



Mission-Critical Power for **AI Data Centers and Grid Stability**

Curved Graphene-based supercapacitors and SuperBatteries

Certified



9001:2015



14001:2015



IATF 16949

Becoming the Skeleton of Every Energy System

Focused on short-duration applications, where li-ion batteries fail

skeleton⁺

Mission-critical power
from microseconds to
15 minutes for key
applications in grid, data
centers, and speciality power



15 years of deep R&D in
our own materials,
production processes, and
market-leading products,
secured by **70 patent**
families



300+ people worldwide,
including the largest
engineering and R&D
team in the high power
industry globally.

PRODUCTS IN THE FIELD TODAY, SERVING CUSTOMERS INCLUDING



**World's Largest
supercapacitor factory**
Leipzig, Germany

Data Centers, Grid, and Industry Need MW, not kWh

<15-minute power storage solutions with supercapacitors and SuperBatteries

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AI Data Centers

- Power smoothing for AI data centers
 - In-rack and microgrid
- BBU (Battery Backup Unit) energy storage for data centers



Power Grid

- Virtual inertia / Grid forming in E-STATCOMs
- Grid power back-up and quality



Mobility

- High power storage for alternative drivetrains
- Engine starting
- 12V boardnet stabilization & backup power solutions



Industrial Power

- Peak load shaving to cover short-term peak power demands
- Industrial UPS solutions
- High-power support for electric arc furnaces



Defense

- MW-pulse power for vehicles/radars; silent-watch hybrid kits to cut idling and signatures
- Engine starting
- Peak-shaving and UPS solutions for FOB and ship microgrids

Millions Of Units In The Field With An Excellent Track Record

Unrivalled quality and reliability in mission-critical applications from aerospace and power grids to mobility

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**Mission-critical
power you can
bet your
business on
from rockets to
national grids**

Certified to
international quality
and safety standards



100+ MWs installed
in grid and industrial
sites worldwide

SIEMENS

 **Hitachi Energy**



10,000+ systems
and modules
operating today

 **ŠKODA**





+ global truck and
passenger car OEMs



Delivering products
to customers
10+ years

 **esa**

+ global aerospace and
defence primes

Only Company To Have Full Value Chain From Materials To Software

Resulting in higher quality, reliability, and smaller product for high-power needs

skeleton⁺



Award winning core technology protected through 70 patent families



>110 patents granted or pending

Unique advantage with **Curved Graphene**, Skeleton's patented carbon raw material

FULL CONTROL OVER THE ENTIRE VALUE CHAIN



Raw Material
Curved Graphene™



Single Cells
Supercapacitors



Modules & Power Electronics
From low to high voltage needs



Systems
MWs of immediate power

Modern European Production with a Secure Supply Chain

ISO-9001/14001 & IATF-16949-certified production

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Leipzig Superfactory

Markranstädt, Germany

- + 20 800 m² (224 000 sq. ft.) - the largest and most modern supercapacitor factory globally
- + 1st phase of 10 800 m² (116 000 sq.ft.) operational



SuperBattery Factory

Varkaus, Finland

- + 10 000 m² / 108 000 sq. ft. of production space dedicated to SuperBattery production



Curved Graphene Production

Bitterfeld-Wolfen, Germany

Skeleton Materials is Skeleton's material development arm, situated at the Bitterfeld-Wolfen Chemical Park in Saxony, Germany.

Our Bitterfeld production facility is already the global leader in synthesizing capacity and scaling up Curved Graphene material production to industrial levels to meet the demand for Skeleton's next-generation solutions.



Co-Engineered Energy Solutions, Tailored to Your Challenges

A qualified supplier & system provider to industry leaders

skeleton⁺



The largest engineering and R&D teams in the high-power energy storage industry

- + Internal **electrochemistry, mechanical, simulation, software, and hardware engineering** capabilities.
- + Our engineers optimize system sizing and performance by analyzing inputs such as:
 - + Power profiles
 - + Environmental conditions
 - + Applications
- + From concept to deployment ensuring reliability & scalability.

Data Centers

- + Ultra-fast response and high power for power smoothing and increased compute
- + Unlocks up to 40% more FLOPS for AI data centers by allowing GPUs to operate at their full power without overheating
- + Proprietary power electronics and software



GrapheneGPU

Graphene Sidecar

Grid Stability

- + Reliable, long-life, and instant power to ensure grid stability
- + Modular solutions from modules to systems reaching hundreds of MWs
- + Built for reliability, lifetime performance, and seamless integration into grid systems



Grid module
(162V or 102V)

Grid cabinet
(includes 10 modules)

Speciality power

- + Mission-critical power in seconds for defense, aerospace, and other high-power needs
- + Delivering unmatched durability and reliability in the harshest conditions
- + Field-tested solutions



Supercapacitor cells **Custom solutions**

Technological Advantage Through Superior Carbon Raw Material

Backed by the largest R&D team in the industry

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Supercapacitors

use an electric field
to store energy



Fast

- + **High power density** (up to 60 kW/kg)
- + Limited energy density (up to 16 Wh/kg)
- + Extreme cycle life (>1 million)
- + Extremely fast charge rate (2000 C)
- + High inherent safety
- + No rare metals



SuperBattery

Based on supercapacitor
technology



Fast

- + High power density (4 kW/kg)
- + **Increased energy density** (65 Wh/kg)
- + Long cycle life (50,000)
- + Fast charge (<60s)
- + Extreme power (20 C continuous, 100C peak)
- + High inherent safety
- + High recyclability and sustainability
- + No Graphite, no Co, <5% Li



Li-ion Batteries

use a chemical reaction
to store energy



Slow

- + Limited power density (0.5 kW/kg)
- + **High energy density** (250 Wh/kg)
- + Limited cycle life (<6000)
- + Slow charge rate (3 C)
- + Safety concerns
- + Utilizes critical raw materials
(Li, Graphite, Co)

Addressable Energy Storage Application Space

High power from sub-second to up to 15 minutes duration

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Skeleton products provide **high power energy storage** for applications with **<5-minute charge / <15-minute discharge** cycle durations

Lower cost compared to **Li-ion batteries** in this application space

Supercapacitors



SuperBatteries



Lithium-Ion batteries



<1s to 60s

Fast
charging

1-5 min

1-15 min

>15 min

Increased Safety & Sustainability Compared to Lithium-ion Batteries

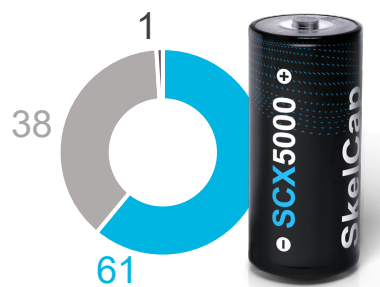
skeleton⁺

Lower cost due to Curved Graphene and abundance of other raw materials



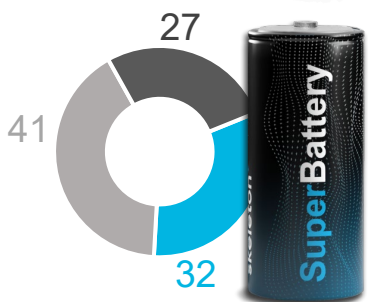
Curved Graphene

- Proprietary carbon, produced without any rare earth materials
- Synthesis byproducts re-usable – zero waste created



Supercapacitor

- Mostly carbon and aluminum, easy to recycle
- Contains no heavy metals



SuperBattery

- Safer to handle than Li-Ion batteries (no lithiated graphite)
- Contains lower cost elements compared to Li-Ion

● Organic components ● Aluminum ● Other



Little to no rare earth metals used

- ✓ The only metal content in supercapacitors is aluminum
- ✓ SuperBattery uses no graphite, nickel or cobalt, and very little lithium (<5% of weight)



Easy and affordable to recycle

- ✓ Carbon and aluminum are easy to recycle
- ✓ Products use lower cost elements than in Li-ion

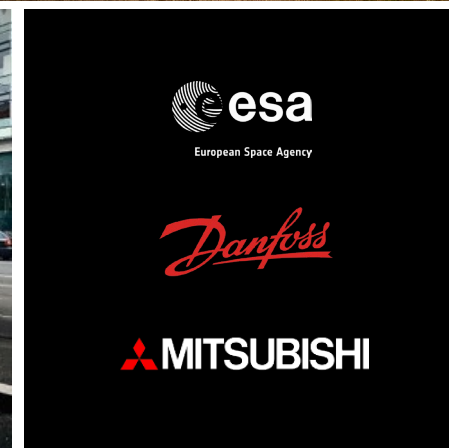
Sustainable production and processing

- ✓ Skeleton uses water-based process for coating and recycling
- ✓ Products are safer to handle than li-ion batteries due to no lithiated graphite or lithium plating

A Qualified Supplier & System Provider to Industry Leaders

To grid, data centers, transportation, and industrial companies, OEMs & Tier 1s

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Hyperscaler-validated

GrapheneGPU

turning hundred-megawatt spikes into steady power

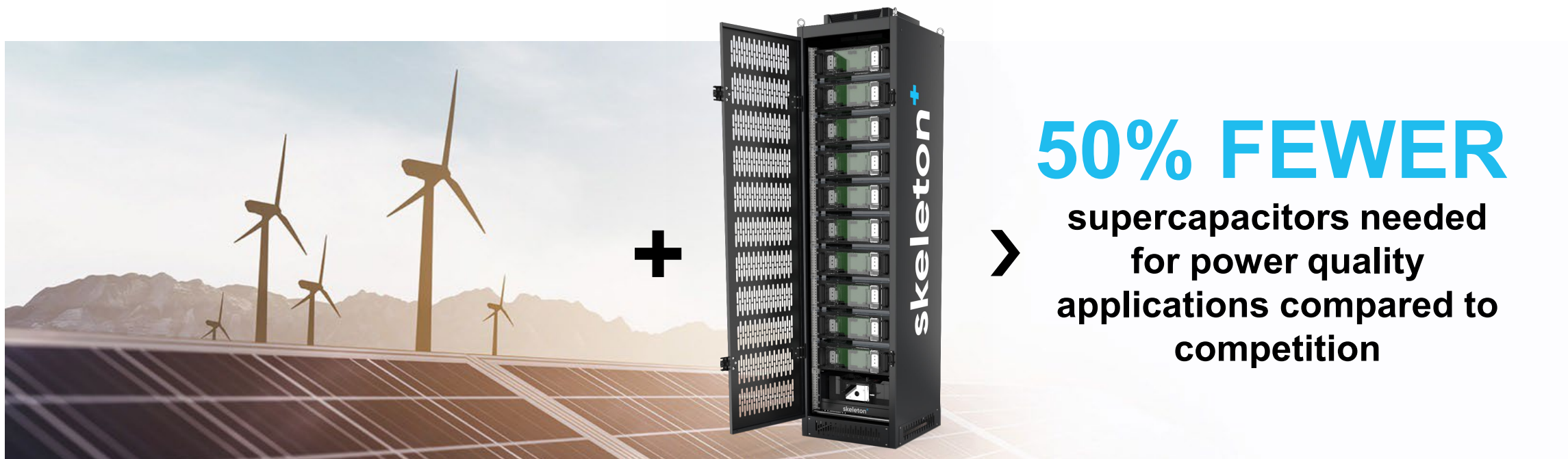
- + **Increase in computing capabilities (FLOPS) up to 40%** by allowing GPUs to operate at their full capacity by reducing thermal de-rating.
- + **Reduced grid connection size by up to 44%** due to GrapheneGPU handling power peaks.
- + **Energy use decreased by up to 45%** by eliminating dummy or artificial loads used to stabilize power demand.



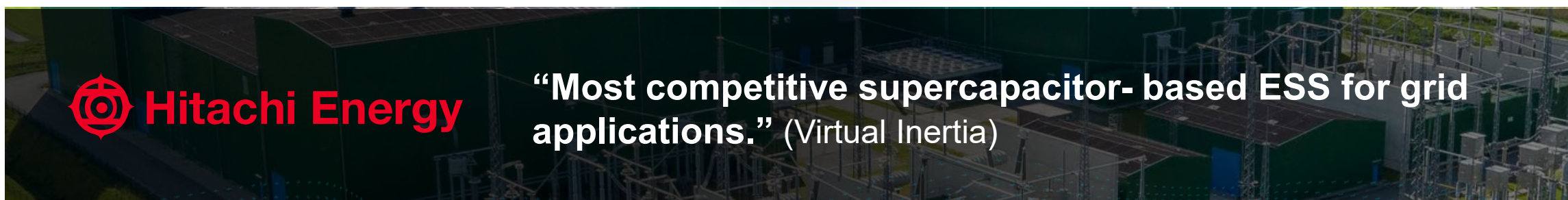
Enabling Higher Penetration of Renewable Energy & Stabilizing Power Grids

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MWs not, kWh business – 50 MW solution delivered



50% FEWER
supercapacitors needed
for power quality
applications compared to
competition



Hitachi Energy

“Most competitive supercapacitor- based ESS for grid applications.” (Virtual Inertia)

Supercapacitors Electrifying Trams Across Europe

Kinetic energy recovery reduces costs and protects infrastructure

skeleton⁺



ŠKODA



“Skeleton Technologies brings the necessary quality mindset to critical applications. **The highest power density and efficiency in the industry provides us with a very clear competitive advantage.**”

Stanislaw Wizur, Škoda Electric



“**Skeleton’s cells are a perfect fit to the rail and tram industry.** Adding them to our energy storage systems will greatly benefit our existing and future customers, **allowing to maximize energy efficiency at an unprecedented level.**”

CAF Power & Automation

Supercapacitors Kickstarting Fusion Reactors

Enabling technology to create clean energy

skeleton⁺



Supercapacitors are used to provide **20 MW of power** for each gram of hydrogen to be heated in less than **1 second**. Skeleton is supplying a global leader in fusion energy.

Key Benefits

To working with us

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IATF-certified & the **largest supercapacitor factory** in Europe



100+ MWs of grid & industrial installations, **10 000+** systems & modules in the field



Unique technology & product roadmap with **Curved Graphene**, protected by 70 patent families



World-class team of **300+ professionals** with vast experience in energy storage development & production

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Thank you!

For more information
contact us:

www.skeletontech.com

Certified



**WE
HELP
TO SAVE
ENERGY**