
# Bridging the Power Gap

## Retrofitting and Future-Proofing Data Centers for the AI Era

### The Opportunity: AI Capacity Meets Infrastructure Reality

The surge in GPU applications, and thus demand, is rapidly outpacing greenfield data center construction, which can often take years to complete. Meanwhile, many existing ”brownfield” facilities operate at below 50% capacity, despite having robust physical infrastructure already in place.

Power Innovations International (Pii) offers a modular in-rack power solution to solve two distinct challenges with one scalable platform: upgrading legacy sites and future-proofing new builds.

### The Core Solution: In-Rack Power for Mixed-Density

Our modular architecture provides a seamless path to high-density compute without requiring a ”rip-and-replace” of your facility’s power infrastructure. This allows for a single hybrid rack powering both 51Vdc AI workloads and legacy 240Vac CPU servers.

### Scenario 1: The Retrofit

***Immediate AI Deployment***

For 10–15 year old facilities originally designed for standard CPU servers, migrating to AI requires immediate high-density support.

- **The Upgrade:** Install 51Vdc output High Power Rectifier (HPR) power shelves in the upper portion of the rack to natively support new high-density GPU platforms.
- **Legacy Support:** Keep your existing CPU servers running seamlessly in the bottom of the rack.
- **The Bridge:** The Pii PF-2662-P2xN inverter shelf pulls power from the newly installed 51Vdc GPU bus to provide the necessary 240 Vac single-phase power to legacy equipment.

# Scenario 2: The Future-Proof

***Design Today, Expand Tomorrow***

**Day 1: Initial CPU Installation**

- **Objective:** Install readily available CPU
- servers today using a scalable 3-phase infrastructure.

- **Configuration:** Bring 3-phase power directly to the rack, distributing standard AC power via rack PDUs.

**Day 2: The 51Vdc GPU Expansion**

- **The Expansion:** Redirect the existing 3-phase AC feed into new HPR shelves to generate the native 51 Vdc bus required for GPUs.

- **The Bridge:** Unplug existing rack PDUs and re-plug them into the Pii Inverter Shelf. The inverter converts 51 Vdc back to 240 Vac, keeping original CPUs operational.

## The Product: Pii PF-2662-P2xN Inverter Shelf

***Bridging 51 Vdc Architecture and 240 Vac Equipment***

- **Input:** 51 Vdc (pulled directly from the HPR output bus for GPUs).
- **Output:** 240 Vac Single Phase.
- **Compatability:** Fully designed for the common redundant power supplies (CRPS) utilized by all major server vendors.

**CPU Only → Hybrid GPU + CPU**

## Strategic Value to Your Operations

- **Speed to Market:** Deploy AI capacity in existing space in a matter of weeks, rather than waiting years for new construction.
- **Capital Efficiency:** Reuse existing 3-phase drops, rack PDUs, and fully functional CPU servers
- **Operational Continuity:** Upgrade or expand power architectures with minimal disruption to your existing legacy compute operations.
- **Sustainability:** Leverage existing assets and lower your carbon footprint by optimizing and extending the lifespan of your current digital infrastructure.