

# Energy efficient power electronics for high demanding industries (e.g. data center, shipping industries)

## Targets

- Highly efficient power electronic converter
- Highly efficient Hybrid Energy Storage

## Activities

- Develop ultra low parasitic passive components (novel capacitor technologies, inductors) to increase the over energy efficiency of power electronics
- Development of hybrid energy storage incl. Li-ion battery, supercapacitor, capacitor storage
- Application of AI tools for optimal energy storage management
- Implement and validate digital-twin-based control in for all scenarios

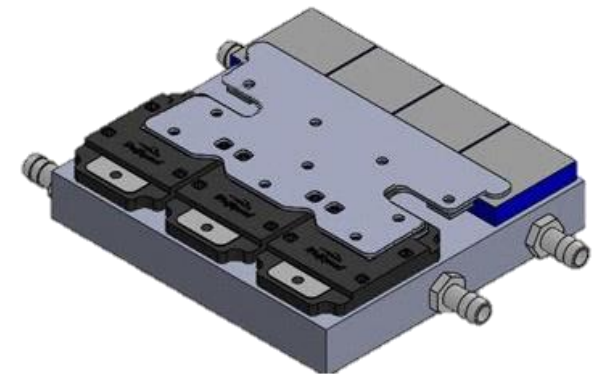
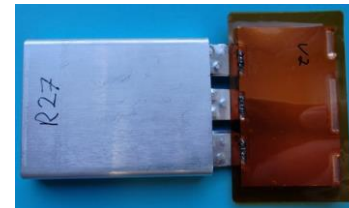
## Use case support

- Help during the design and design in phase of components for highly efficient power electronic systems
- Build up of hybrid energy storage systems

### a) Data Center grade

### 800 V Polymer Aluminium Electrolytic Capacitor

120  $\mu$ F in 80 cm<sup>3</sup>, 800 V, coolable 120 A@20 kHz @125°C  
Fully coolable, GaN MOSFET compatible, ESR = 4 nH,



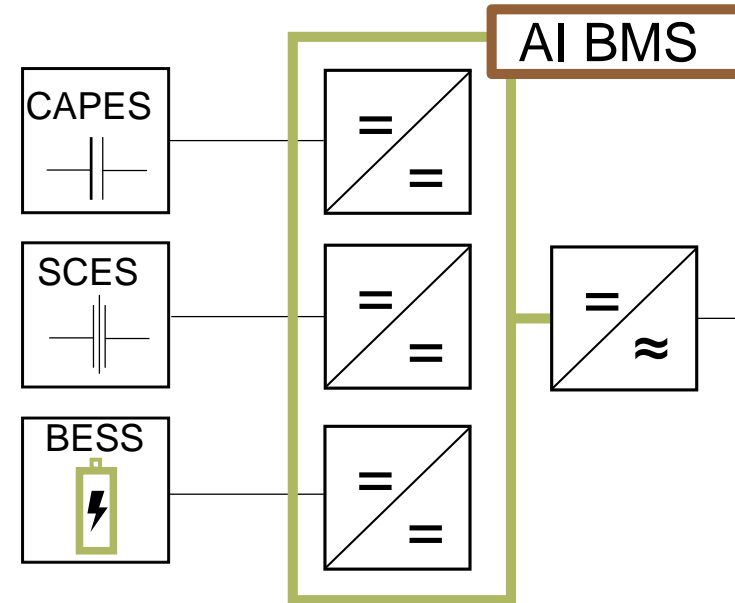
### Support we can provide for the project

- Design and analyze of power electronic systems
- Development of a highly efficient DC-link bus with novel capacitor technologies
- Development of Hybrid energy storage system with batteries, supercapacitors and regular capacitors using an AI based BMS
- Create practical engineering tools
- Advance research in emerging technologies
- Provide prototyping and demonstration infrastructure

### Complementary skills needed for the proposal

Partners with expertise in energy-efficient converter solutions for data centre or marine applications incl. intelligent AI controlled hybrid energy storage

### b) Marine grade - Hybrid Energy storage with AI BMS in a Marine Micro Grid



CAPES – Classic Capacitor Energy Storage

SCES – Super Capacitor Energy Storage

BESS – Battery Energy Storage

# Projects

## Netzpatron

**Duration:** June 2017 → July 2020

**Project budget:** 5.7 mio. Eu

MV Grid stabilizing using  
ESS

Funded by:

BmWi

Project Details



Project partners:



## ComEiCo: Competitive Electrolyzer Converters

**Duration:** June 2022 → Feb 2025

**Project budget:** 12 mio. DKK

In ComEiCo power electronics converters for electrolyzers with improved efficiency, low cost, and provisions for grid services are developed.

Funded by:

Innovation Fund Denmark

MISSION  
GREEN FUELS

Project Details



Project partners:



## IEA Wind Task 61 on VRE-Hydrogen Integration

**Duration:** June 2025 → Dec 2028

**Project budget:** 2.23 mio. DKK

This project will explore and identify current challenges in the design, control, and deployment of hybrid VRE-hydrogen plants.

Funded by:

EUDP

Project Details



Project partners:



## PHESS – Supercapacitor Technology

**Duration:** June 2025 → July 2027

**Project budget:** 25.23 mio. DKK

This project will explore and identify build up of novel supercapacitor technology for grid services and more

Funded by:

EUDP

Project Details



Project partners:



# Calls of interest

HORIZON-CL4-2027-04-DATA-09  
HORIZON-CL5-2027-03-D5-14  
HORIZON-CL5-2026-03-D3

Energy efficiency and sustainability of AI data processing in Data Centres (IA)

Onboard renewable energy solutions and energy saving measures to reduce the fuel consumption of ships by at least 55% (ZEWTP Partnership)

01: Targeting key value chain components for increasing the competitiveness of renewable energy technologies in Europe

03: Innovative technologies and solutions to improve wind energy systems supporting the Strategic Energy Technology (SET) Plan on wind

18: Grid-forming capabilities for more resilient and RES-based electricity grids

20: Hybrid AI-Control Framework for a next-generation grid-scale energy storage and system integration

21: Novel solutions for off-grid storage of renewable energy for critical infrastructures

## Other Calls

- CETP
- Eureka
- Doctoral Network