



Beyond Grid Forming

Agile Grid Forming for AI Loads

Devin Dilley
President/Co-Founder

Jason Barmann
Director of Sales, New Markets

October 24, 2025





Agenda

- **Company Overview**
- **Product Overview**
- **AI Datacenters – Operational Challenges**
 - Load Variability
 - Riding-Through Grid Contingencies
- **Model Fidelity**
 - Benchmarking EMT Model
- **Beyond Grid Forming**
 - EPC's Parallel BESS Solution

Company Overview



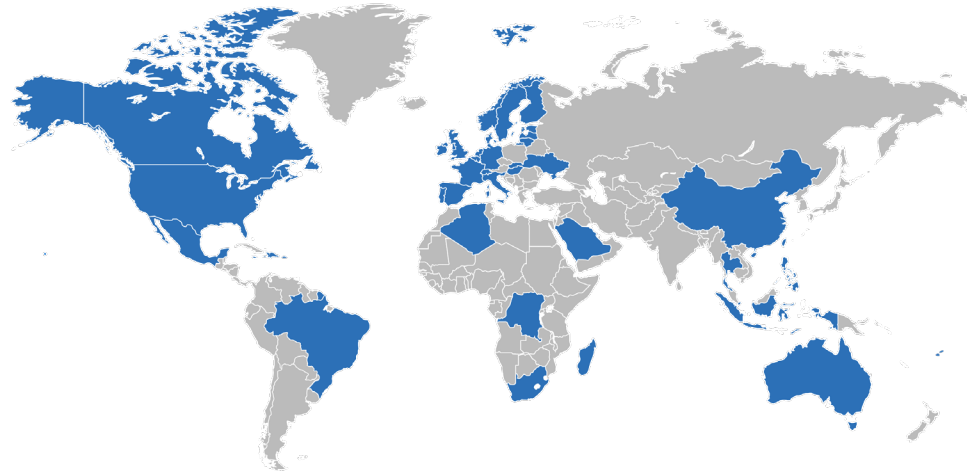
Company Description

- **EPC Power Corp. designs, engineers and produces inverters suitable for use in Storage and Data Center applications**
- EPC Power has sold more than 7 GW of inverters to date and is installed in 62 countries
- EPC Power's primary North American office is in San Diego County, California with a European office in Helsinki, Finland to support global demand and a R&D office in Raleigh, North Carolina
- Opened second manufacturing location in Greenville, SC to support production volume and product line expansion
- All of EPC Power's products are 100% designed, engineered, and **manufactured in USA**

Revolutionary Inverter Technology

- ✓ Full grid-forming
- ✓ Advanced grid-following features
- ✓ Seamless transition between operation modes
- ✓ Blackstart
- ✓ Advanced P/Q (Power / Current Control)
- ✓ Advanced Voltage (Voltage Control)

Current Geographic Footprint



62

Countries with EPC
Inverter Installations

>7 GW

Inverters Sold to Date

100%

Products Developed
In-House

Main Facilities	Main Purpose
Poway, CA	Headquarters; R&D; Manufacturing
Greenville, SC	Manufacturing
Raleigh, NC	R&D
Helsinki, Finland	R&D; European sales; European service



epcpower: 

ENERGY YOU CAN RELY ON.
Made in the USA

M System



Modular Technology

- Modular blocks to scale from 3MW to 6MW
- Compact footprint and increased power-density

Simple O&M

- Modular design with low component count
- Predictive analytics to minimize unplanned downtime
- Remote trouble-shooting and diagnostics

High Reliability and Uptime

- >99.5% availability
- Built-in redundancy N+1, N+3, etc.
- Zero voltage ride-through during utility outages

High Efficiency and Performance

- >99% peak efficiency
- SiC technology
- Full rating at all power factors

Seamless System Integration

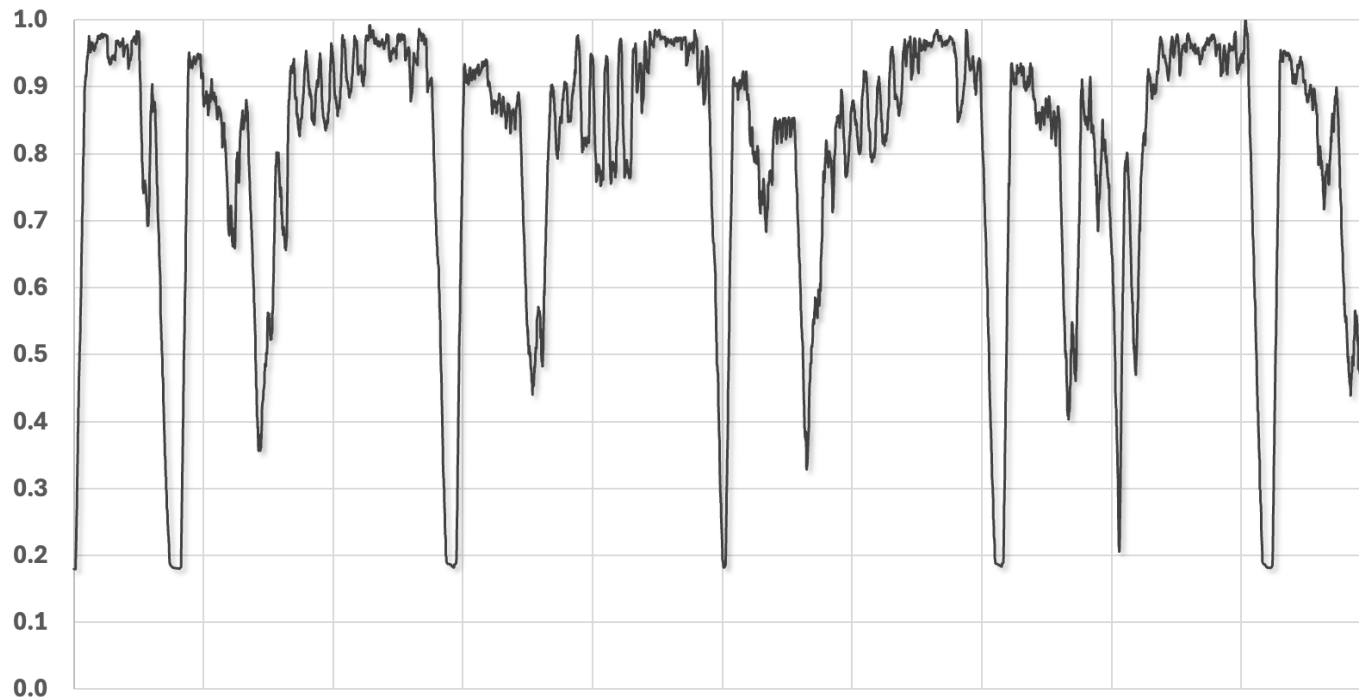
- Grid forming and AI load smoothing applications
- Grid-connected and in parallel with on-site generation or islanded with generation

AI Datacenters – Operational Challenges

Load Variability

Extreme Load Variability at Unprecedented Scale

Per-Unit load profile of a GPU server cluster

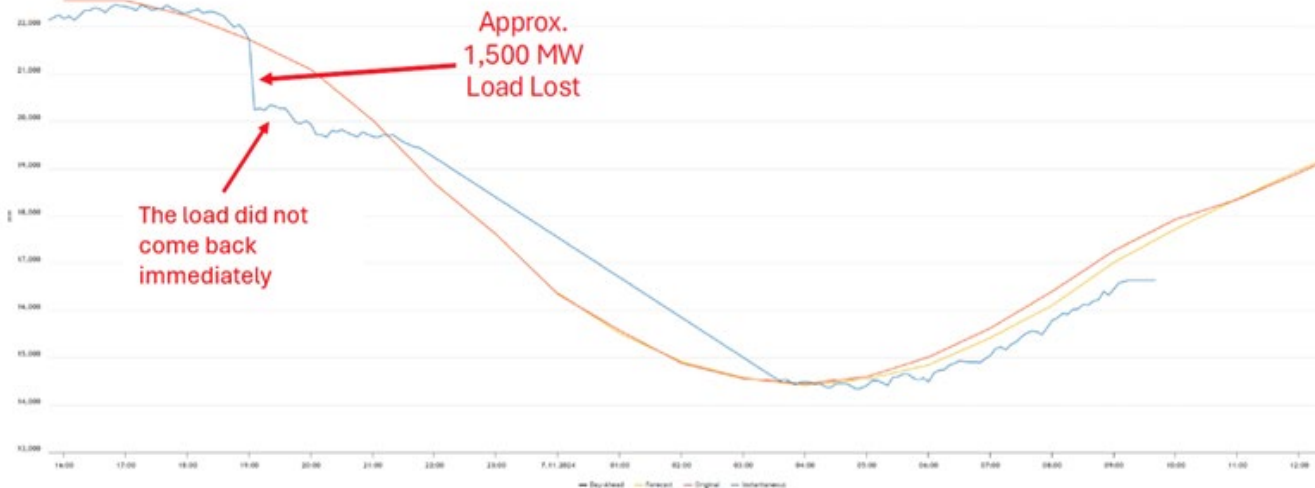


- Power quality issues
- Torsional interaction with synchronous generators – vibration of shaft
- **Accelerated failure** of onsite and/or nearby generation resources

AI Datacenters – Operational Challenges

Riding-Through Grid Contingencies

Loss of Large Load



- Requires high reliability / availability
 - e.g. “Five-Nines”
- Low-voltage (LV) UPS takes load off-grid during undervoltage events
- **Loss of “large-load” – potential for cascading failure**

Source: “Considering Simultaneous Voltage-Sensitive Load Reductions,” *North American Electric Reliability Corporation (NERC) Report*, January 2025.

Key Questions

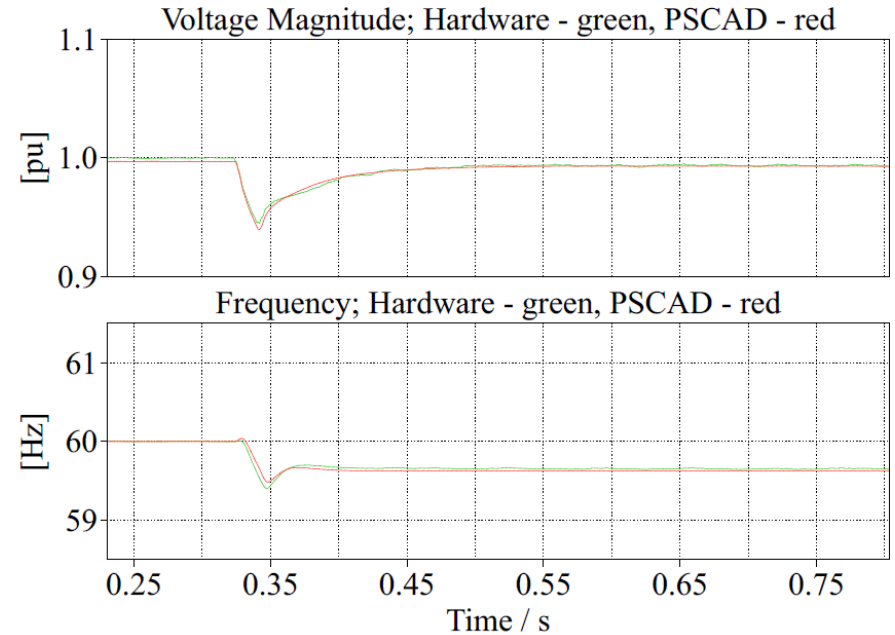
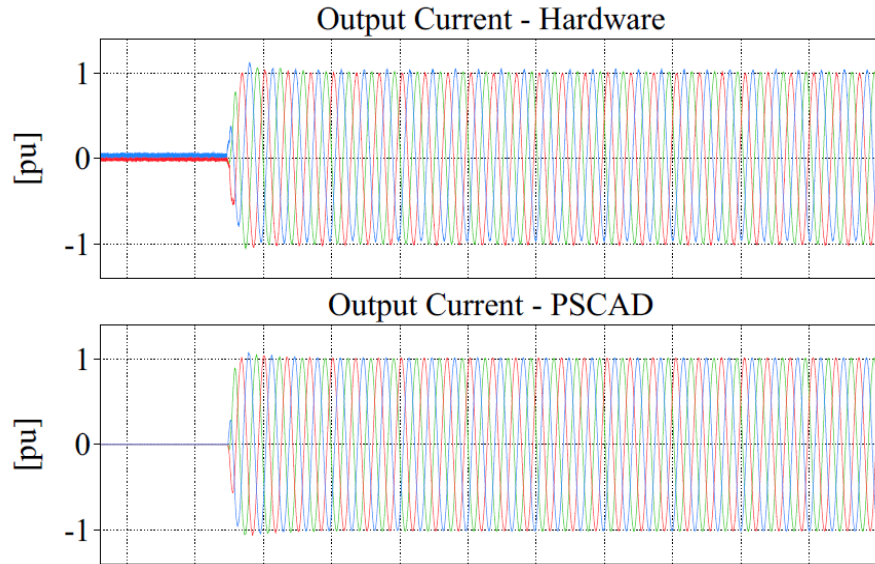
- Solution **must provide both** – “Load-Smoothing” and “Ride-Through”
- Can a potential solution guarantee that **load never goes off-grid**?
- If load goes off-grid and transfers to onsite generation, **how long to reconnect to grid – seconds / minutes / hours?**
- Can & how can a potential solution **support the grid until transfer** from onsite generation to grid?

The logo for epcpower, featuring the word "epcpower" in a lowercase, sans-serif font, followed by a stylized icon of three horizontal bars of increasing height, resembling a power symbol or a signal waveform.

Model Fidelity

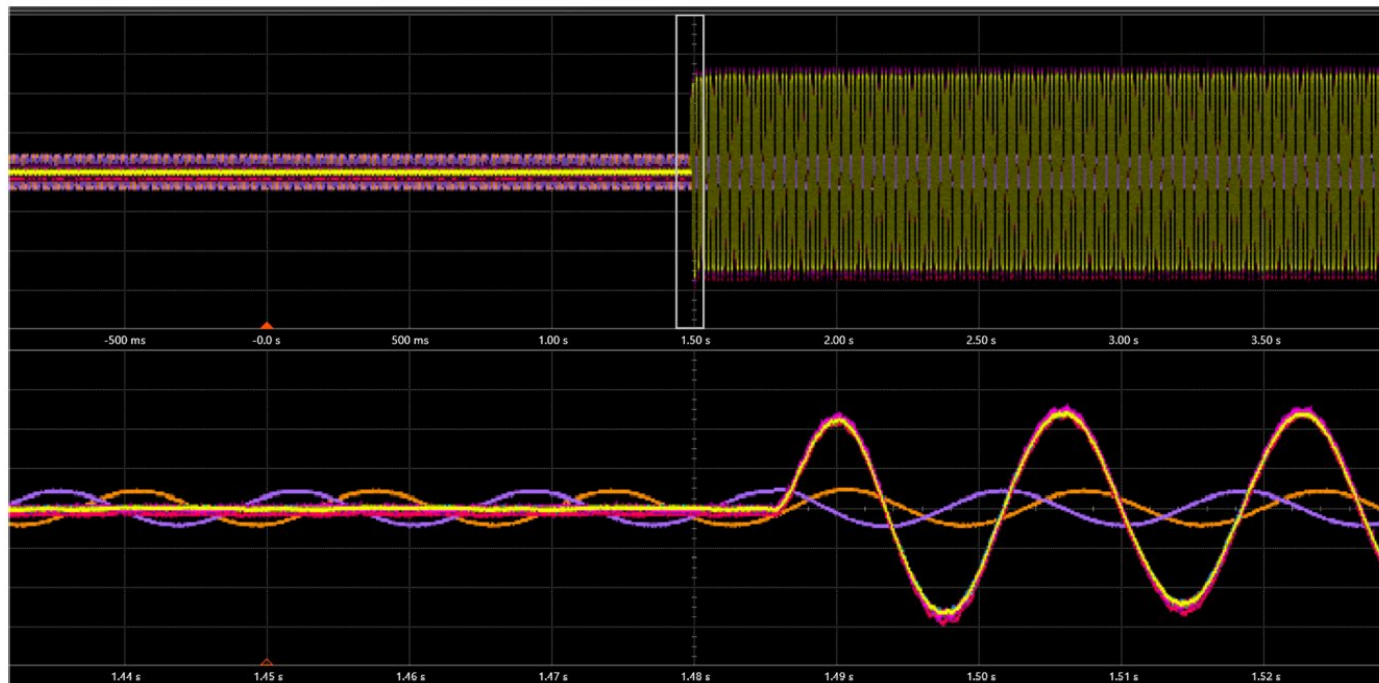
Benchmarking EMT Model

EMT (PSCAD SIL) Model vs Hardware



Model vs. Hardware step response of M inverter while grid-forming.

EPC M System (cont.)



Instantaneous load pick-up/sharing by several parallel M inverters

EPC M System (cont.)



A grid forming M system supplying representative “extreme-variable” load

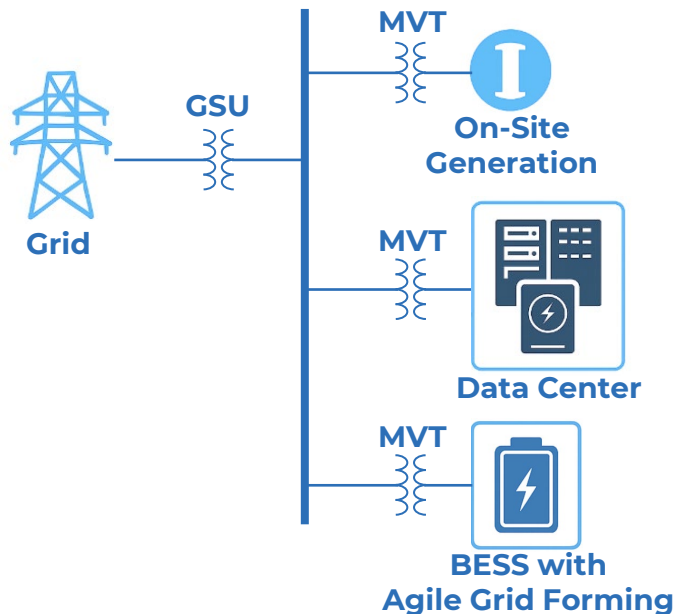
The logo for EPC Power, featuring the text "epcpower" in a lowercase, sans-serif font, followed by a stylized icon of three horizontal bars of increasing height, resembling a power or energy symbol.

epcpower

Beyond Grid Forming

EPC's Parallel BESS Solution

EPC's Parallel BESS Solution



EPC's Proprietary Technology

- **Agile Grid Forming Control** – Fast response to variable loads

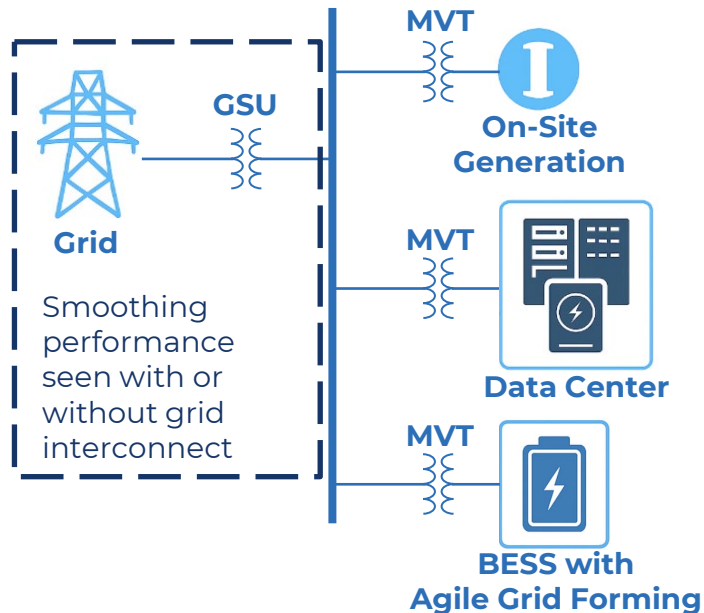
Strategy for Load Variability

- *Agile Grid Forming Control* enables load pickup in $\approx$ ms time-scale
- “Smooth loading” attainable at POI as seen by grid operator

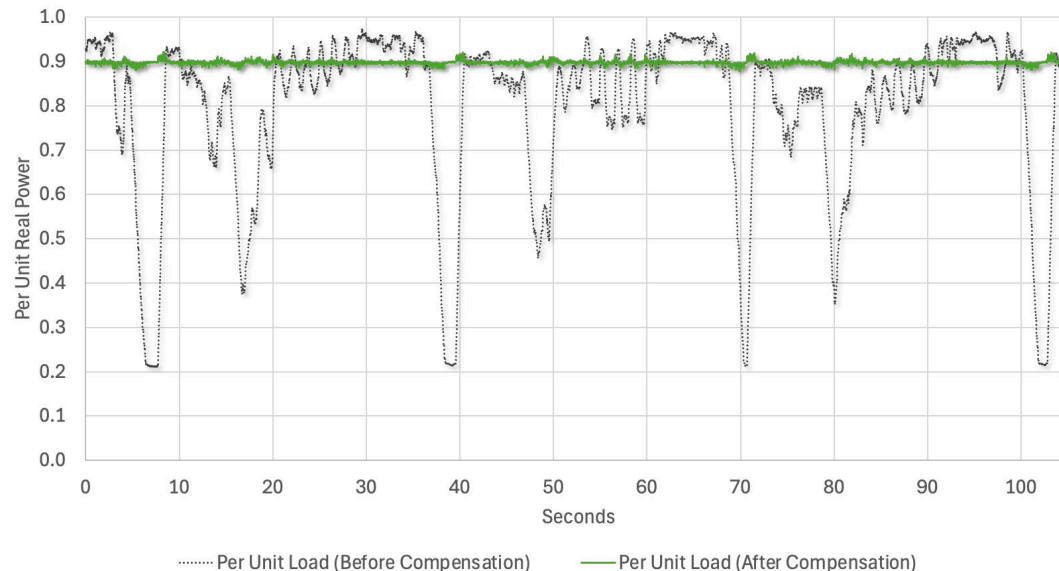
Strategy for Ride-Through

- Data center can operate as intended, i.e., taking load offline during grid disturbance
- *Agile Grid Forming Control*, with inherent ride-through capability, immediately returns to pre-fault load level at fault clearance

Load Smoothing



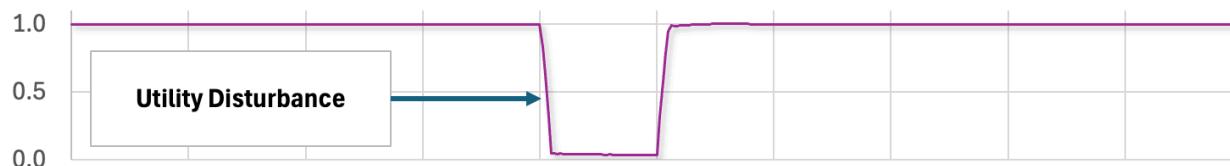
Agile Compensation of Load Fluctuation



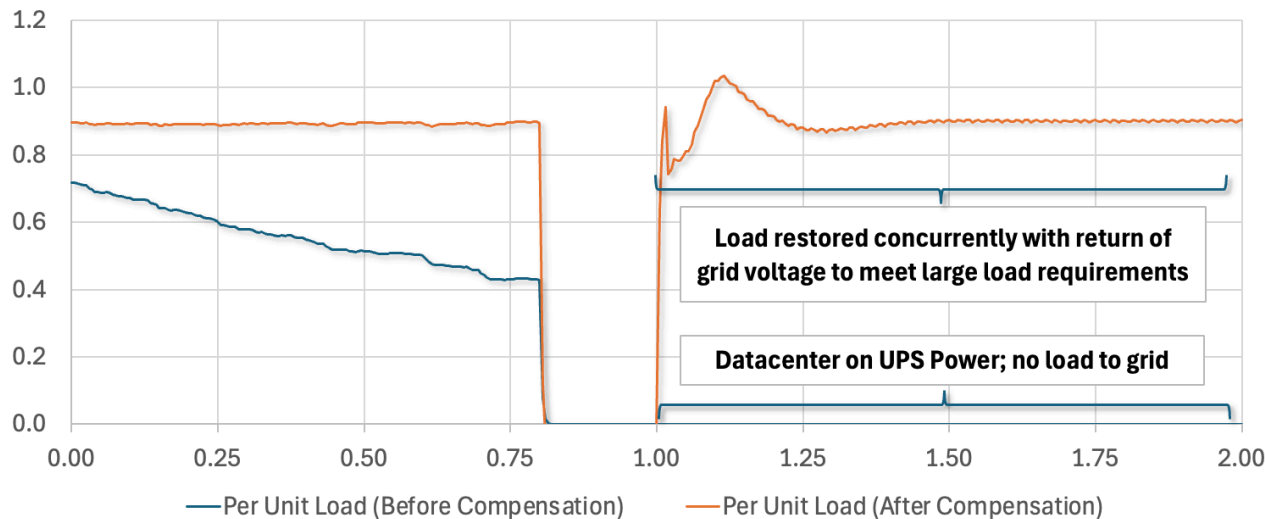
Not achievable by typical “grid-forming” BESS

Ride-Through of Grid Contingency

Grid Voltage During Fault



Grid Load Preserved by Agile Post Grid Fault



Key Challenges for AI Datacenters

- **Extreme load variability**
- Critical load of **unprecedented scale**
- How to simultaneously guarantee **uninterrupted service** of datacenter load and **ride-through** of grid contingencies
- “Legacy” grid forming falls short

EPC Power Solution

- **Ride-through** and **load smoothing** can be achieved by EPC’s proprietary **Agile Grid Forming** solution in parallel configuration
- Prevents detrimental impact on lifetime of on-site equipment
- **Non-intrusive** to existing datacenter architecture



EPC Power: California

13250 Gregg Street, Suite A-2

Poway, CA 92064

+1.858.748.5590

Adam Kabulski

SVP, Global Sales & Marketing

adam.kabulski@epcpower.com

EPC Power: South Carolina

360 Old Laurens Rd., Suite 800

Simpsonville, SC 29681

+1.864.883.9577

Contact