



WHITE PAPER

# Powering Mission Readiness

## Strategic Benefits of Mobile Battery Energy Storage Systems in Defense Operations

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## EXECUTIVE SUMMARY

In modern defense operations, reliable, flexible, and efficient energy solutions are essential to mission success. Mobile Battery Energy Storage Systems (BESS), such as POWR2's POWRBANK, address the military's urgent need for resilient off-grid power.

This white paper explores the strategic benefits of deploying POWRBANK battery energy storage systems across defense operations, emphasizing enhanced operational resilience, substantial fuel savings, tactical mobility, and alignment with the Department of Defense's electrification and energy efficiency goals.



## INTRODUCTION

### MEETING THE MODERN MILITARY'S POWER DEMANDS

The U.S. military operates in some of the world's most remote and unpredictable environments. As mission environments become more complex, the need for resilient, flexible, and efficient power solutions becomes more urgent. Mobile Battery Energy Storage Systems (BESS), like the POWRBANK, meet this need by delivering deployable, reliable power wherever it is needed most.

POWRBANK is a mobile BESS engineered to enhance mission readiness, reduce logistical burdens, and support dynamic operations across all branches of the U.S. military and defense contractor missions. From training centers to field hospitals, battery energy storage systems provide clean, reliable power that empowers forces to operate efficiently.







## HOW BESS PROVIDES MISSION-CRITICAL POWER

Temporary power generators like diesel often run inefficiently, burn excessive fuel, and create unwanted noise. Battery energy storage systems are designed to optimize the efficiency of power generation and usage. POWR2's POWRBANK combines the latest load sensing technology with high-density lithium-ion batteries.

The diesel generator supplies electricity to the site, directing any surplus power to charge the battery energy storage system. Once the BESS is full it acts as the main source of power, powering the load quietly, and with zero emissions. In the case of the POWRBANK, once depleted it automatically restarts the generator to recharge as needed.



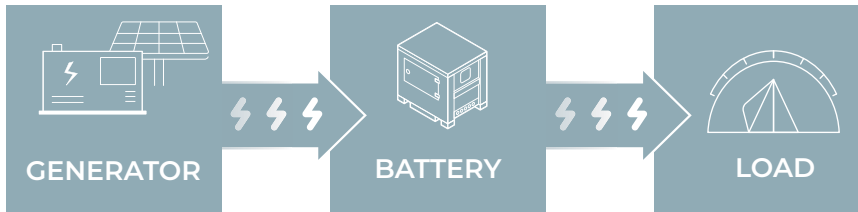
This cycle reduces generator runtime, lowers diesel fuel dependency, and ensures a continuous supply of mission-critical power.

In an optimal configuration, the diesel generator's sole purpose is to charge the BESS, ensuring efficient utilization of resources.

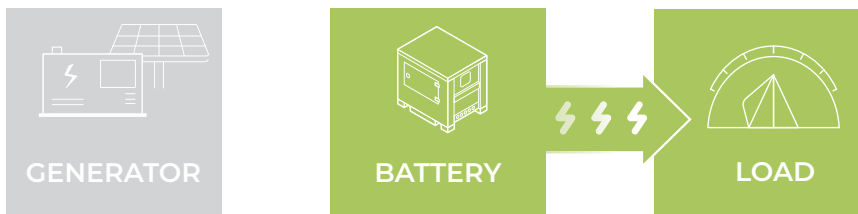


# POWRBANK IN A HYBRID SETUP

1. Diesel generator or solar panels supply power to the site and excess power is used to recharge the BESS.



2. When the BESS is fully charged, the generator is switched off and the BESS provides quiet power to the load.



## 1. Enhanced Operational Resilience

Defense operations cannot afford downtime. Power disruptions, whether due to generator failures, fuel shortages, or grid instability, can jeopardize mission-critical systems. Battery energy storage systems can serve as a backup energy source to provide power during outages. The ability to seamlessly integrate with diesel generators or renewable systems provides versatility and adaptability.

Mobile BESS increase the efficiency of grid-independent operations, making them invaluable in remote environments. This resilience can translate into improved mission success in the field.

## 2. Fuel Savings and Reduced Logistical Burdens

Fuel logistics can be an intensive aspect of military operations. Integrating battery energy storage with traditional diesel generators enables hybrid operation, significantly cutting fuel consumption by reducing generator runtime by up to 80% compared to using a diesel generator alone.

By storing excess energy and dispatching it during periods of peak demand, BESS reduces generator load and allows for quiet, efficient power operation. Reduced fuel dependency can result in fewer resupply missions, reduced exposure to threats, and lower operational costs.

### 3. Tactical Mobility, Modularity, and Scalability

Defense operations demand flexibility. Mobile battery energy storage systems like the POWRBANK are designed for rapid deployment, easy transport, and modular scalability. They feature forklift pockets, lifting rings, and optional trailers to move easily around camps. They can be relocated as mission needs evolve, making them ideal for expeditionary forces, humanitarian missions, or temporary forward operating bases.

Some POWRBANK systems can be operated in parallel to increase power output and storage capacity. This modular solution scales to support small outposts or large command centers. This adaptability supports diverse, time-sensitive operational scenarios.

### 4. Supporting Strategic Priorities: Electrification and Supply Chain Resilience

Beyond tactical advantages, utilizing mobile battery energy storage systems supports broader strategic initiatives, including goals for energy resilience, electrification, and operational sustainability. Defense organizations are increasingly prioritizing the deployment of resilient power solutions that reduce reliance on vulnerable fuel supply chains.



In 2024, the Department of Defense (DoD) announced that they were actively seeking suppliers to assist in meeting 100% carbon pollution-free electricity (CFE) by 2030.

BESS complement this pursuit by providing zero-emission power. They also promote the use of solar energy for a 100% zero-emission solution.

**Deploying mobile BESS solutions on missions enables more sustainable, electrified operations while enhancing operational capability and reducing environmental impact.**

## MISSION-READY BY DESIGN

Mobile BESS are designed for rapid deployment and rugged field conditions. They can be transported by trailer to anywhere that efficient power is needed, making it easy to overcome difficult terrain.

Additionally, POWRBANK battery energy storage systems are NEMA 3/IP55 rated and have a wide

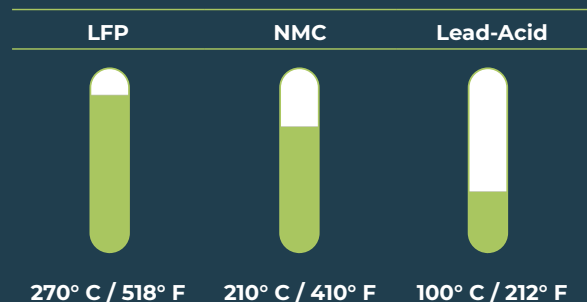
operating temperature range. POWR2 offers an optional heating kit to support POWRBANK usage in harsh climates. The power connections on POWRBANK mobile battery energy storage systems are designed for easy access so cables can be connected quickly.

### LFP, Thermal Runaway & Depth of Discharge

POWR2 POWRBANKs use Lithium-Iron Phosphate (LFP) battery technology. The POWRBANK's LFP batteries have a cycle life of approximately 6,000 cycles, offering over three times the lifespan of Nickel Manganese Cobalt (NMC) batteries and approximately 20 times the cycle life of lead-acid alternatives.

LFP chemistry ensures high thermal stability, non-toxic material composition, and significantly reduced risk of thermal runaway.

#### Thermal Runaway



#### Depth of Discharge

LFP	NMC	Lead-Acid
80-90%	80-90%	50%

POWRBANKs feature separate input and output connections, enabling direct integration with standard non-synchronous diesel generators and seamless pass-through of supply power to the load.

**Some defense sites may require adherence to stringent safety protocols.**

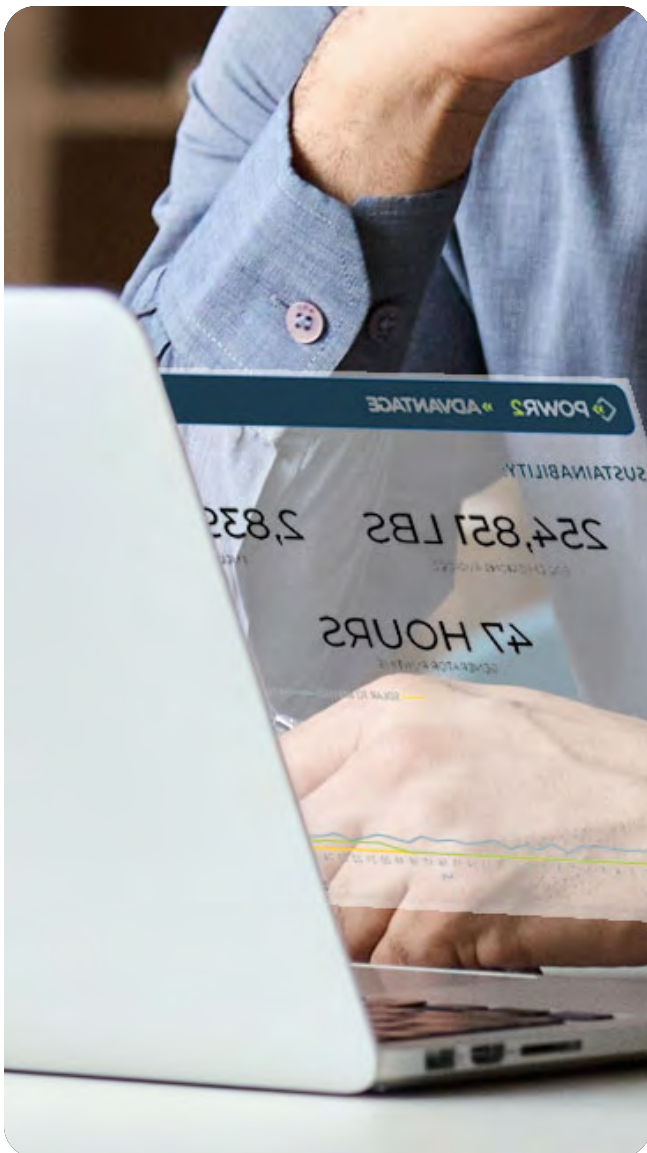
**POWR2 can address these requirements with UL-listed mobile BESS solutions.**

# ENERGY MONITORING AND CONTROL

## FOR SENSITIVE DEFENSE SITES

A key feature of mobile BESS for Defense sites is the ability to monitor and control the energy storage systems and other onsite components like generators remotely. These systems are often called Energy Management Systems (EMS) or Energy Control Modules (ECM).

When evaluating a provider, the DoD and their contractors should be on the lookout for specific hardware and software functionality for sensitive defense sites.



## REMOTE MONITORING & CONTROL

- Ability to monitor and control batteries, generators, and connected loads via a secure, web-based platform.
- Near real-time visibility into system performance metrics (e.g., state of charge, power output, temperature).
- Near real-time adjustments to system settings without requiring on-site visits.
- Alerts and notifications for anomalies or maintenance needs.

## DATA SECURITY

- Secure communication protocols (e.g., TLS/SSL) for all data exchanges.
- Role-based access control (RBAC) to ensure secure and efficient workflows.
- Customizable permission levels based on user responsibilities (e.g., admin, operator, viewer).
- Robust authentication mechanisms like token-based access
- Auditing and validation mechanisms for intrusion detection and prevention to safeguard against unauthorized access.

# BESS DEPLOYMENT SCENARIO

## POWER FOR DOD FIELD HOSPITAL IN A REMOTE AREA

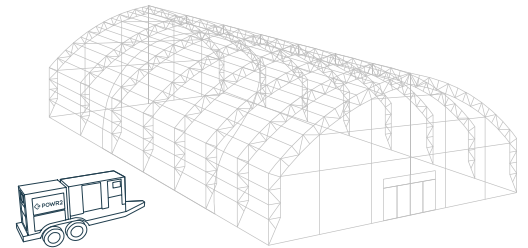
### CHALLENGE

A temporary field hospital in a remote, or high-threat environment experiencing logistical and operational challenges related to power generation:

- **Fuel Dependency and Vulnerability:** The field hospital relies on diesel generators for power, requiring regular fuel resupply missions, possibly through contested territory which makes convoys vulnerable.
- **Generator Inefficiency:** The generators run at low load most of the time, leading to inefficient fuel consumption, frequent maintenance issues, and premature wear.
- **Noise:** Constant generator noise creates an uncomfortable environment for patients and staff.

### SOLUTION

The DoD deploys a **POWRBANK** alongside existing diesel generators creating a hybrid power system.



### RESULTS

UP TO

# 80%

#### REDUCED FUEL CONSUMPTION

Decreasing resupply missions and diesel fuel dependency.



#### QUIET POWER OPERATIONS

Improve environmental conditions



#### GENERATOR MAINTENANCE CYCLES REDUCED

Leads to increased operational readiness and reduced downtime.



Improved overall system efficiency and resilience, supporting 24/7 critical systems.



## CONCLUSION

### ENERGY THAT MOVES WITH THE MISSION

Mobile BESS like POWR2's POWRBANK empowers defense organizations to operate with greater confidence, resilience, and efficiency. Whether powering tactical operations centers or humanitarian efforts, or reducing the logistical burden of fuel supply, the POWRBANK meets the needs of the defense sector.

#### Key advantages of POWRBANK mobile BESS include:



##### FUEL EFFICIENCY

Reduces diesel generator runtime, cutting fuel consumption by up to 80%.



##### STRATEGIC ALIGNMENT

Supports DoD initiatives for net-zero emissions, microgrid deployment, and supply chain resilience.



##### MOBILITY AND SCALABILITY

Provides rapid, modular deployment adaptable to diverse mission profiles.



##### ASSEMBLED IN THE USA

By enhancing energy resilience and reducing logistical burdens, the POWRBANK empowers defense organizations to operate with greater agility, safety, and cost-effectiveness. Mobile energy storage is more than a convenience; it is a strategic asset critical to modern defense success.

### ABOUT POWR2

POWR2 is a leading engineer of scalable, high-performance energy storage technology, helping businesses maximize energy efficiency while reducing fuel consumption. POWR2's mobile BESS technology delivers reliable power anywhere it's needed, enhancing profitability, efficiency, and sustainability. Headquartered in Bethel, Connecticut, USA, POWR2 serves customers worldwide.



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