System (BMS) data accuracy and improves overall system safety by reducing fault points.
- **Simplified Assembly & Reduced Costs**
  Fewer cells per pack simplify assembly and reduce infrastructure needs, lowering overall costs in terms of land, labor, and containers.

Advancing the Battery Industry

The 314 Ah LFP cells, offering larger storage capacity and enhanced performance for residential use, will be the future trend in the home energy industry.

The rise of these massive cells marks a leap into the 300 Ah+ era, transforming residential energy storage. Internal cell stacking technology is key to producing these high-capacity cells, offering advantages such as reduced resistance, better energy density, and improved capacity retention.

Internal Cell Stacking Technology Advantages

- **Lower Resistance:** Stacking reduces resistance by 10-15%, improving efficiency and extending battery life.
- **Higher Density & Smaller Footprint:** Avoids "C-corner" issues, enabling higher density and smaller project footprints.
- **Improved Capacity Retention:** Ensures more stable performance and better capacity over the battery's lifetime.

Use Case Comparison

Homeowner with Electric Vehicle and V2H Integration

For example, a homeowner in a suburban area with high electricity rates and frequent power outages is considering using their EV for V2H power. They use their EV as a backup energy source, utilizing its battery to supply power to their home during peak hours when electricity costs are higher.

While this provides some short-term savings by leveraging the EV battery, they begin to notice a reduction in driving range and a decline in battery health. After a few years, the homeowner realizes that using the EV battery for V2H is not sustainable — frequent discharge cycles and high-power demands for home energy storage shorten the battery's lifespan, leading to a costly replacement. Additionally, the EV's primary function as a transportation tool is compromised by the energy drain from daily use.

Homeowner Using FranklinWH's Dedicated Storage System

In contrast, another homeowner in a similar location opts to install a FranklinWH ESS with high-capacity LFP cells. This system is optimized for daily charge and discharge cycles, storing excess energy from their rooftop solar system during the day and using it during peak hours or at night.

The homeowner benefits from the system's extended cycle life—up to 10,000 cycles—ensuring reliable, long-term energy storage. During grid outages, the FranklinWH ESS automatically supplies power to the home, ensuring continuous energy availability. With its high thermal performance and safety certifications, the ESS provides peace of mind, avoiding the trade-offs associated with using an EV battery for storage. The homeowner enjoys both lower electricity costs and greater energy independence, with minimal degradation of the storage system over time.

Integrating EVs into the Power Ecosystem

While the use of EV batteries for home charging may deplete the battery faster, it's important to highlight the value of Vehicle-to-Load (V2L) technology. By blending EVs into the integrated power sources, the FranklinWH system offers the ultimate flexibility.

Homeowners can depend on the core FranklinWH system for their daily energy needs, while the EV serves as a backup power source in emergency situations, without affecting their regular energy usage. This integration optimizes the use of home battery storage during normal operations, while still ensuring access to the vehicle's stored energy in critical situations when solar and the grid may be unavailable.

Summary

Although using an EV battery for V2H may appear to be a cost-effective choice at first, dedicated stationary energy storage systems using optimized LFP cells, such as the CATL 314 Ah cell, provide a far better long-term investment by enabling more efficient use for the application.

These systems offer enhanced performance, safety, and reliability. Backed by thousands of positive reviews, FranklinWH's whole-home storage solution ensures lasting energy independence, giving homeowners a more resilient and reliable energy alternative.

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