**Hackathon Project Deck: StrideCharge**

### 🌍 Problem Statement

Millions of people, especially in rural, off-grid, or emergency zones, lack reliable access to electricity for charging essential personal devices. Whether hiking, commuting, or living in low-power areas, there’s no consistent way to stay charged on the go.

**Challenge:** How can we convert everyday human motion into usable electrical energy?

### ✨ Idea Summary: StrideCharge

**StrideCharge** is a wearable energy-harvesting backpack that converts the natural up-down shaking motion of walking into electricity using electromagnetic induction.

**Core Principle:** Faraday’s Law of Electromagnetic Induction > “A changing magnetic field near a coil induces an electric current.”

### ⚙️ System Design

**1. Shaking-Based Induction Module** - Neodymium magnet slides through copper coil when user walks - Motion causes current generation

**2. Power Conditioning Circuit** - Bridge rectifier (AC to DC) - Capacitor for smoothing - Voltage regulator (e.g., LM2596 for 5V USB)

**3. Battery Storage** - Rechargeable Li-ion/Li-Po battery - Charge controller (e.g., TP4056)

**4. Output Module** - USB-A or USB-C port - LED indicator for battery level

### 🤩 Features & Advantages

* ✅ Passive energy harvesting — works while walking
* ✅ Comfortable & silent design
* ✅ Modular & upgradeable (solar + kinetic hybrid possible)
* ✅ Sustainable and eco-friendly
* ✅ Low-cost, beginner-buildable prototype

### 🌎 Use Cases

* Rural students without stable electricity
* Hikers, trekkers, campers
* Emergency responders in disaster zones
* Military or field workers

### ⚖️ Evaluation Criteria Highlights

| Category | Score | Justification |
| --- | --- | --- |
| Innovation & Creativity | 9.5/10 | Unique blend of wearable and passive energy tech |
| Feasibility | 8.5/10 | Easy to prototype, real-world physics based |
| Impact | 9.5/10 | Solves critical energy access issues |
| Usability | 8/10 | Comfortable, modular, user-friendly design |
| Scalability | 8.5/10 | Can evolve into hybrid or IoT-enabled system |

### ⚡ Live Demo Plan

* Show shaking magnet in tube lighting an LED
* Log voltage output while walking
* Connect stored power to small USB device (e.g., flashlight, fan)

### 🔹 Future Roadmap

* Add solar panel integration
* Smartphone app for power tracking
* Energy optimization with ML algorithms
* Waterproofing and rugged casing for outdoor use

### 🎯 Final Pitch

“Every step we take generates motion — we turned that motion into power. With StrideCharge, your backpack charges your phone while you walk. No outlets. No sun. Just movement.”