Energy Storage Summit London 2025

epcpower

Modular and High Efficiency Low Voltage AC-coupled Converter for Utility Scale PV and BESS

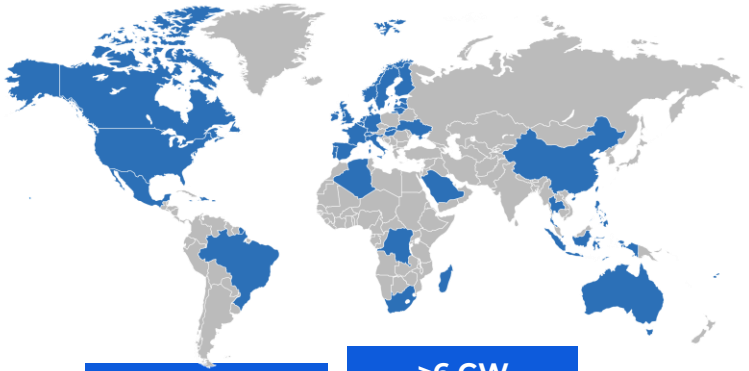
February 2025

Who We Are

Company Description

- **EPC Power Corp. (“EPC Power” or “EPC”) designs, engineers and produces power converters suitable for BESS and PV applications**
- EPC’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
- EPC’s inverters are designed for the energy storage and PV market and include advanced functionality as standard, that enable participation in grid ancillary services like frequency regulation, voltage control and black start, with leading response time.
- All of EPC’s products are 100% designed, engineered, and built in-house and made in USA

Current Geographic Footprint



Production capacity 8 GW/year

62
Countries with EPC Inverter Installations

100%
Products Developed In-House

>6 GW
Inverters Sold to Date

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

Project Experience

Delivered to

- +60 countries - site conditions/grid codes with variety of use cases - following, forming, micro-grids, protected bus etc. from small to large sites

Largest Projects

- 227 MW / 908 MWh
  - **Lancaster**, CA (Utility: SCE)
  - Commissioned: Q3 2022
- 300 MW / 1200 MWh
  - **Eleven Mile**, AZ (Utility: SRP)
  - Commissioned: Q1 2024









Product offering - Current

PD250 and PD500

- ✓ 250 kW-500 kW AC output
- ✓ Supporting up to 1250 VDC

CAB1000

- ✓ >4,000 manufactured to date, >200 projects
- ✓ Modular 1-1.5 MW blocks configurable up to 6 MW
- ✓ Up to 690 VAC, 1500 VDC

Revolutionary Inverter Technology

- ✓ Full grid-forming capability with weak grid support
- ✓ Advanced grid-following features
- ✓ Seamless transition between operation modes
- ✓ Black start capability
- ✓ Virtual Inertia
- ✓ Very fast response time
- ✓ Microgrid parallel to various other sources

Product offering - New product

CAB1000

- Robust and field proven solution since 2019
- 1.5 MW scalable unit up to 6 MW in one power block
- >99% uptime minimizing downtime and potential revenue losses

M System

- M System changing the game with modular design
- Utilizes next generation Silicon Carbide technology
- 6,4 MVA power block with multiple DC connections

Powering the future with confidence
Utility-grade solar & storage inverter
Bidirectional | 99% Efficiency | Up to 1500 VDC
Reliable. Secure. High-Performance

New product offering – M System

M Inverter & M System

- Advanced Silicon Carbide(SiC) Devices
- Forced air cooling
- High Frequency Modulation & Unique Topology → Common mode voltage-free for cleaner, more reliable power
- Best in class efficiency
- 450 A_{AC} inverter module Energy Storage(ES)/ Photovoltaic (PV) Inverter
- Flexible parallel operation allows up to 12 M series inverters in parallel (6,4 MW)
- UL and IEC Certified inverter building block

Why Choose M System? – All in one

Modular Design

- Flexible for various storage durations
- Easily scalable for different applications

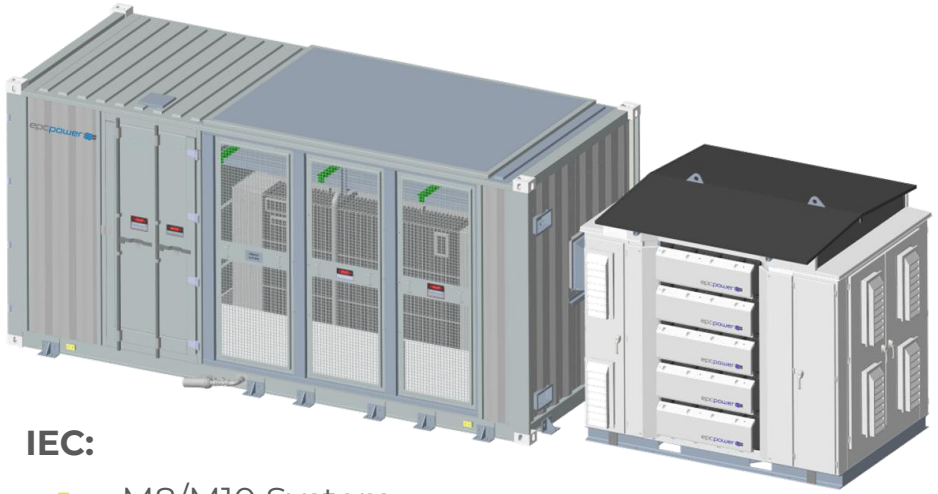
1.46 x 0.42 x 0.85 m
240 kg

M10 System - 5.3 MVA
3.3 x 2.4 x 2.7 m
3400 kg

UL Skid and IEC Power Block

UL:

- M8/M10 System
- Medium Voltage Transformer (MVT)
- Throat Connection with AC Bus between M System and MVT
- Optionally all on same Steel Skid



IEC:

- M8/M10 System
- LV/MV step up station
  - Medium Voltage Transformer (MVT)
  - MV Switchgear (RMU)
  - Auxiliary Transformer (Optional)
  - LV distribution board
- Close coupling AC Bus between M System and LV/MV step up station

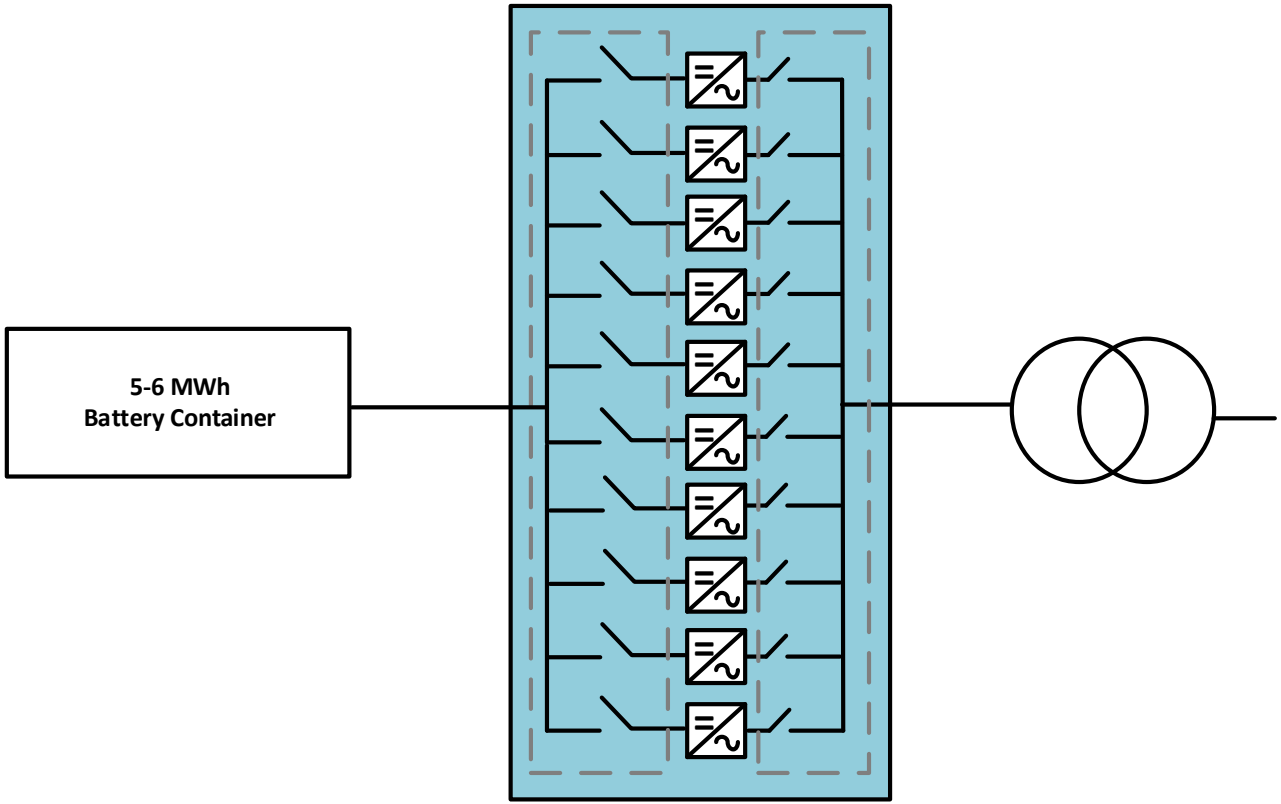
Why Choose M Solution? – One for all

Versatile All-in-One Solution for PV+BESS

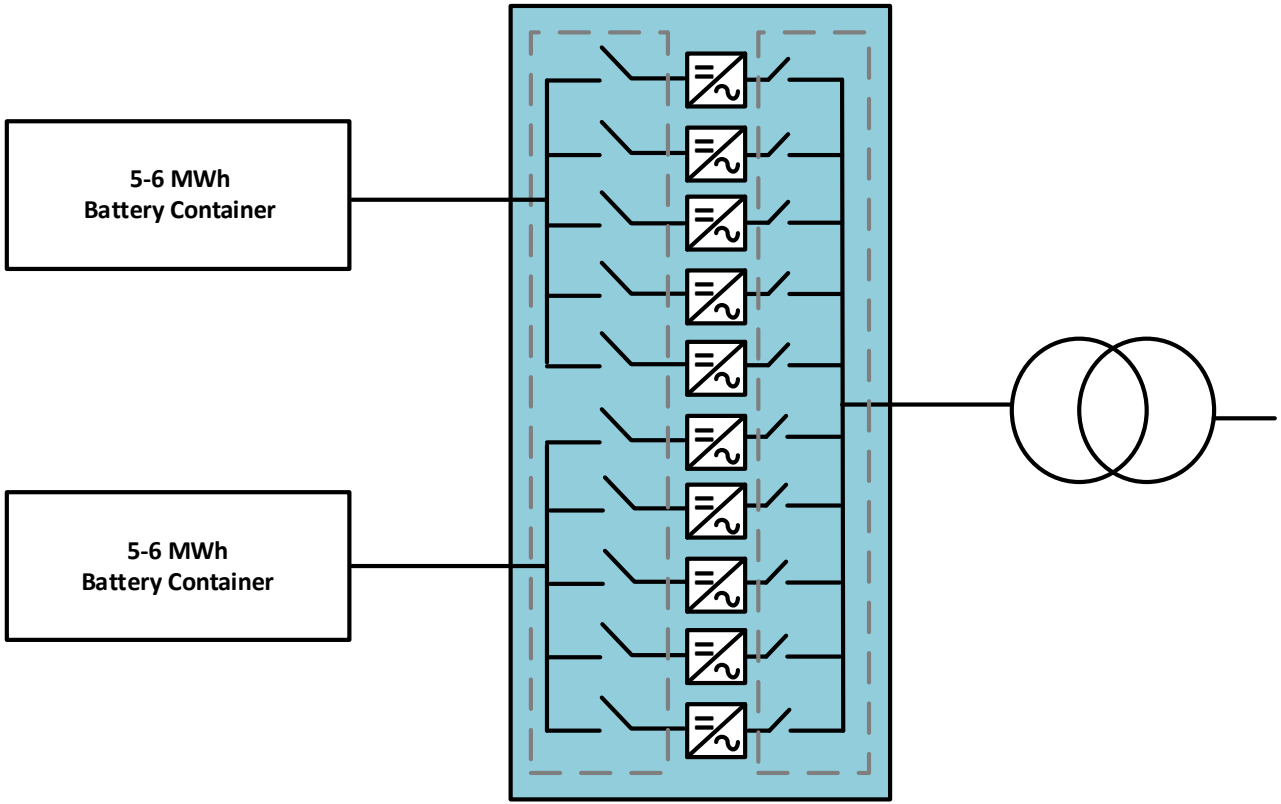
- ✓ BESS Control Modes:
  - ❑ Grid Following - Power or PF Ref Command
  - ❑ Grid forming functionality
  - ❑ Black start functionality
  - ❑ Advanced grid support features: Virtual inertia, FFR, etc.
- ✓ PV Operating mode:
  - ❑ Autonomous PV inverter (state machine) with MPPT
- ✓ LV AC coupled PV plus BESS mode
- ✓ Wide AC & DC Voltage range allows for integration with wide range of storage and PV technologies

Inverter Rating	PV Primary Models					
AC Voltage [V_{AC}]	350	400	600	630	660	690
Power [kVA]	272	311	467	480	514	537
Min DC Voltage [V_{DC}]	519	596	894	939	984	1025
Max DC Voltage [V_{DC}]	1500					

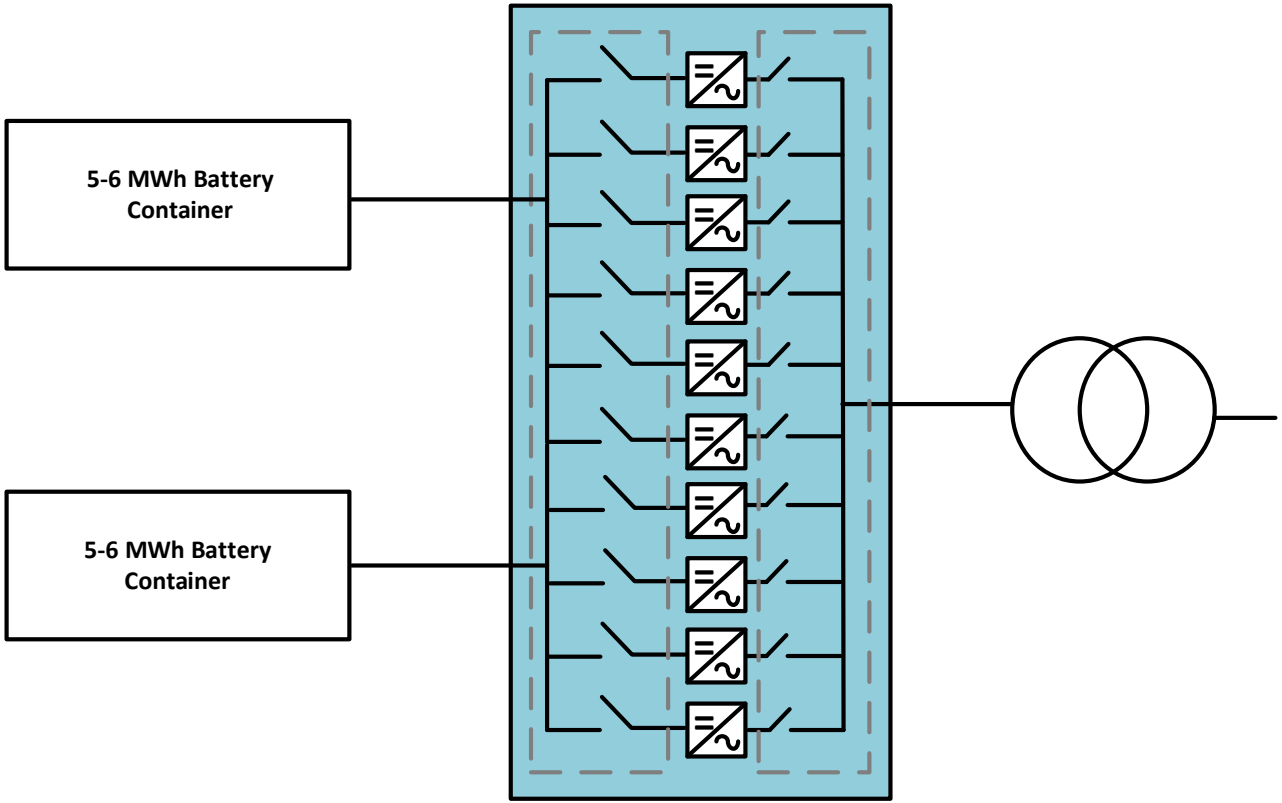
M10, 1-hour storage with 1 x 5 MW / 5 MWh



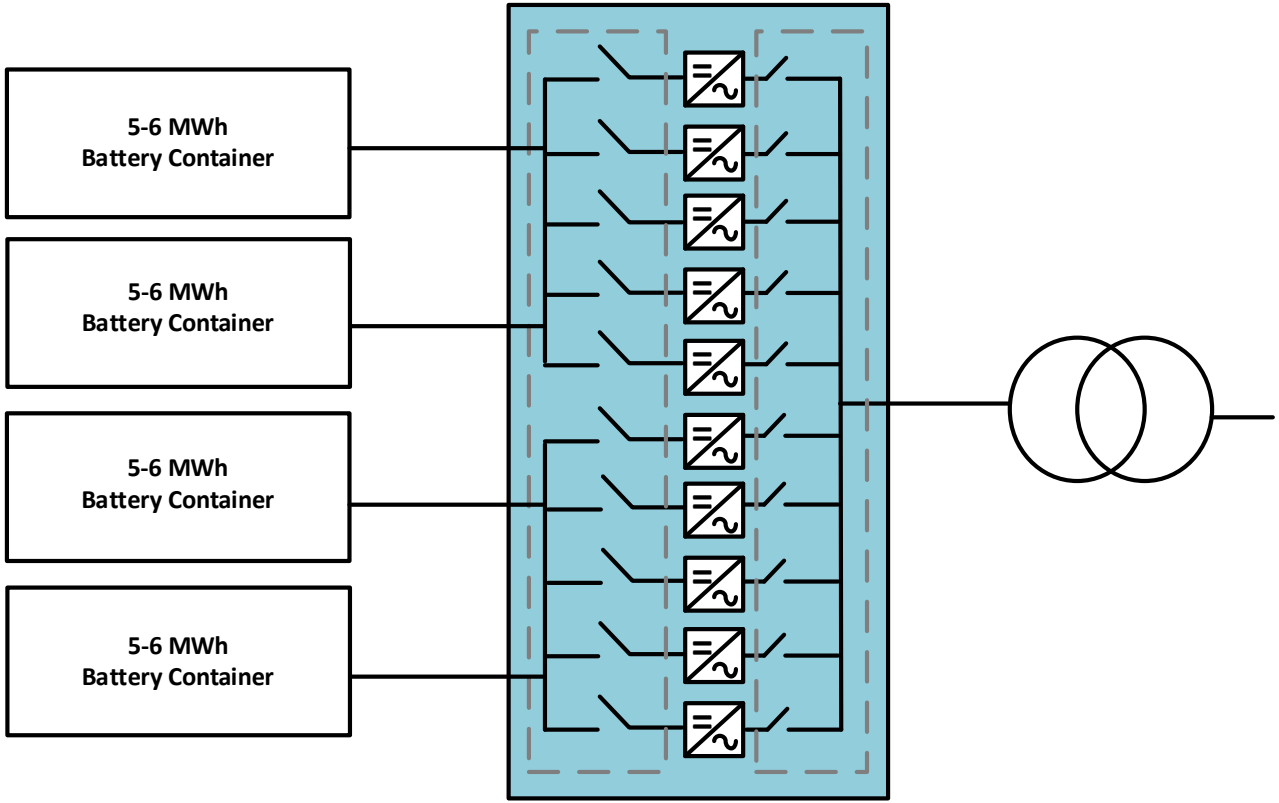
M10, 2-hour storage with 2 x 2.5 MW / 5 MWh



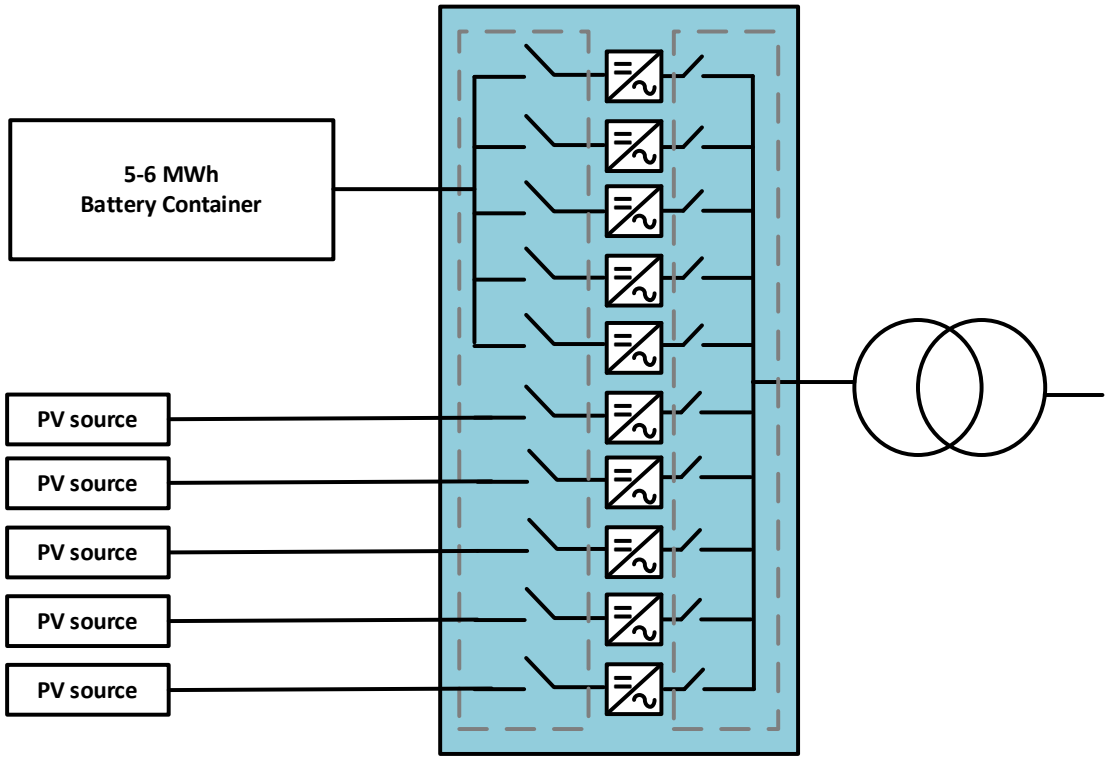
M10, 2-hour storage with 1 x 5 MW / 10 MWh



M10, 4-hour storage with 2 x 2.5 MW / 10 MWh



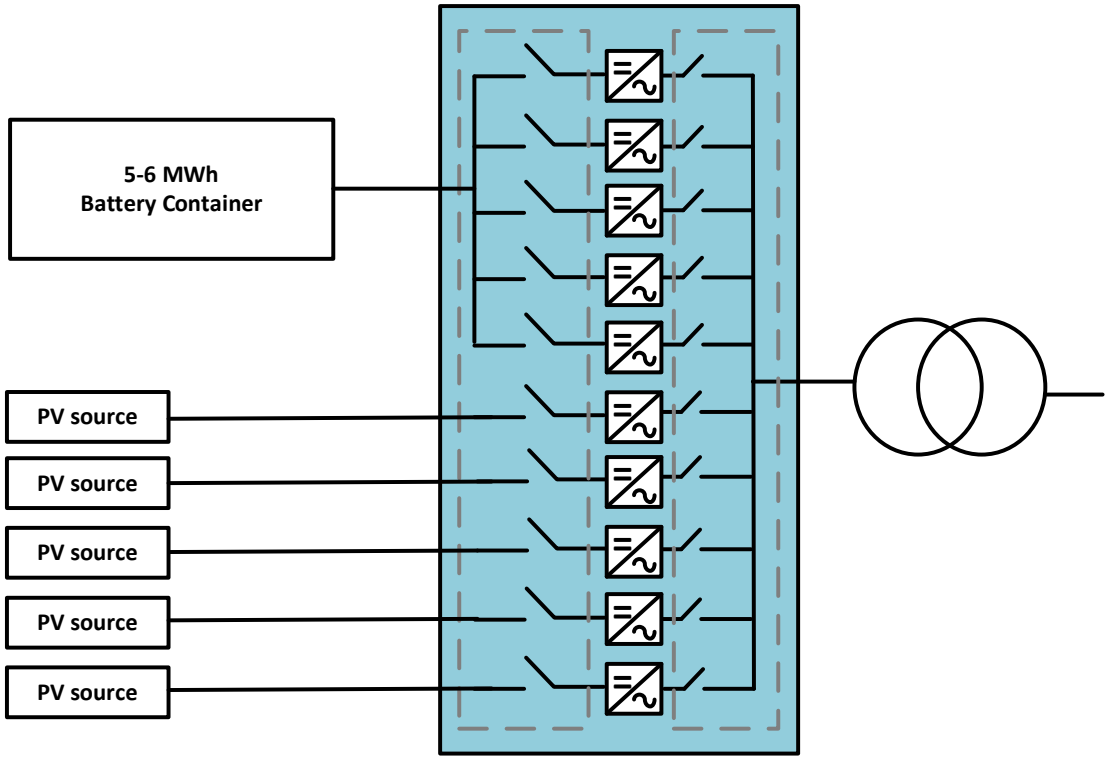
Examples of LV side AC coupled and benefits



Operation modes

- ✓ **Feeding grid from BESS and PV**
- ✓ **Charging battery from PV and grid**
- ✓ **Charging battery from PV only**
- ✓ **Charging battery from PV and feeding excess to grid**

Examples of LV side AC coupled and benefits



Use Cases for LV AC-Coupled BESS and PV:

- ✓ **Hybrid Systems** – Systems that can operate both ON and OFF the grid, providing backup power during outages.
- ✓ **Microgrids** – Ideal for microgrid applications where AC loads need to be powered from both solar and batteries.
- ✓ **Retrofit Solutions** – Easy Add-On to existing PV Plants without modifying the PV field.

New product offering – Summary

Return on Investment

- Modular design for high availability
- Low maintenance cost reduces operational costs

Modular Technology

- Scalable system designs
- Provides optimal flexibility for site and project designs
- Dual Certified Inverter for PV and BESS

Simple O&M

- Low maintenance and O&M requirements
- Modular design with low component count
- Remove and replace serviceability

Advanced Technology

- Up to 10 independent 537 kVA DC Inputs
- Industry leading > 99% Efficiency
- Wide AC and DC operating Range
- No power derate up to 45°C
- Flexible battery matching configuration

One inverter for all uses

- >99% efficiency, contributing to lowest LCOE
- Designed and optimized for PV and BESS
- Built in the USA
- Silicone Carbide Technology

Contact

EPC Power Oy

Valimotie 21

00380 Helsinki, Finland

Jyrki Leppänen

Director, Global Sales

jyrki.leppanen@epcpower.com