

# Flexible-scale Li-ion Battery Storage Rack System

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Energy, Environment & Aerospace (Battery Systems)

## Abstract

Utah State University researchers have developed a Flexible-Scale Lithium-Ion Battery Storage Rack System that provides safe, scalable battery management for light electric vehicles, motorcycles, and small equipment. Using contactless wireless power transfer, the system optimizes charge states and extends battery life without the safety hazards or wear of physical plugs. This simplified modular design effortlessly scales to support fleets ranging from 20 to over 1,000 batteries.

## What It Is

Utah State University Researchers invented a simplified rack system that uses contactless wireless power transfer to store and charge batteries for light electric vehicles and small equipment.

## Value Proposition

By removing wear-prone and tedious connectors and keeping cells in an ideal environment, this design significantly reduces replacement costs by extending battery lifespan across fleets scaled from 20 to 1,000+ units.

## Applicable Markets

Warehouses, golf courses, military operations, electric scooters, delivery fleets, automation, and industrial manufacturing plants.

## Benefit

In large-scale fleet operations involving electric scooters, golf carts, small construction equipment, or delivery vehicles, reliable battery storage is critical. Traditional battery racking systems often rely on physical plugs that wear out, pose spark or shock hazards, and lead to poor battery longevity. Additionally, managing energy storage for fleets ranging from 20 to over 1,000 batteries requires a solution that scales without adding operational issues. The Flexible-Scale Li-Ion Battery Storage Rack System solves these challenges through a streamlined, highly effective approach. By incorporating contactless wireless power transfer, the system eliminates tedious physical charging cables while keeping batteries in an ideal state of charge. Its simple design naturally avoids heat buildup without complex mechanisms, ensuring safe, hassle-free operation. Most importantly, the system's modular architecture dramatically reduces battery replacement frequency. By extending overall battery life and adapting seamlessly to any fleet size, it protects high-value energy assets and delivers significant long-term savings.

## Market Application

Factories, warehouses, military operations, golf courses, and other operations require batteries. Lithium batteries are expensive, especially in large numbers. These batteries have limited lifespans and need to be replaced regularly. The Flexible-Scale Li-On System keeps these batteries operating longer, which reduces replacement frequency and saves companies significant margin.

## Researchers

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Intellectual Property

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