

MV-UPS | MEDIUM VOLTAGE UNINTERRUPTIBLE POWER SUPPLY

Load decoupling where it matters



The MV-UPS solution directly addresses the grid stability challenges faced by energy intensive industries by combining medium voltage power electronics with integrated energy storage to decouple critical operations from grid instability. The MV-UPS creates a stable electrical “island” for the load while maintaining a controlled, predictable interface with the utility grid.

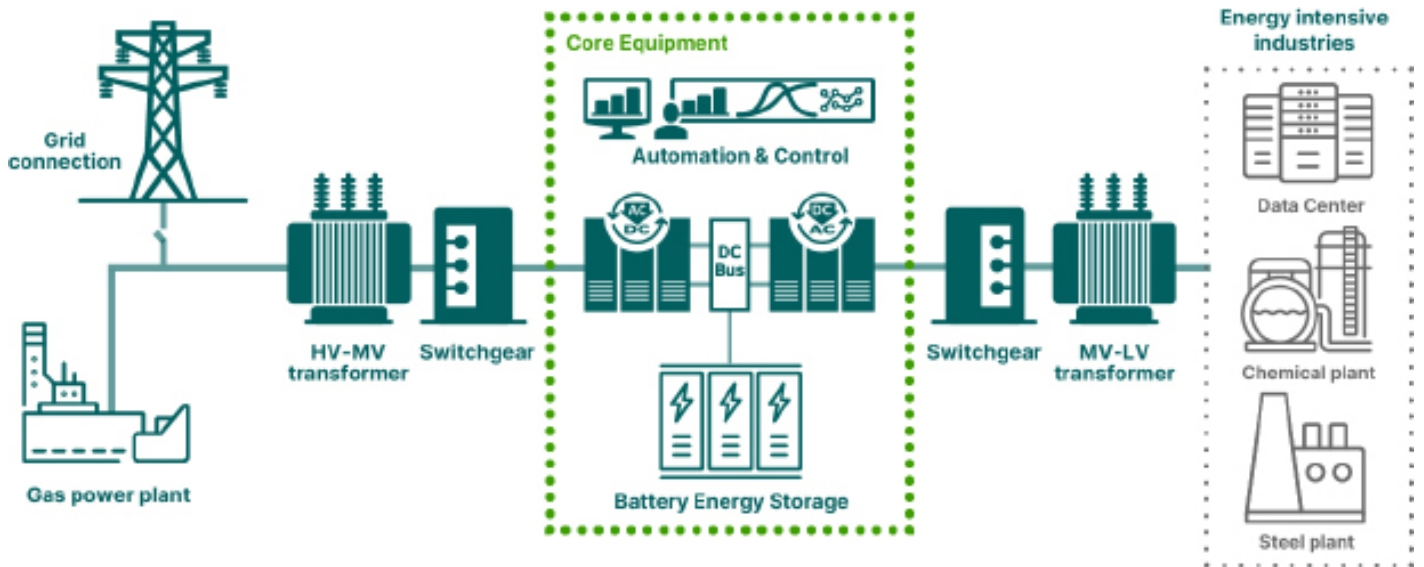
On the grid side, the MV-UPS precisely regulates how much active power is drawn from the network, ensuring compliance with contractual and grid code requirements. On the load side, it operates in grid forming mode, delivering a stable voltage and frequency regardless of grid disturbances or rapid load changes. Integrated batteries dynamically absorb or inject power, instantaneously balancing the difference between grid input and load demand.

This architecture enables near instantaneous response to load steps, smooths power swings, provides fault ride through, and protects sensitive processes from voltage dips and frequency events—allowing energy intensive industries to operate reliably, efficiently, and with confidence in an increasingly unstable grid environment.

GRID STABILITY CHALLENGES

Energy intensive industries such as data centers, AI factories, metals, chemicals, and advanced manufacturing are facing unprecedented grid stability challenges. Electrification, digitalization, and high density processes are driving rapid growth in power demand, often faster than grid infrastructure can be reinforced. At the same time, these facilities exhibit highly dynamic load profiles, with sharp ramp rates and frequent power swings that stress transmission and distribution networks.

In modern operations—particularly AI driven and digitally controlled processes—power demand can fluctuate dramatically within seconds. These fast variations can lead to voltage instability, poor power quality, and increased exposure to grid disturbances. As grid operators tighten connection requirements and enforce ride through, ramp rate, and power quality constraints, industrial operators face growing risks of curtailment, penalties, or unplanned downtime. Aging grids, congestion, and the rising share of intermittent renewable generation further compound these challenges, making stable and predictable power supply a critical business concern.



KEY FEATURES

- **Medium voltage UPS with integrated energy storage** – Delivers uninterrupted, high quality power while decoupling critical loads from grid instability.
- **Grid forming output with independent voltage and frequency control** – Ensures stable operation during grid disturbances, faults, or islanded conditions.
- **Predictable and compliant grid interaction** – Precisely controls power drawn from the grid, reducing exposure to curtailment, penalties, and grid constraints.
- **Ultra fast response to load fluctuations** – Absorbs sharp power swings and ramp rates in real time, protecting sensitive processes.
- **Built in fault ride through and power quality protection** – Shields operations from voltage dips, frequency events, and grid faults.
- **Resilient, scalable architecture for mission critical loads** – Supports multi MW industrial, data center, and AI applications with high availability and future proof design.

CUSTOMER BENEFITS

The MV-UPS unlocks new levels of grid flexibility and operational efficiency for energy-intensive industries through its advanced power management capabilities:

Peak shaving

- Dynamically absorbs and releases power to flatten demand spikes
- Reduces exposure to high-price periods and curtailment penalties

Load shedding

- Intelligently disconnects non-critical loads during grid stress events
- Maintains critical operations while supporting grid stability and avoiding interruptions

Load shifting

- Moves energy consumption to lower-price, off-peak hours
- Leverages renewable generation surpluses for cost optimization

These capabilities optimize energy costs, enhance grid compliance, and improve operational resilience for energy-intensive industries.

Compared with traditional BESS Shunt technology, the MV-UPS solution offers:

- **100% decoupling between** grid dynamics and load dynamics (DC bus),
- **100% load voltage regulation** (grid forming),
- **100% grid support functions availability** (dedicated grid converter):
 - P load decoupled from grid frequency,
 - Full reactive power capability (Q load decoupled from Q grid),
 - Full grid VRT/FRT capability,
- **Load immunity** from:
 - HVRT/LVR and FRT,
 - Grid transient OV,
- **Grid immunity** from datacenter side fault,
- **Superior control bandwidth** for fast ramp,
- **Fewer 150 MW units to synchronize.**

TECHNOLOGY

CONVERTER

Type	Voltage Source Converter
Topology	MMC back-to-back
Operation	4 quadrants - Bidirectional
AC input voltage	34.5 kV +/- 10%
AC input frequency	50/60 Hz +/- 2%
Power	185 MVA
Power factor range	0-1
AC output voltage	34.5 kV
AC output frequency	50/60 Hz
Converter efficiency	98.5%

CONVERTER FUNCTION

Islanded mode	
Gas turbine soft starter	0-100% speed
Gas turbine frequency control	50/60 Hz
Black start	0-100% speed

Grid tied mode	Load side
Voltage ride through	Voltage regulation
Frequency ride through	Frequency regulation
Reactive power control	Active filtering
Power factor control	Power damping

VALUE STREAM COMPATIBILITY

Load shedding
Frequency response
Voltage support
Reactive power support
Demand Response

Depending on your plant configuration and specific operational requirements, GE Vernova can offer **tailored solutions to ensure grid stability and optimize power quality.**

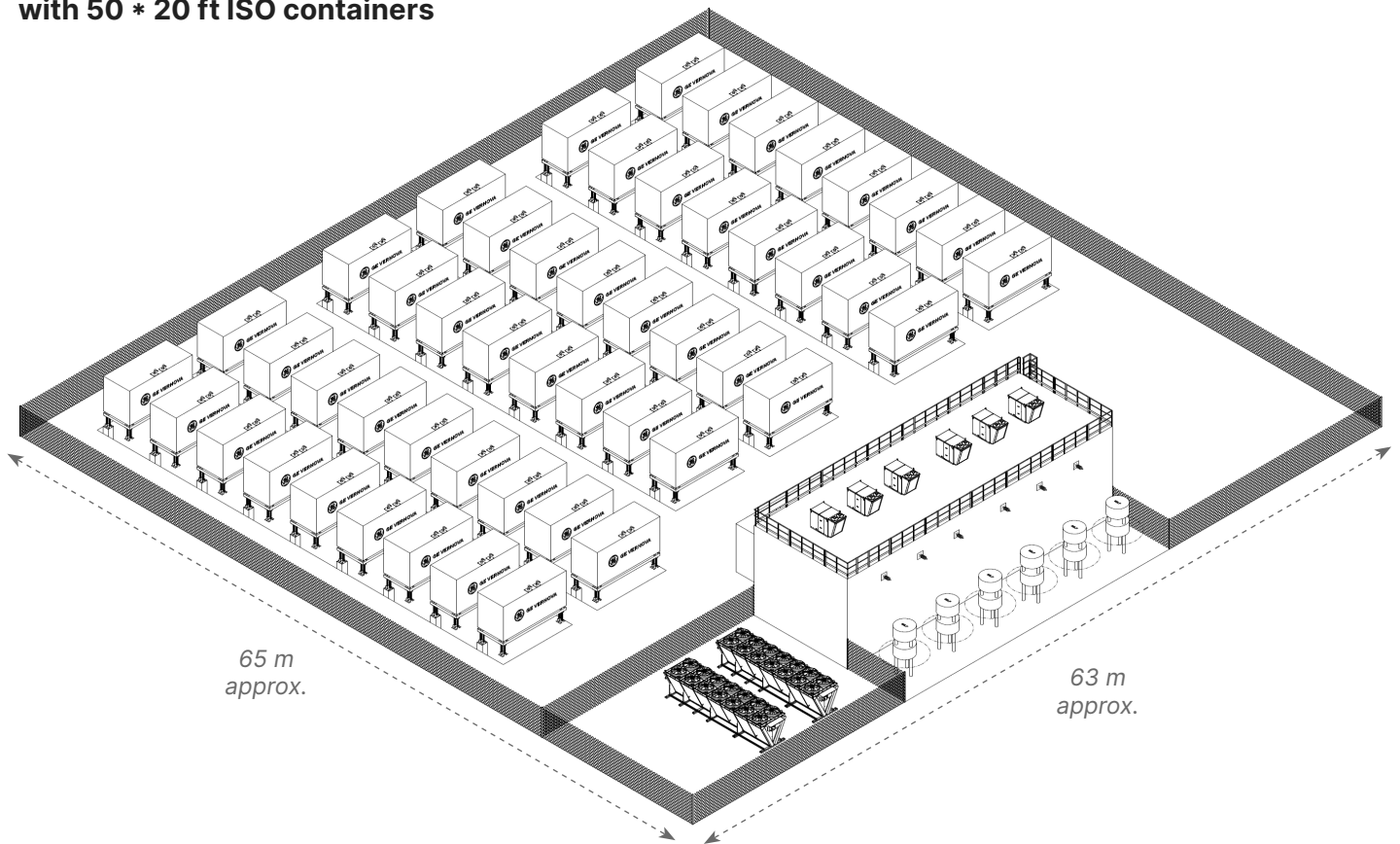
Our **E-STATCOM** combines our latest generation of Modular Multilevel Converters with a Battery Energy Storage System (BES), providing dynamic reactive power support and fast voltage regulation.

For more complex stability challenges, we also offer **hybrid solutions** that integrate multiple Flexible AC Transmission System (FACTS) devices. These solutions are designed to meet critical technical requirements—such as short-circuit contribution, reactive power support, and synthetic inertia—creating adaptable and future-proof systems that address a wide range of stability issues while optimizing total cost of ownership.

We work closely with you to evaluate your unique needs and recommend the most effective solution for your facility.

MV-UPS TYPICAL LAYOUT

with 50 * 20 ft ISO containers



65 m
approx.

63 m
approx.

About GE Vernova's Power Conversion & Storage business

GE Vernova's Power Conversion & Storage business combines advanced energy conversion and storage systems to meet the electrification needs of utilities and industries. With a focus on power stability, energy storage, and industrial electrification solutions, Power Conversion & Storage empowers customers by addressing their most complex electrification challenges and accelerating their transition to a sustainable, decarbonized future.

For more information, please visit
governova.com/power-conversion

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