



ECHO-Charging

Energy Conversion Hub for Optimizing (ECHO)
Transportation Electrification

The Challenge

As transportation electrification expands across passenger vehicles, freight, and emerging mobility systems, charging infrastructure must deliver significantly more power while remaining affordable, reliable, and grid-friendly.

Current charging systems often require costly infrastructure upgrades and are not optimized for the diverse charging needs of future transportation networks. ECHO is developing the technologies and operational strategies needed to support scalable, multi-modal charging hubs.



What We're Building

ECHO is advancing the power electronics, charging technologies, and operational tools that will enable future high-power charging hubs.



Expected outcomes

- ✓ Reduce the cost of future charging infrastructure
- ✓ Support megawatt-scale charging for freight & commercial fleets
- ✓ Improve charging efficiency & operational performance
- ✓ Enable more flexible & scalable charging hub designs
- ✓ Better integrate transportation electrification with grid operations
- ✓ Accelerate commercialization of next-generation charging technologies

Key Focus Areas

- **Advanced Power Conversion Systems** — Developing lower-cost, more efficient technologies for high-power charging applications.
- **Megawatt-Scale Charging Infrastructure** — Evaluating next-generation systems capable of supporting heavy-duty vehicle and fleet electrification.
- **Wireless Charging Innovation** — Improving the performance, efficiency, and compatibility of wireless charging technologies.
- **Vehicle & Battery Optimization** — Assessing how charging technologies and dynamic wireless power transfer can reduce battery requirements and improve vehicle performance.
- **Hub Coordination & Energy Management** — Creating intelligent scheduling and control systems that optimize charging operations while maintaining reliability and safety.



Scan to connect with our research teams!

Help Shape the Future of Electrification

Seeking Engagement

Charging Infrastructure Providers

- Charging hub design requirements
- Deployment and operational challenges
- Technology integration needs
- Commercialization opportunities

Utilities & Energy Providers

- Grid integration considerations
- Load management strategies
- Infrastructure planning priorities
- Energy resilience requirements

Vehicle & Equipment

Manufacturers

- Charging requirements
- Battery optimization opportunities
- Fleet electrification needs
- Technology performance expectations

Industry & Commercial Partners

- Market opportunities
- Business model development
- Deployment pathways
- Product and licensing considerations