Heron Power Electronics
www.heronpower.com

Heron Link: Unlocking Efficient Power Conversion for Gigascale AI

October 2025

Eliminating bottlenecks with a streamlined and scalable power platform

Artificial intelligence is transforming global digital infrastructure. New AI data centers are planned at gigawatt scale, with GB300 racks drawing 140 kW each and future generations exceeding **1MW+**. Yet the electrical backbone powering these facilities remains largely unchanged, anchored in low-voltage and low density AC distribution.

This mismatch creates bottlenecks in efficiency, reliability, and deployment speed. Today's power architectures require multiple conversion stages—each adding cost, footprint, labor, thermal load, and single points of failure—wasting megawatts of energy across the data center campus.

Heron Power has a solution to remove these barriers. By integrating a medium-voltage solid-state transformer (**Heron Link**) with energy storage (**Heron SuperBBU**), Heron delivers hyper-efficient 34.5kV AC to 800V DC conversion in direct alignment with NVIDIA's 800V rack reference architecture. The result is a streamlined, scalable power platform that:

- Increases MV-to-rack efficiency to >98.5%, cutting losses in half
- Stabilizes power ripple at the rack level
- Provides over 30 seconds of ride-through support
- Improves availability with modular redundancy
- Shrinks electrical equipment footprint by 70%
- Accelerates deployment
- Lowers both CapEx and OpEx

> *"Heron delivers hyper-efficient 34.5kV AC to 800V DC conversion in direct alignment with NVIDIA's 800V rack reference architecture.*

As AI compute demands ever-more capable infrastructure, Heron delivers the architecture data centers need: built for scale, reliability, and speed to power. Heron is proud to be collaborating with NVIDIA to pioneer electrical infrastructure that evolves in step with, and empowers, the next generation of accelerated compute capability.

The Time for a New Power Distribution Architecture is Now

As solar grew to be the fastest-growing source of new power generation worldwide, its electrical backbone was forced to evolve. The industry moved from 5 kW single-phase 240V rooftop inverters to three-phase central inverters exceeding 4 MW at 700V AC, paired with 34.5kV medium-voltage collection systems. This leap in voltage and power density unlocked true gigawatt scale and the deployment of hundreds of gigawatts per quarter.

AI is now at a similar inflection point: today's compute surge demands a transformation—from legacy low-voltage, multi-stage architectures toward high-capacity, purpose-built systems that can scale to the needs of AI factories.

“
today's compute surge demands a transformation—from legacy low-voltage, multi-stage architectures toward high-capacity, purpose-built systems that can scale to the needs of AI factories.

Today's architecture is limited in several critical ways:

- **Low-Voltage Equipment and Labor Bottlenecks**
  Meeting 50x rack power growth with today's 4-make-3 architecture and low voltage busways requires massive expansions in electrical equipment footprint and copper busways. Equipment manufacturers are already constrained, and the resulting field labor hours make projects slow, costly and impractical.

- **Multi-Stage Inefficiency**
  Legacy data center designs step down through multiple stages (MV → LV AC → UPS → PDU → rack PSU), with each conversion introducing 1% or more loss. At gigawatt scale, these compounding inefficiencies waste tens of megawatts—enough to power a mid-sized city.

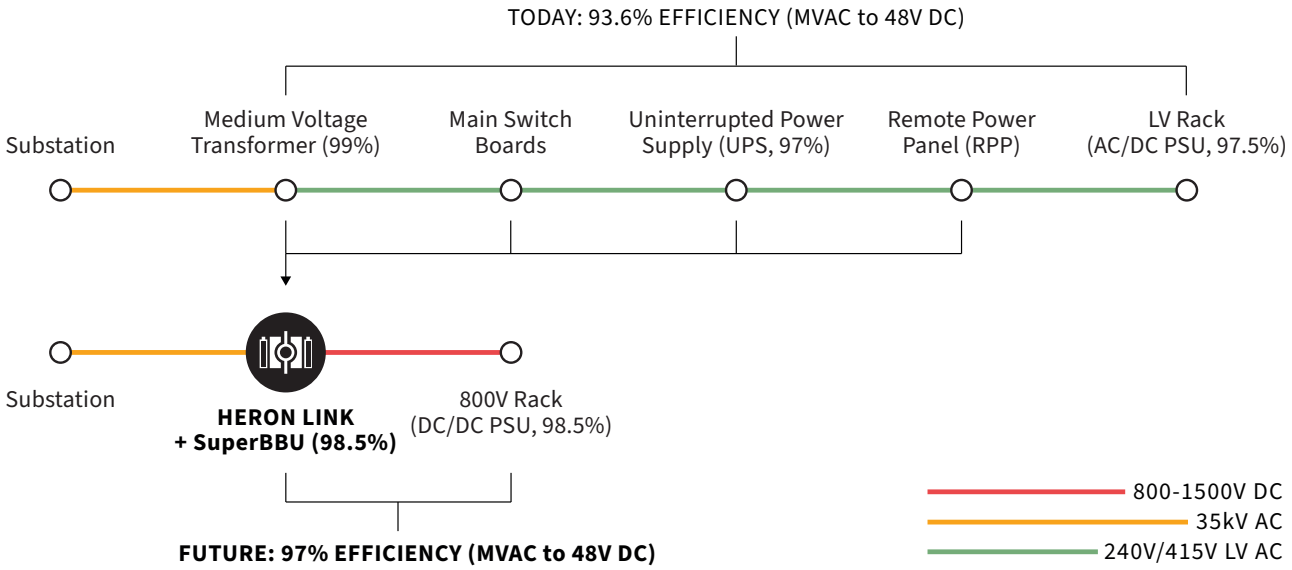
- **Single Points of Failure**
  Centralized UPS systems and low-frequency transformers are bulky, expensive, vulnerable, and painful to replace. Failures can take down entire sections of a facility or force operators to overbuild, adding unnecessary cost and complexity.

“
Forward-looking hyperscalers, compute providers, and standards bodies are charting the path ahead.

- **Challenging Grid Integration**
  Legacy data center power systems rely on unidirectional rectifiers and centralized UPSs designed solely to protect IT load. They disconnect under minor grid disturbances, creating abrupt load drops that destabilize regional grids. At gigawatt scale, this behavior becomes unsustainable. Without a new power architecture, the grid and data centers alike face escalating reliability risks.

Forward-looking hyperscalers, compute providers, and standards bodies are charting the path ahead. The Open Compute Project (OCP) is driving facility-level standardization, while Heron's partner NVIDIA has set a benchmark with its 800V DC rack reference architecture to enable higher rack power density and more efficient distribution.

FIGURE 1 Power System: Traditional vs Future



The move to 800V DC racks is not uncharted territory; it builds directly on more than a decade of large-scale deployment in EVs and utility-scale batteries, where hundreds of gigawatts have already been connected at similar DC voltages. A robust global supply base of power semiconductors, capacitors, cables, touch-safe connectors, and protection devices is already in place, scaled and cost optimized by the EV and BESS industries.

→ **Heron's power electronics team has collectively shipped over 80GW of 1kV+DC grid-connected systems** and is uniquely positioned to bring all participants together to establish more scalable power architectures for AI factories.

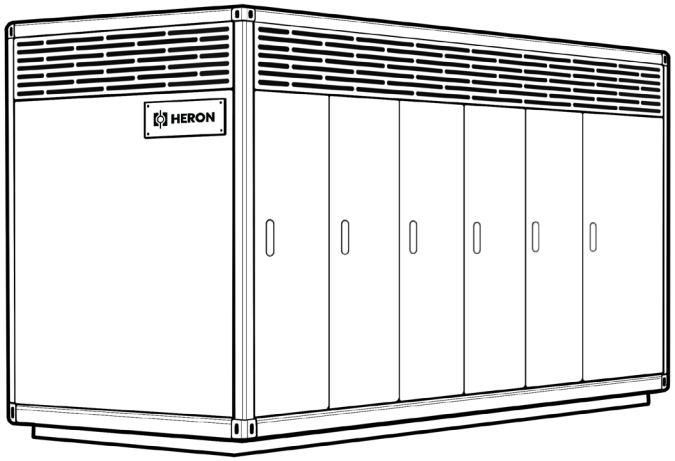
continued →

Heron's Solution for AI Factories

Heron introduces a new class of medium-voltage power electronics purpose-built for hyperscale AI and high-performance computing. The Heron Link performs direct 34.5 kV AC → 800 V DC conversion, while the integrated SuperBBU provides fast, rack-coupled energy storage to absorb compute-driven power ripple.

Together, they eliminate layers of transformers, UPS units, and switchgear—delivering efficiency, modularity, and grid intelligence in a single platform.

FIGURE 2 Heron Link Cabinet



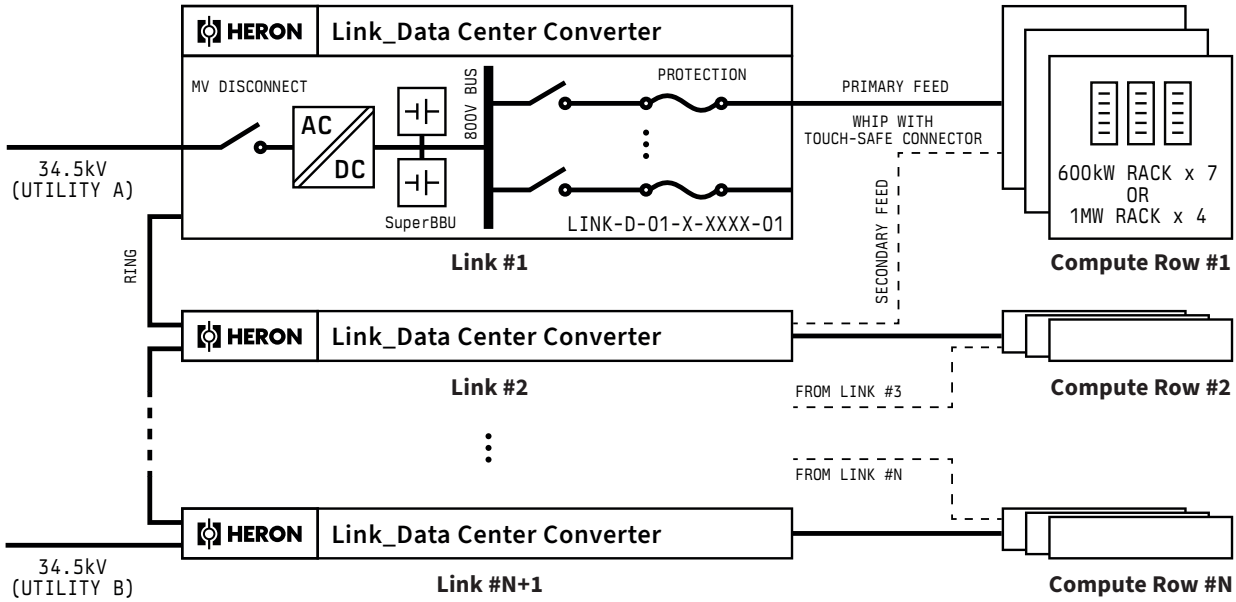
Heron Link Data Center Converter

AC: Power	5MVA
DC: Power	5MW @ 950V-1500V, 4.2MW @ 800V
Operational DC Voltage	700-1500V
Conversion Efficiency	>98.5%

Heron's solution delivers measurable benefits across the full data center lifecycle:

- **Higher Efficiency:** >98.5% from medium voltage input to rack-level DC 800V.
- **Higher Uptime:** Better availability through modular redundancy and service.
- **Highest Power Density:** Seamless compatibility to NVIDIA's 800V N+1 reference designs and adaptable to 1MW+ racks and 1500V+ DC enables higher compute density per square foot.
- **Load Smoothing:** Integrated SuperBBU absorbs ripple and compensates power draw at the rack.
- **Ride-Through Resilience:** 30 seconds of backup power support during grid or facility transitions protects multimillion-dollar AI training runs.
- **Reduced Footprint:** Elimination of thick copper busways, switchgear, and centralized switchgear / UPS rooms shrinks electrical footprint by up to 70%— freeing up floor space for revenue-generating compute racks.

FIGURE 3 Distributed N+1 Power Delivery: MV Feeder Ring to Rack



- **Faster Deployment:** Architecture elegance cuts lead-time, construction cost and labor, eases commissioning, and accelerates time-to-compute.
- **Better Economics:** With domestic manufacturing and zero grain-oriented electric steel, Heron Link sidesteps supply chain bottlenecks. Lower capital expenditures, maintenance, energy costs, and accelerated deployments results in higher ROI.
- **Sustainability:** Lower material usage and higher efficiency translate into significant embodied and operating carbon savings.
- **Seamless Grid-Integration:** Paired with SuperBBU storage, Heron Link's grid-forming controls transform AI factories from passive loads into active grid assets. They ride through disturbances, maintain IT continuity, and deliver voltage/frequency support and harmonic damping compliant with emerging grid standards (ERCOT and IEEE 2800 requirements).

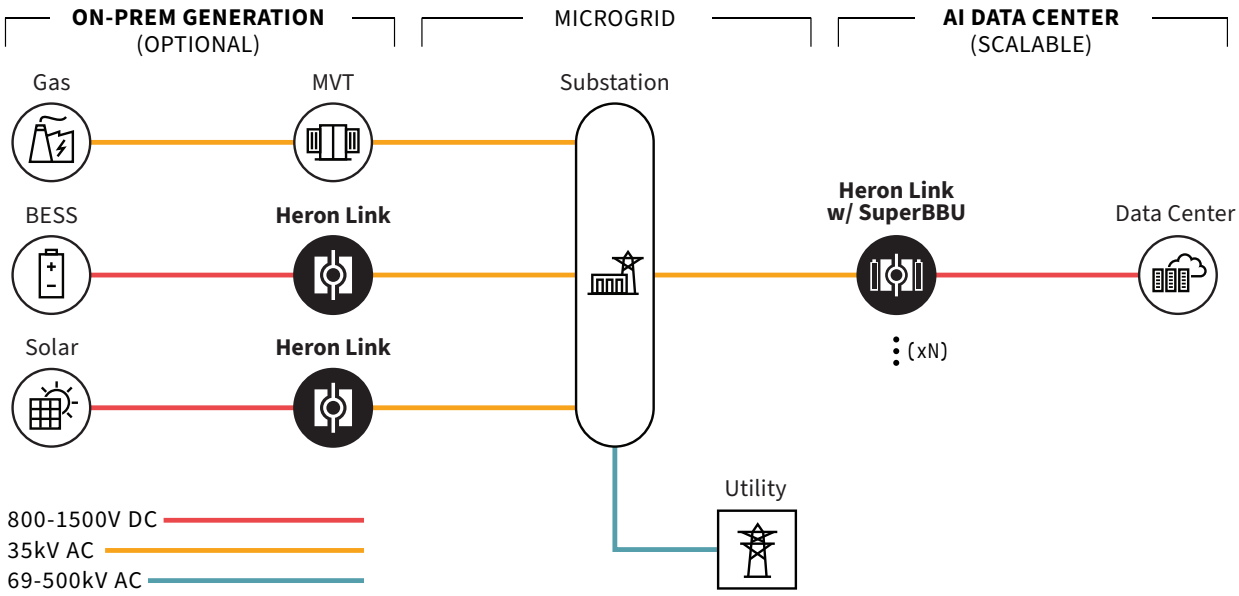
continued →

An Ultimate Vision

The AI era demands a foundational shift in power architecture. Legacy low-voltage systems cannot scale with gigawatt campuses, power dense racks, and 24/7 uptime expectations. Heron Link delivers direct MV-to-DC conversion, modular resiliency, and grid-interactive intelligence—the foundation for simpler, more efficient and denser 800V DC infrastructure.

Beyond the four walls of the data center, Heron Link natively integrates with on-prem solar, battery energy storage systems (BESS) or natural gas electricity generation. Instead of treating generation and load as separate systems, Heron's grid-forming and integrated plant controls enable data centers to become flexible microgrid hubs, capable of balancing variable renewables while maintaining power stability, accelerating time to power for developers ahead of full-capability grid interconnections.

FIGURE 4 On Prem Power System with Heron



Partner with Heron Power to define the next standard of AI power infrastructure. We invite hyperscalers, data center developers, AI hardware manufacturers, utilities, and EPCs to contact **product@heronpower.com** for specifications or grid-modeling assets (PSS/E, PSCAD, Simulink under Heron's forthcoming OpenVSM initiative). Together, we can accelerate an all-electric future built for the AI era.

More on Heron Link:
- Specification: available on request
- Compliance: UL 1741, UL 347A, OCP 800 V rack, IEEE 1547, IEEE2800
- Grid Modeling Assets: Available in PSS/E, PSCAD, and Simulink for grid integration studies with Heron's OpenVSM design.