

Medium Voltage UPS

5MW to 50MW+
4.16kV to 34.5kV



MV UPS Series connected power conditioning device

MV UPS is a high-performance, high-efficiency power-conditioning and uninterruptible power supply built on an advanced line-interactive architecture.

It protects critical loads from a broad spectrum of utility voltage events while delivering continuous, clean power.



Efficiency	>98%
Fault clearing capability	> 450% of rated current
Dynamic response	Equivalent to LV double-conversion UPS — surpasses the ITIC curve
Input power smoothing	Fully compliant with utility and slow-ramp distributed generation (e.g., gas turbines) dynamic load requirements
Load profile compatibility	Optimized for both industrial and AI data center load profiles
Energy storage autonomy	Scalable from seconds to multiple hours

Increasing demand for Quality Power



Limitations of Conventional Solution



Grid Disturbances & Power Fluctuation



- Deliver conditioned, stable voltage to downstream solid-state transformers (SST) and/or conventional transformers.
- Buffer AI and industrial load power transients, presenting a smooth, predictable power profile to the upstream grid or distributed generation source.
- Provide seamless bridge power during transitions between grid and distributed generation, eliminating transfer interruptions.
- Deliver ancillary grid services on demand, including compliance with ERCOT large-load voltage ride-through requirements.
- Supply high magnitude fault-clearing current to clear downstream faults and maintain system continuity.



APPLICATIONS

Semiconductor | Data Centers
Pharmaceutical | Industrial
Critical Infrastructure



STANDARDS

SEMI F47 | ERCOT Guideline
IEC 62040-3 Class 1
ITIC Requirements



PERFORMANCE

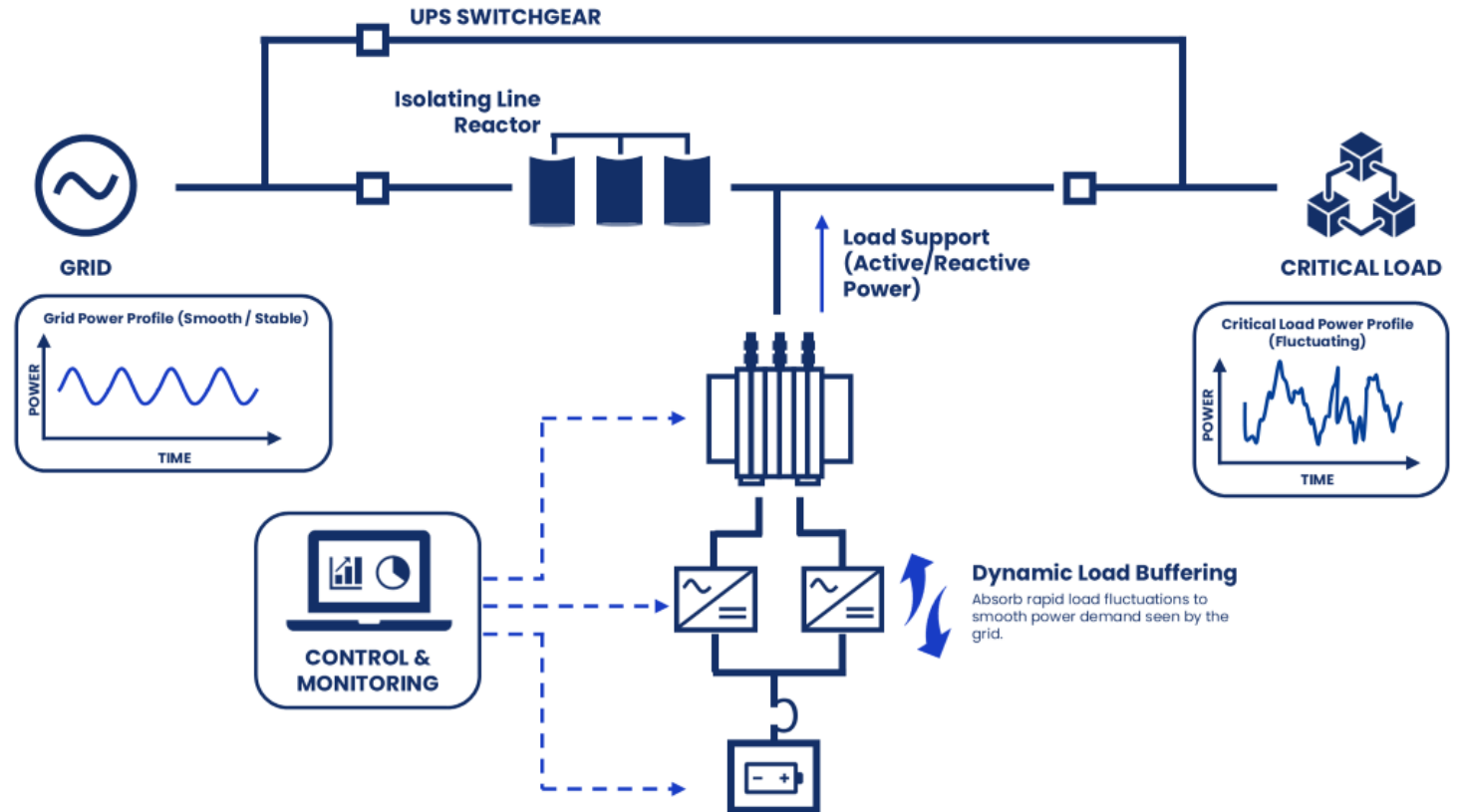
Fast Response (ms)
High Efficiency
Fully Scalable



GLOBAL SUPPORT

Proactive Engineering
Regional & Global Support

- Isolating line reactor decouples the system from the utility grid.
- High-performance power converters continuously condition and filter upstream disturbances without engaging the energy storage.
- Exceptional availability and class-leading efficiency achieved.
- Output voltage quality matches that of leading low-voltage double-conversion UPS systems.
- Compatible with a broad range of modern energy storage technologies including ultracapacitors and LFP batteries.



The MV UPS delivers continuously regulated output voltage to the load, independent of upstream utility conditions. It maintains tight output regulation across the full range of load power factors and input voltage disturbances, achieving output quality fully consistent with LV double-conversion UPS standards. The system exceeds ITIC ride-through requirements and provides continuous clean power, all while sustaining the system efficiency in the 98% range.

By presenting a clean, stable and predictable load profile to the utility or distributed generation, the system supports grid-integration requirements and mitigates constraints common in distributed or weak-grid environments.

LINE-INTERACTIVE POWER PATH



Utility or generator remains the primary source of load power during normal operation.

DYNAMIC POWER SUPPORT



Converters provide active and reactive power support through the coupling transformer.

GRID-FRIENDLY OPERATION



Dynamic load buffering reduces rapid load variations transferred to the upstream network.

ENERGY STORAGE INTEGRATION



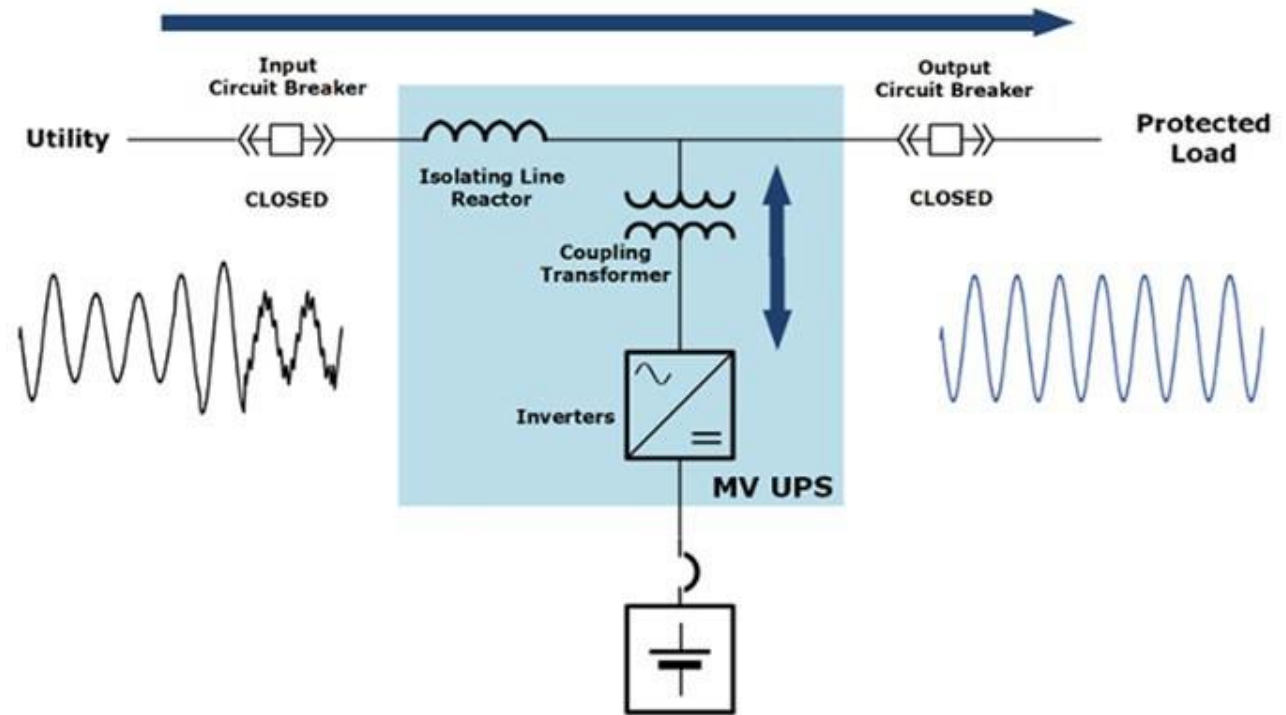
BESS supports ride-through, transient load demand and extended backup operation.

Power Conditioning Mode

During power conditioning mode, the power converters actively regulate both real and reactive power flow from the utility to the load, without engaging the energy storage system, eliminating unnecessary cycling and preserving storage capacity for when it matters the most.

Simultaneously, the MV UPS continuously conditions the incoming supply, filtering upstream disturbances before they can propagate to the protected load.

Dynamic reactive-current support is provided in real-time, ensuring stable, high-quality voltage delivery under all load conditions.

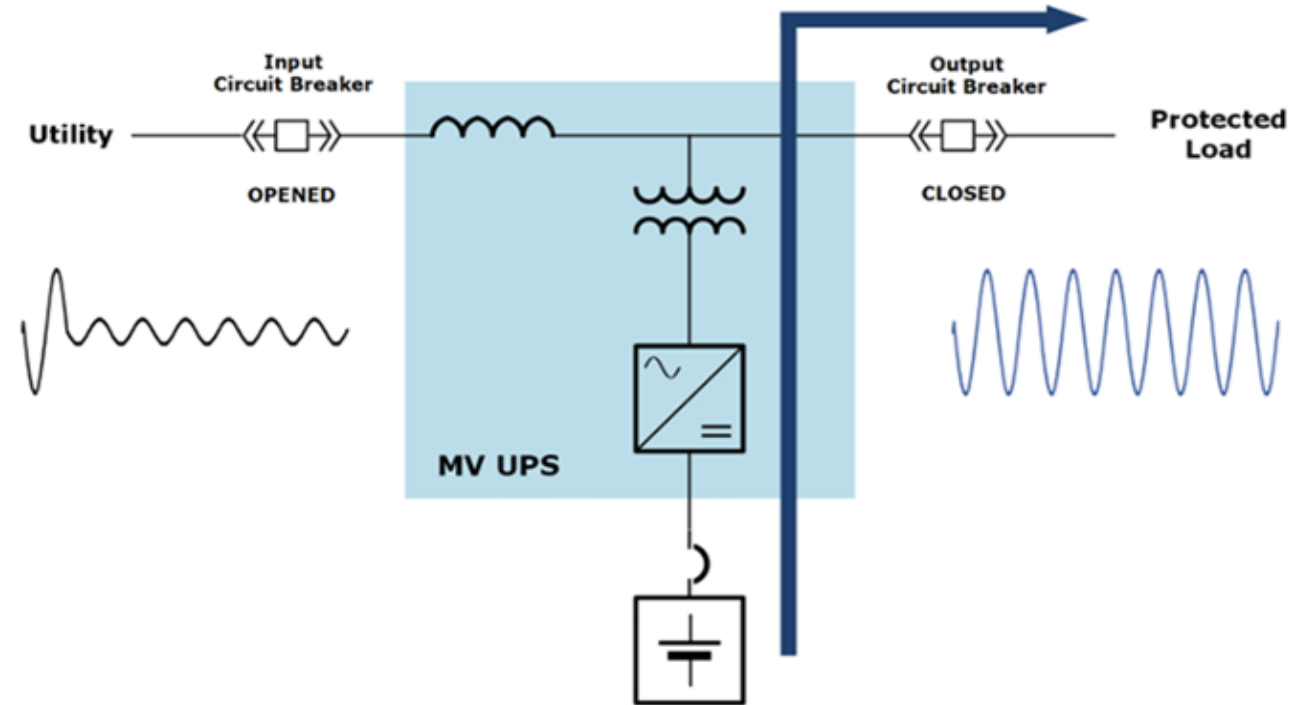


Energy Storage Mode

If the utility power becomes unavailable, the MV UPS immediately opens its input breaker and transitions the load to the energy storage system without interruption, entering energy-storage mode.

The transfer is seamless and imperceptible to the protected load. Output voltage regulation is maintained continuously throughout.

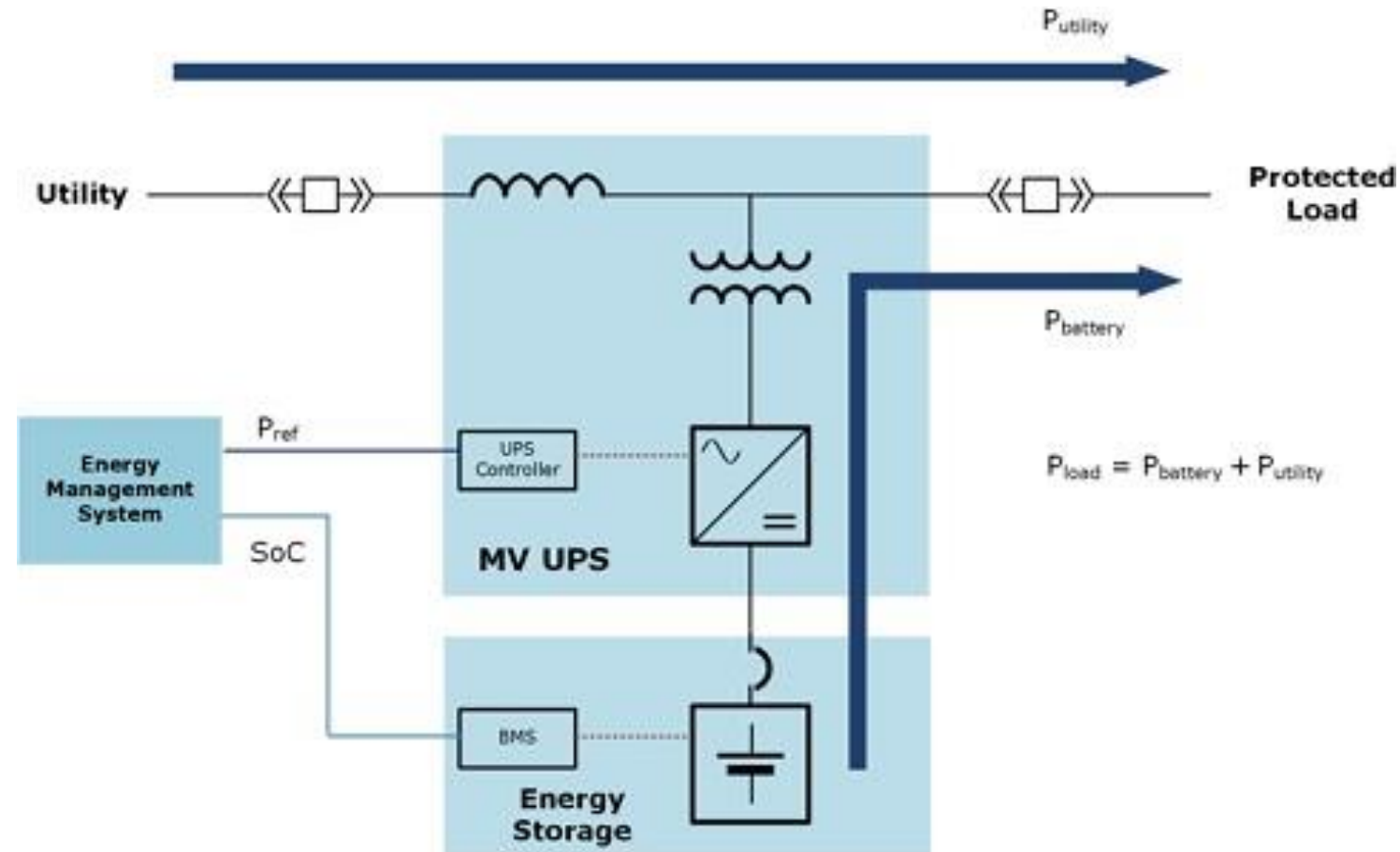
Stored energy then sustains the critical load for the required ride-through duration, bridging the gap until utility voltage is restored or an alternative source, such as a diesel generator, is brought online, synchronized and ready to assume the load.



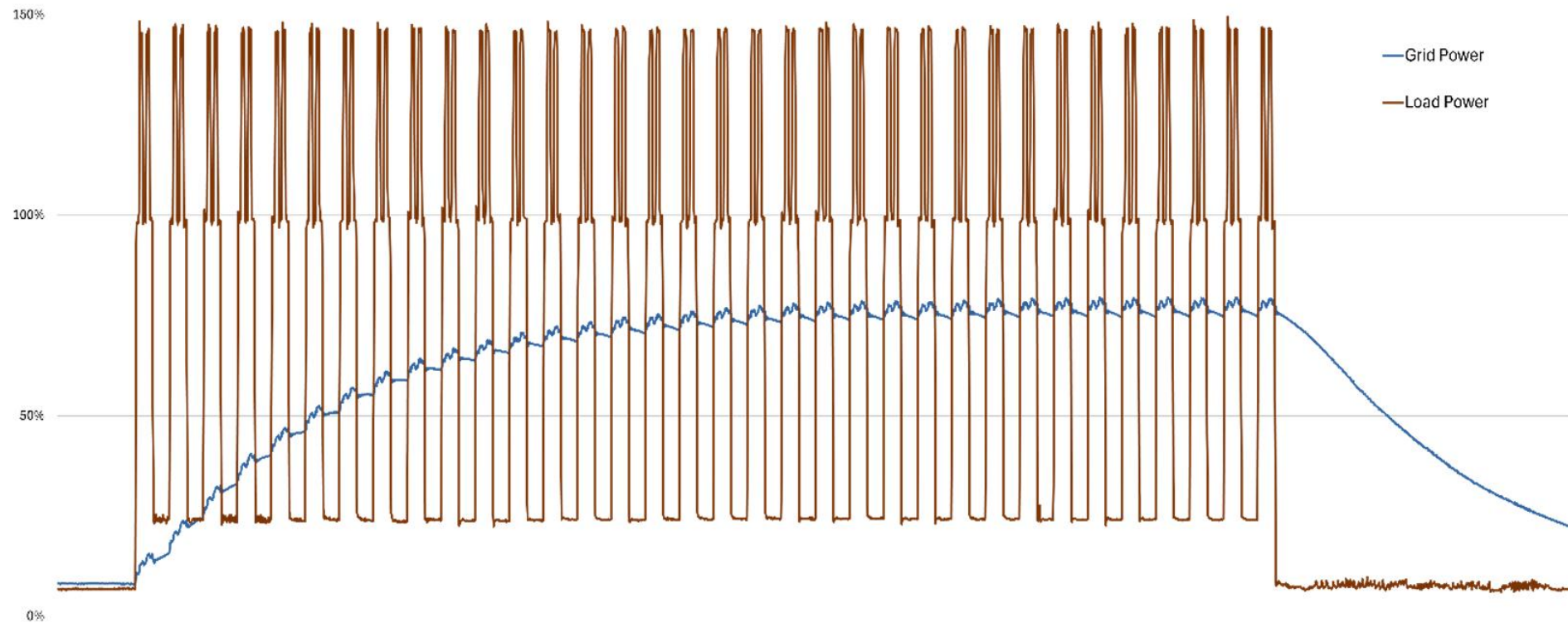
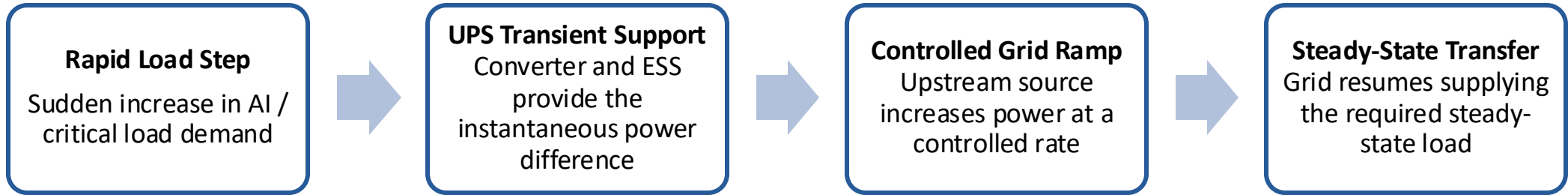
The MV UPS can interface with an external Energy Management System (EMS) to support functions beyond primary power-quality protection.

Through coordinated control of the integrated energy storage system, the unit may be utilized for peak shaving, demand management, and renewable energy integration, depending on the applicable system configuration and site requirements.

For peak-demand management, stored energy can be dispatched to reduce the maximum power drawn from the upstream source and smooth short-duration load variations.

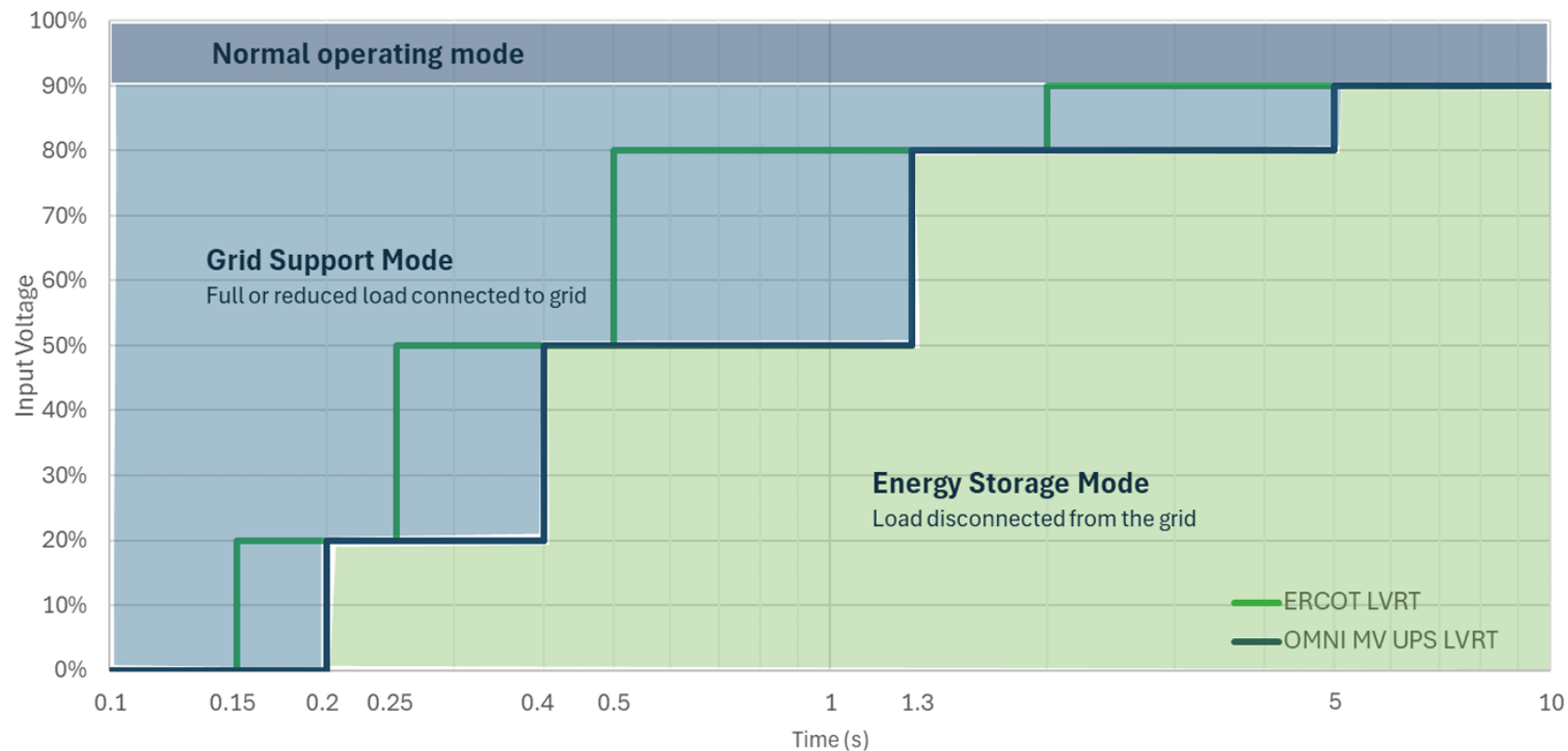


Dynamic Load Buffering



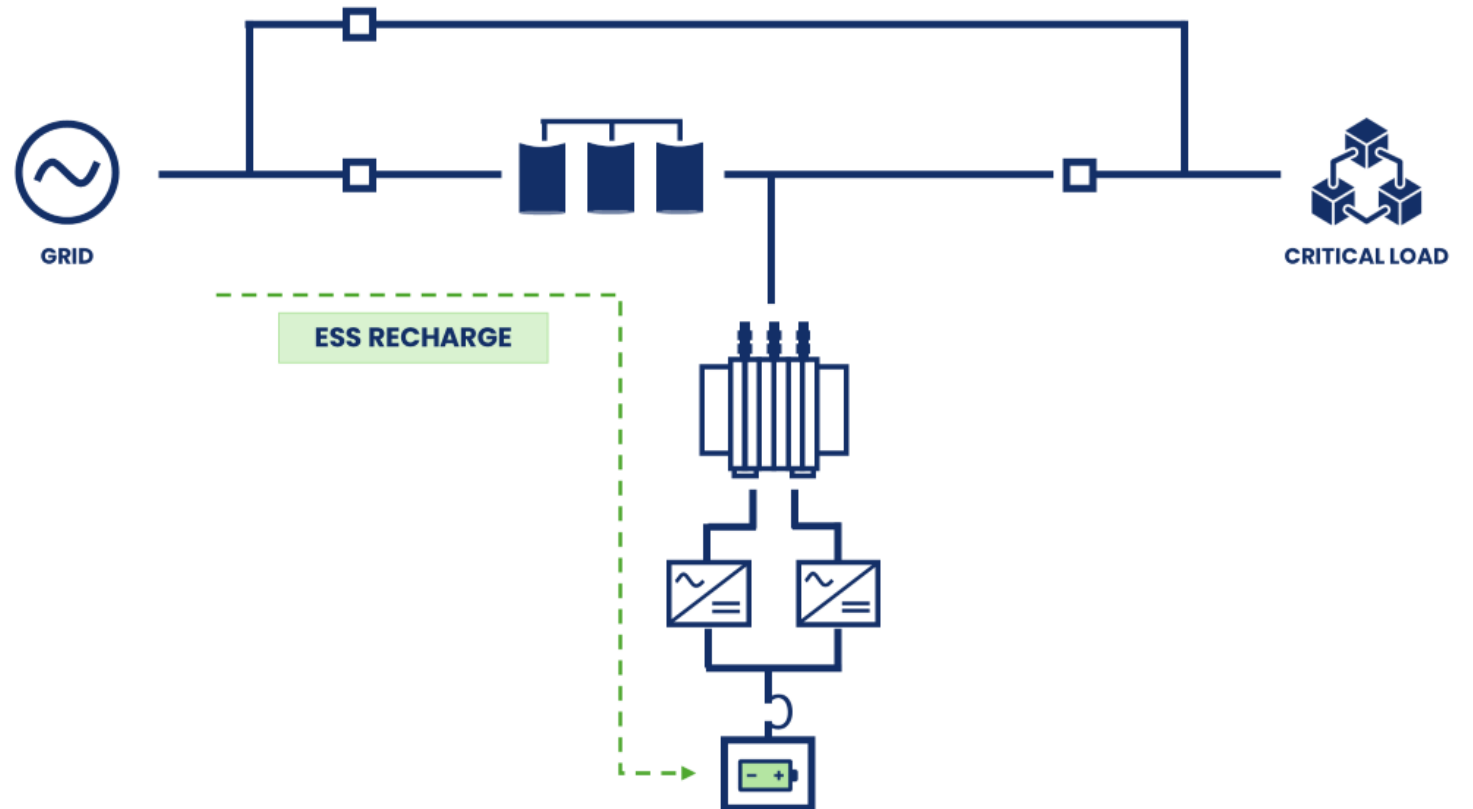
During grid disturbances, the UPS operates in grid support mode, maintaining full or partial load connection to the utility grid instead of immediately disconnecting the facility.

The system ride-through performance exceeds current ERCOT Large Load (LL) voltage ride-through curve requirements, providing significant operational margin for future and evolving grid compliance standards.



After the disturbance:

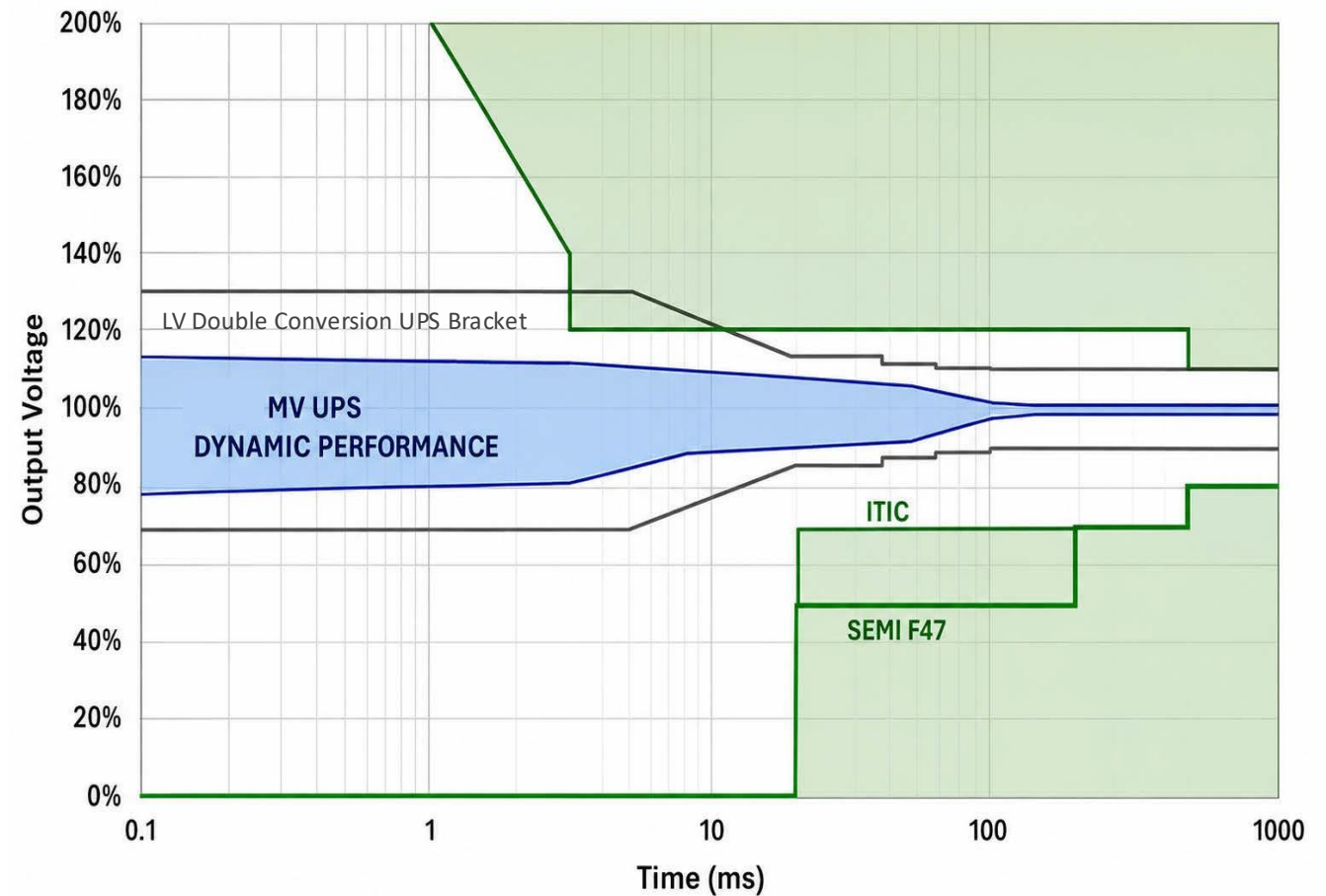
- Grid stabilises.
- Converter support reduces.
- Normal operating condition resumes.
- ESS recharges



Dynamic Performance

The MV UPS is designed to provide high-speed dynamic response during upstream grid disturbances and rapid load variations, while maintaining continuous online operation with no transfer interruption. The system regulates the protected output voltage during severe utility events and large transient load steps, supporting load ride-through performance consistent with requirements such as **ITIC** and **SEMI F47**.

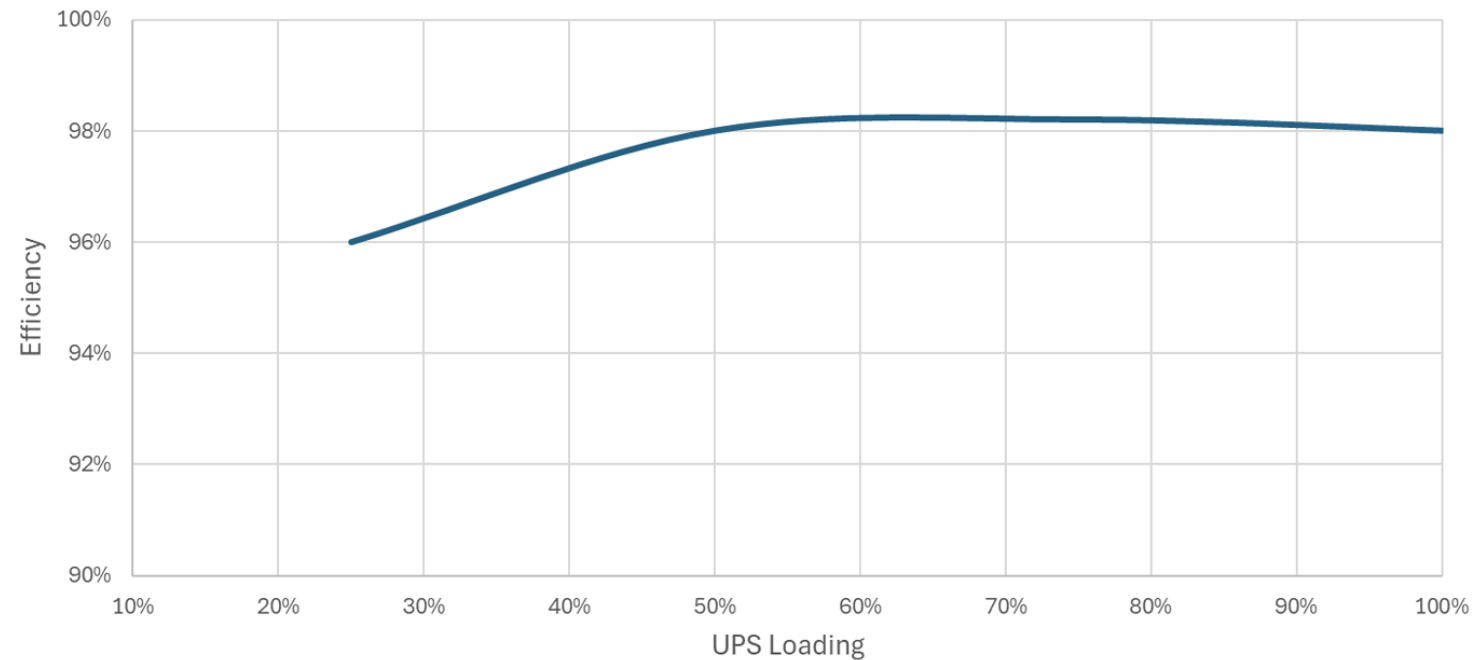
Its dynamic response is comparable to, and where demonstrated may exceed, that of conventional low-voltage double-conversion UPS systems designed to IEC 62040-3 Class 1 performance, while extending similar power-quality capability to medium-voltage, multi-megawatt applications.



Efficiency

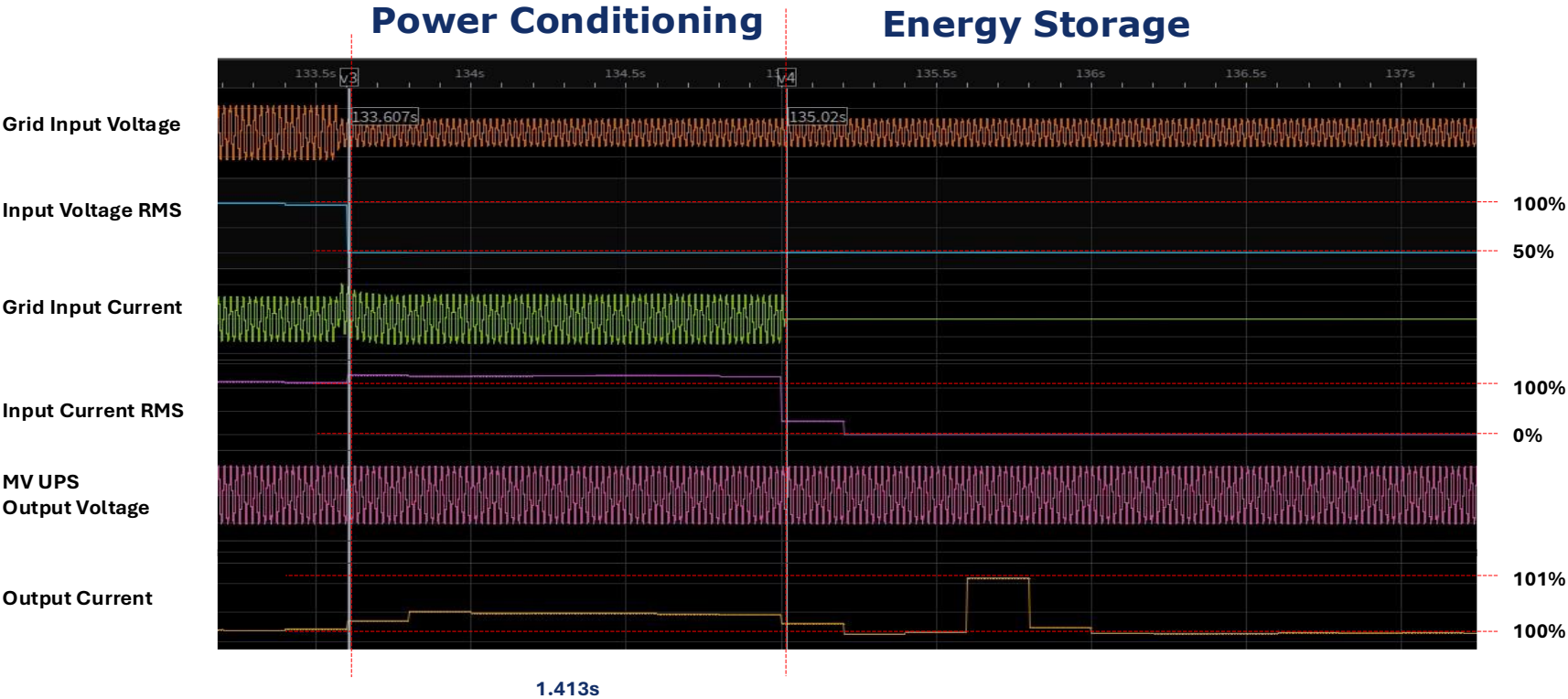
The MV UPS delivers industry leading efficiency of up to 98% across a wide operating range, substantially reducing operational losses compared to traditional LV double-conversion UPS systems. Compared to alternative medium voltage backup technologies, the system provides dramatically lower energy losses, resulting in significant reductions in operating costs.

Designed as a fully outdoor-rated solution, the MV UPS eliminates dedicated UPS HVAC infrastructure, reducing parasitic cooling losses and further improving overall facility efficiency and PUE for large-scale AI, HPC, and mission critical applications.



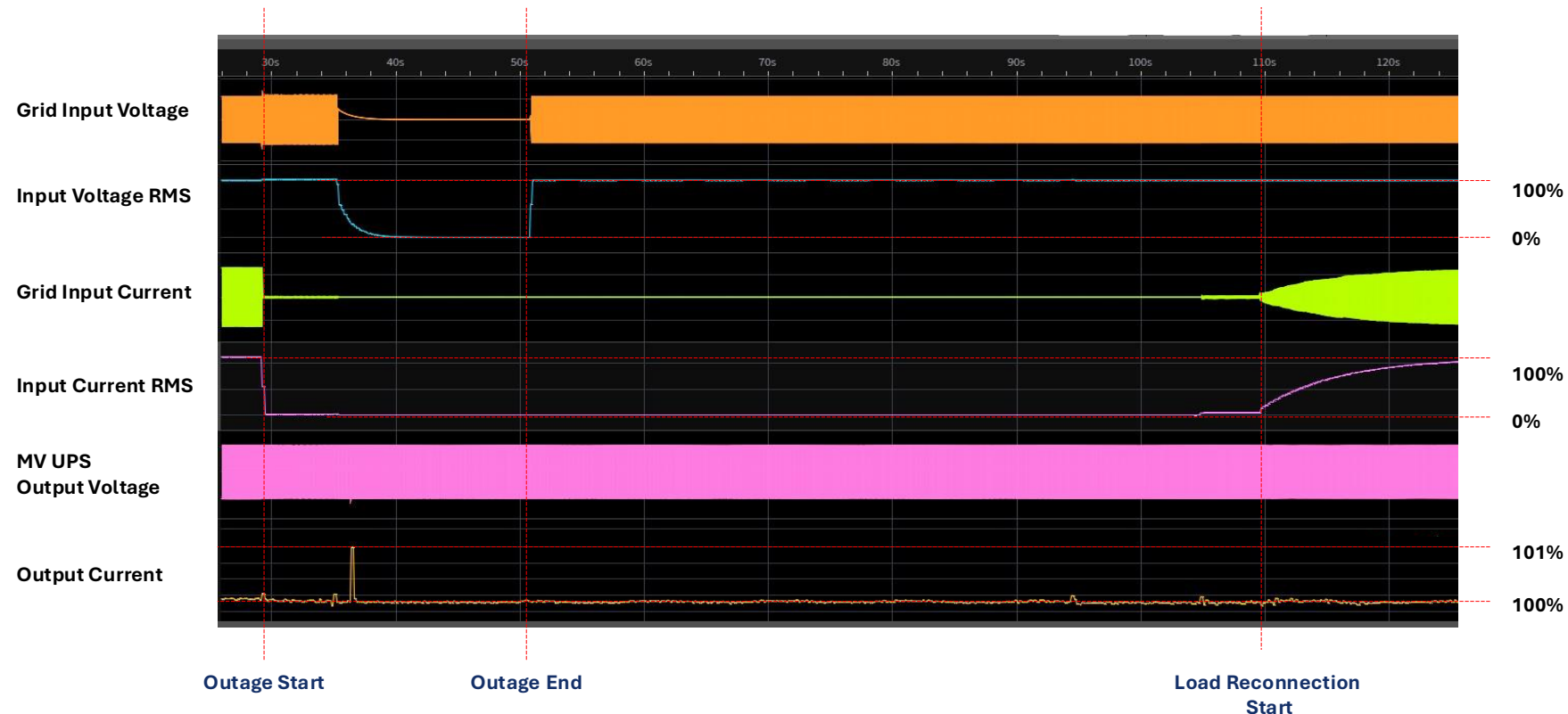
Power Conditioning

The MV UPS is designed to maintain protected output voltage without observable interruption. During one testing, Voltage regulation is sustained for approximately 1.413 s, after which the Energy Storage System provides additional power support as required. The transition occurs without a corresponding disturbance in the protected output voltage.



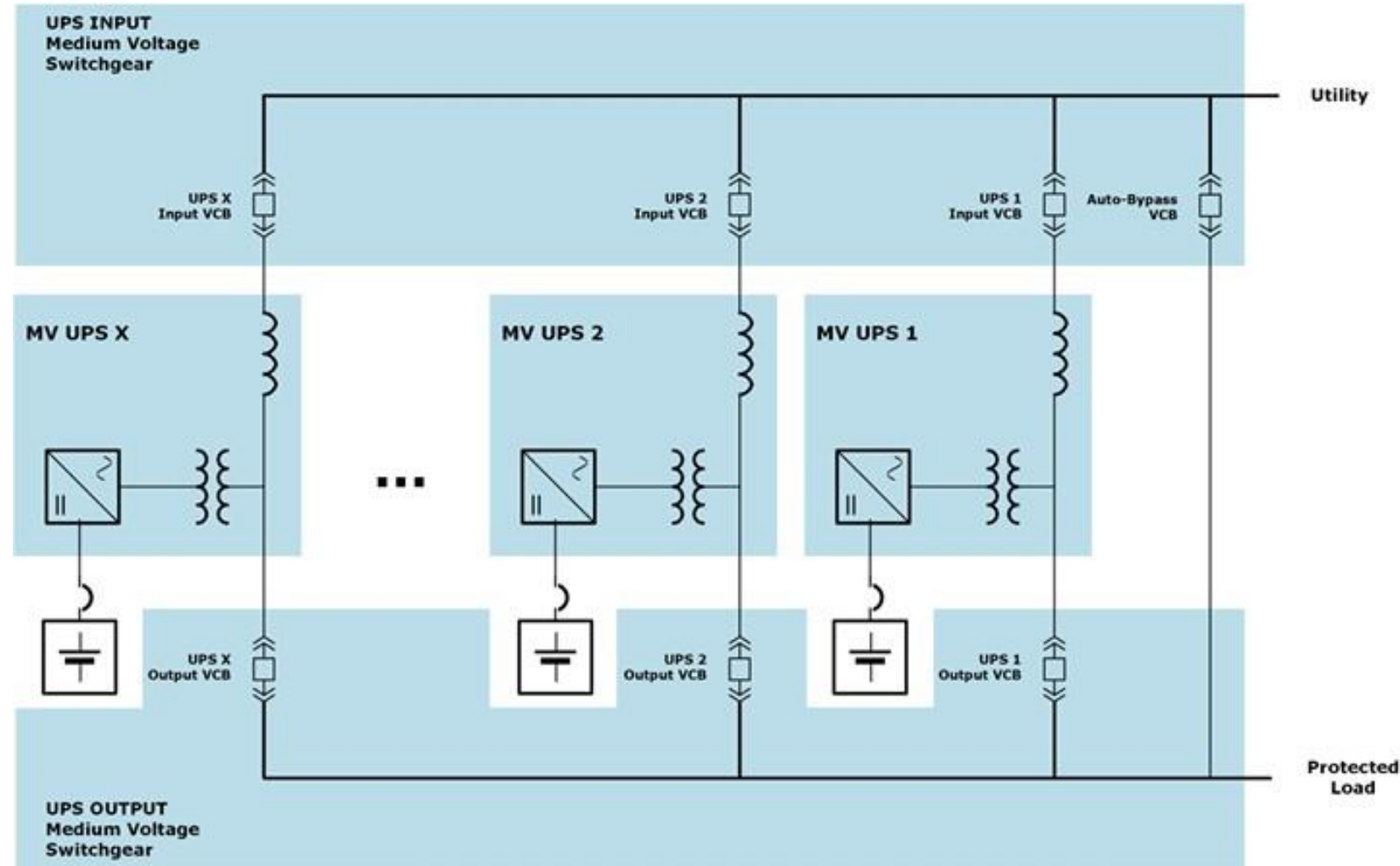
Supply Failure & Recovery Response

In one recorded event, an outage of approximately 20 seconds occurred. The output voltage remains regulated throughout with no observable interruption at the load. After restoration and synchronization of the utility source, the input current progressively ramped back to its steady-state level following synchronization.



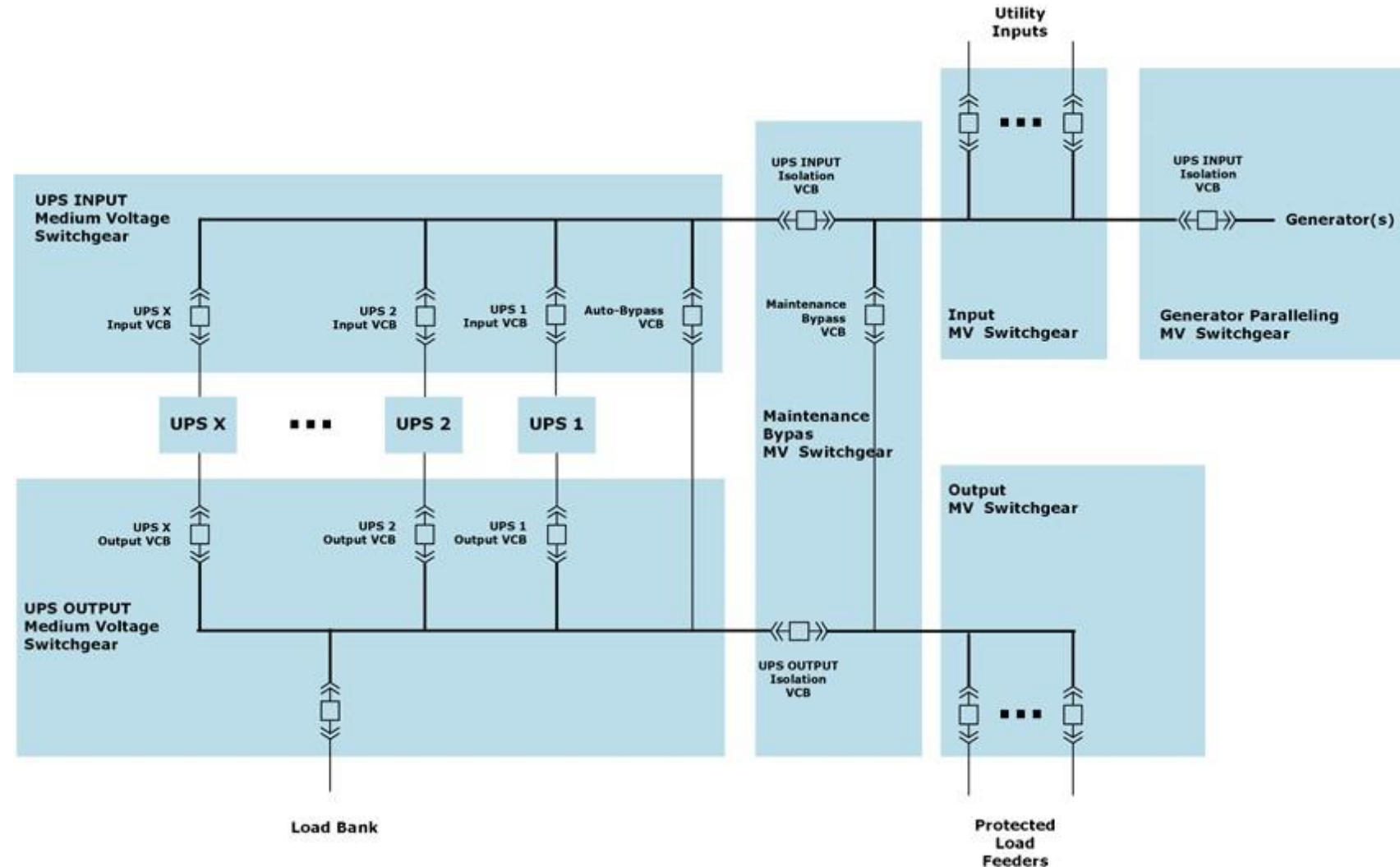
Parallel System Configuration

- ✓ Multiple units can be connected in parallel to scale total system capacity beyond 50MW.
- ✓ Natively supports any redundancy tier (from N+1 to full 2N) without requiring additional switchgear or bypass infrastructure.
- ✓ Equally suited to cost-optimized deployments and mission-critical applications demanding the highest levels of availability.

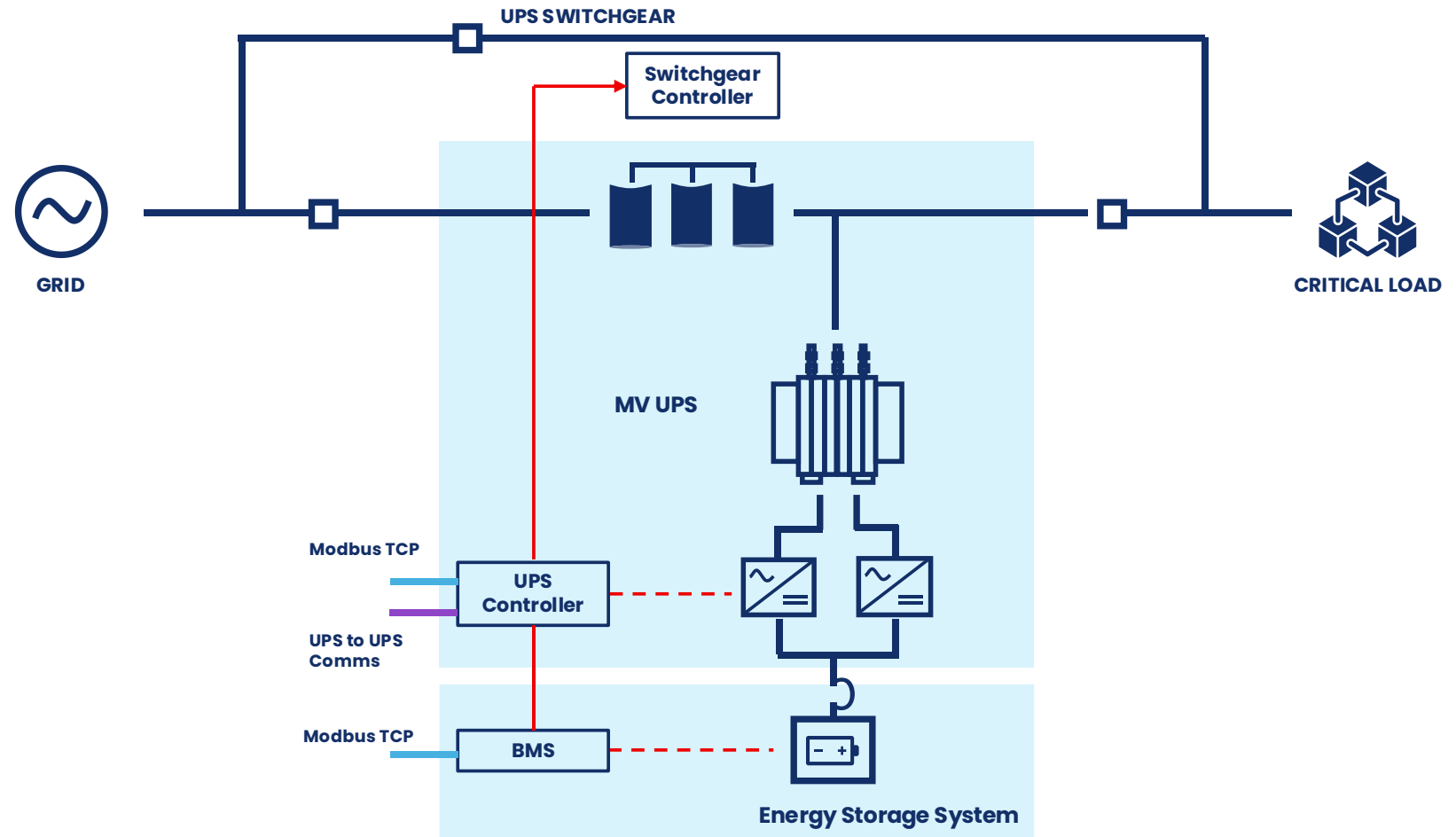


Large-Scale / Dedicated Electrification Architecture

- ✓ Standard MV UPS project built around a core system rated up to 50MW or beyond.
- ✓ Seamlessly integrated with the site's Balance of Plant electrical infrastructure.
- ✓ Can extend further to encompass comprehensive MV generator-paralleling switchgear, enabling fully integrated islanding, generation dispatch and source transfer within a single, cohesive electrical system.



- ✓ The MV UPS incorporates a coordinated monitoring and control architecture for integration with the associated medium-voltage switchgear and Energy Storage System.
- ✓ UPS controller interfaces with the MV switchgear control system to coordinate required switching functions
- ✓ Modbus TCP is used as the primary communication interface



Technology	Voltage Sag Support	Active Power	Reactive Power	Energy Storage	Load Ride-Through
Passive Reactor	Limited	No	No	No	Limited
STATCOM	Yes	Normally No	Yes	Normally No	Limited
ESS + PCS	Possible	Yes	Yes	Yes	Depends on architecture
Conventional UPS	Yes	Yes	Yes	Yes	Yes
MV UPS Architecture	Yes	Yes	Yes	Optional/Yes	High

System Data		
Rated Voltage	4.16 kV to 34.5 kV	Application Specific Voltage
Rated Power	5MVA, 5MW	Single Unit
System Max Rated Power	50MW+	Parallel Operation
Performance		
Efficiency	>98%	
Dynamic Output Performance	In line with LV double conversion UPS (IEC62040-3 Class 1) Surpassing the ITIC requirements Surpassing the SEMI F47 requirements	Full online, no transfer time
Architecture	Advanced Line Interactive	
Output		
Steady State Voltage Variation	±1%	
Rated Frequency	50Hz or 60Hz	
Frequency Accuracy	±0.1%	ES mode only
Maximum Fault Clearing Current	>450%	

Interface		
System Display	12" Touchscreen Display	
Communication	Ethernet Modbus TCP	
Hardwired Interface	Digital Inputs Relay Outputs	

MV Switchgear		
Type	Air Insulated or Gas Insulated	Manufacturer Agnostic
IEDs	[No Title]quired by UPS and System Protection	IED Manufacturer Agnostic
Instruments	VCBs, PT, CTs, Sas, for the MV UPS portion	As per the UPS engineering requirements

Energy Storage		
Type	LFP, Ultracapacitors	Manufacturer Agnostic
Autonomy	Seconds to Hours	Project Specific
Rated Voltage	< 1500VDC	
Dimension (LxWxH)	One or multiple 20'L x 8'W Containers	Application Dependent

General Information		
Dimension (LxWxH)	40' x 8' x 8'	Single UPS 5MVA Unit Outdoor NEMA3R
Weight	39T (86000lbs)	

Thank You.

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