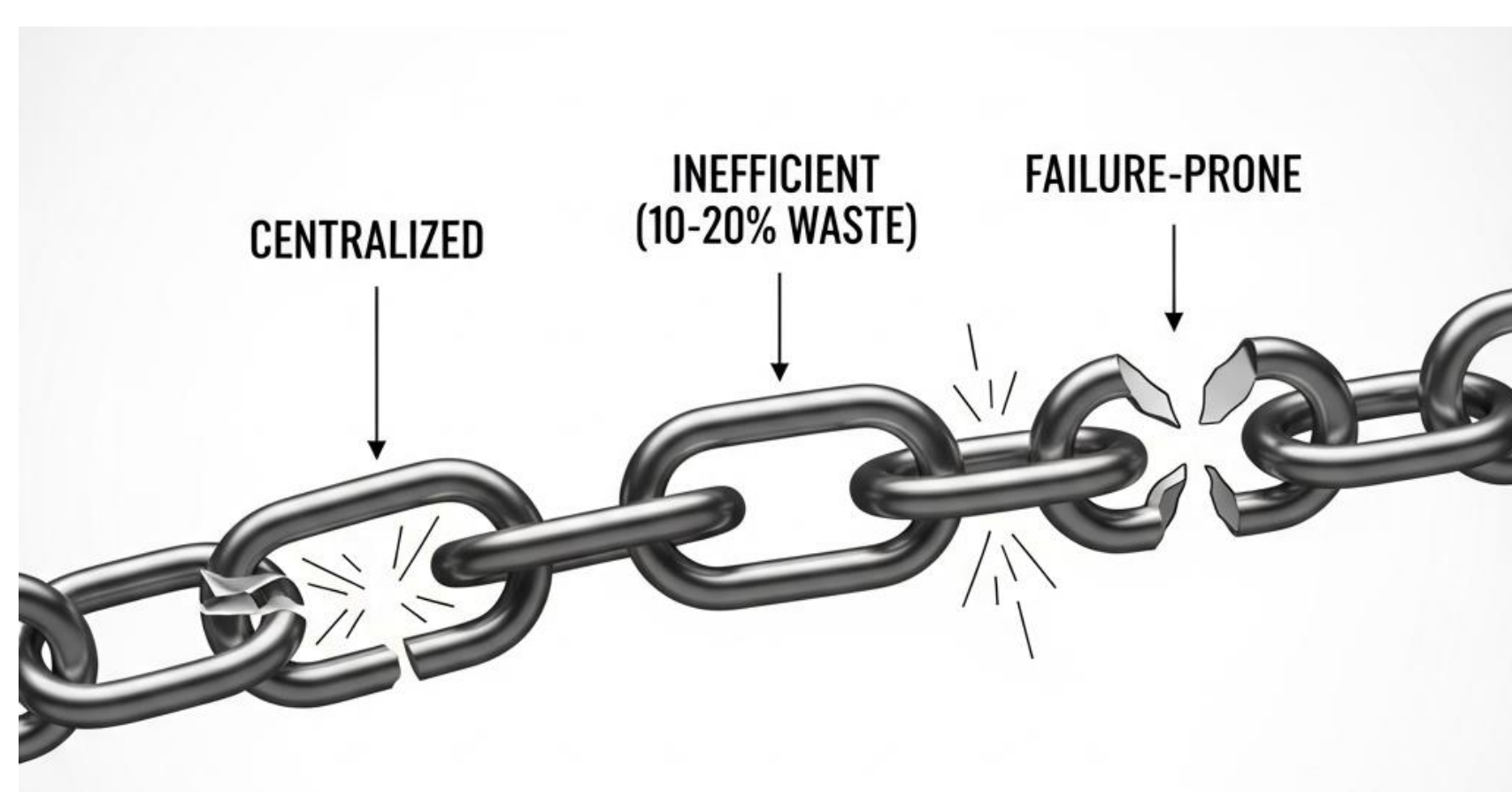


Enabling Petawatt AI Clusters with Real-time Energy Routing (RER)



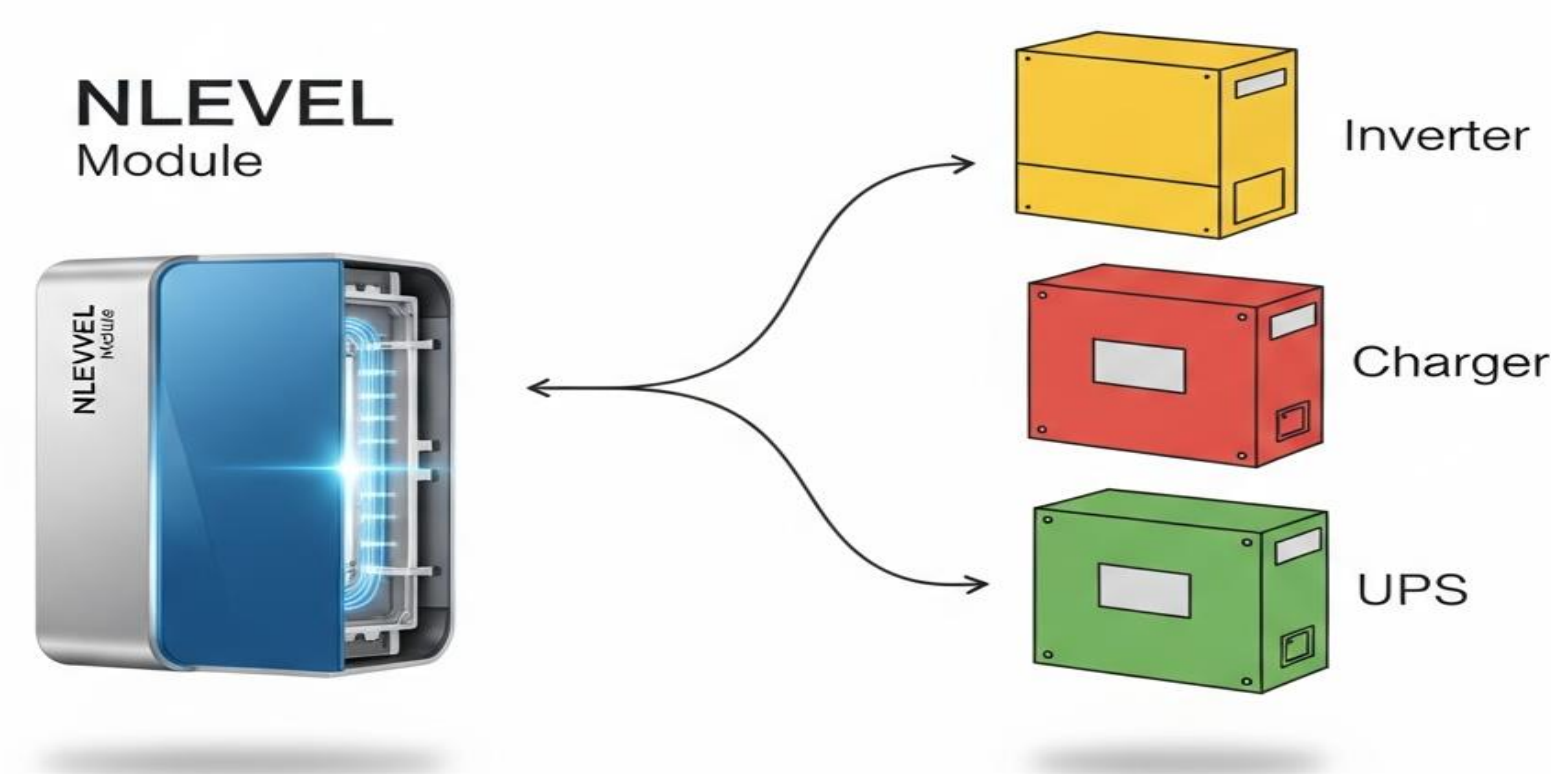
THE CRISIS: THE POWER WALL

- The "Power Wall": Traditional monolithic AC-UPS-DC chains cannot scale to meet the 1MW+ requirements of next-gen AI racks.
- Legacy Inefficiencies: Multiple conversion stages degrade PUE and increase heat dissipation.
- Single Points of Failure: Centralized UPS and switchgear create systemic vulnerabilities for mission-critical GPU clusters.
- The Bottleneck: Exponential AI growth is currently throttled by rigid, analog power distribution.



THE SOLUTION: REAL-TIME ENERGY ROUTING

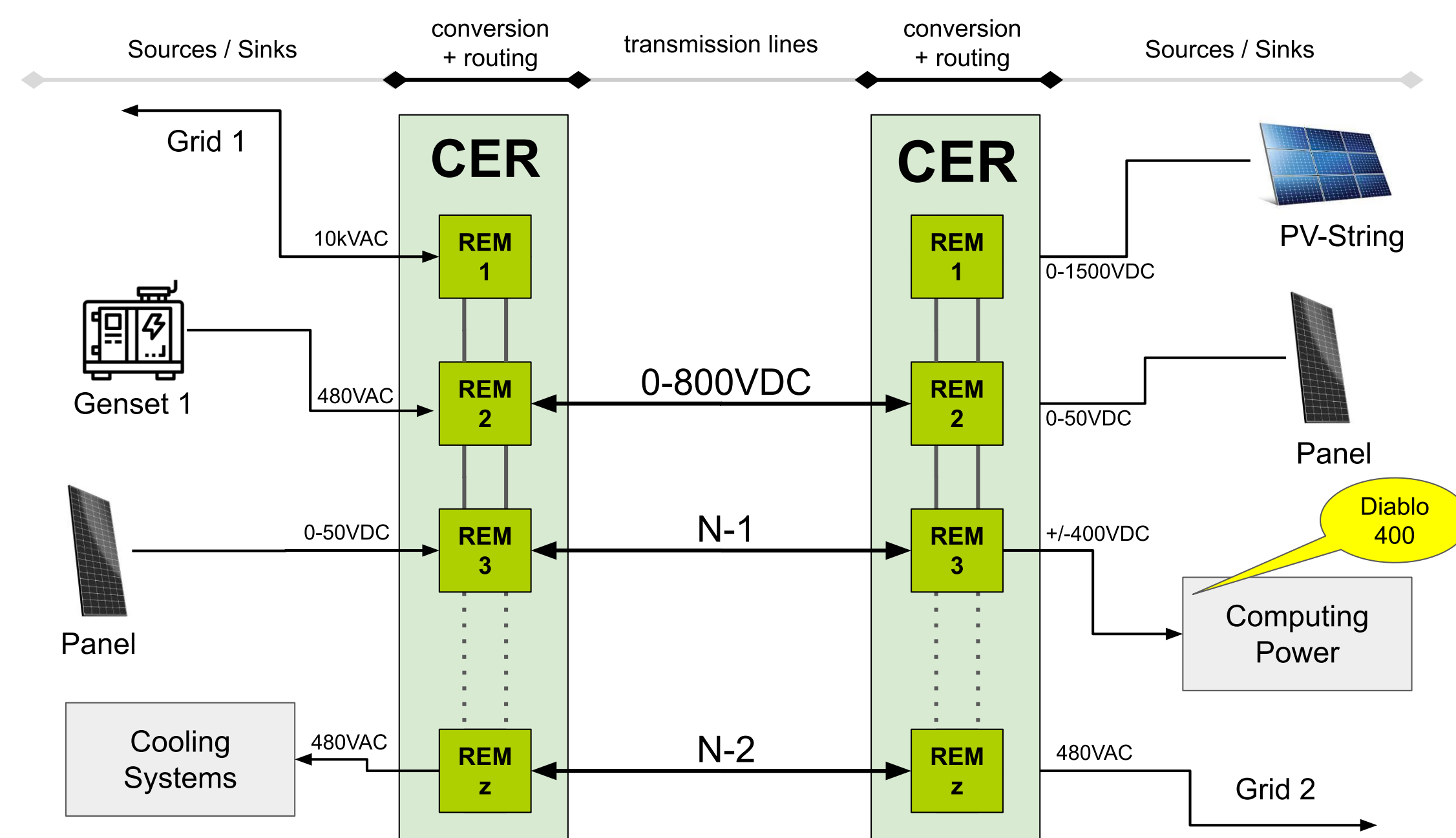
- Energy Block Stream: Electricity is treated as addressable, time-aware "packets" (Energy Blocks) routed through a software-defined grid.
- Real-time Energy Modules (REM): Standardized, intelligent hardware units acting as energy routers to dynamically synthesize waveforms.
- Chassis Energy Routers (CER): Aggregated REMs manage bidirectional flows between grid, batteries, and loads without external inverters.
- In-Band Telemetry: The power line itself is used for communication, eliminating complex external data cabling for monitoring.



OCP IMPACT & SUSTAINABILITY

- Rack & Power: Enables 1MW+ density by delivering power directly adjacent to the silicon (Motherboard Energy Routers).
- Facility Simplification: Radical reduction of "Gray Space" by eliminating HVDC cabinets, central UPS, and ATS.
- Sustainability & Circularity: Storage-Agnostic: Seamlessly mix new and "Second-Life" batteries of different chemistries; Lossless Integration: Direct connection of DC sources (Solar/Wind) with >95% Round-Trip Efficiency.
- Deterministic Performance: "Energy QoS" guarantees power delivery with specific latency parameters for AI workloads.

RER-Architecture



Commitment

- Open Standard: Formal submission of RER specifications to OCP working groups.
- FRAND Licensing: Foundational patents licensed under Fair, Reasonable, and Non-Discriminatory terms.
- Multi-Vendor Ecosystem: Open-source reference firmware and hardware IP-Cores to foster innovation and prevent vendor lock-in.

RER Ecosystem

