skeleton

Energy Storage for **High-Power Applications**

Curved Graphene-based supercapacitors
and SuperBatteries

Certified

ISO 9001:2015 · ISO 14001:2015 · IATF 16949

Becoming the Skeleton of every energy system

We are uniquely positioned to capitalize on the data centre, grid transmission and short duration mobility sectors' growth

€95bn

addressable market opportunity for short duration, high power energy storage[1] across different end markets

15

years of R&D investments in proprietary material technology and products, protected through 33 active or pending patents

€330m

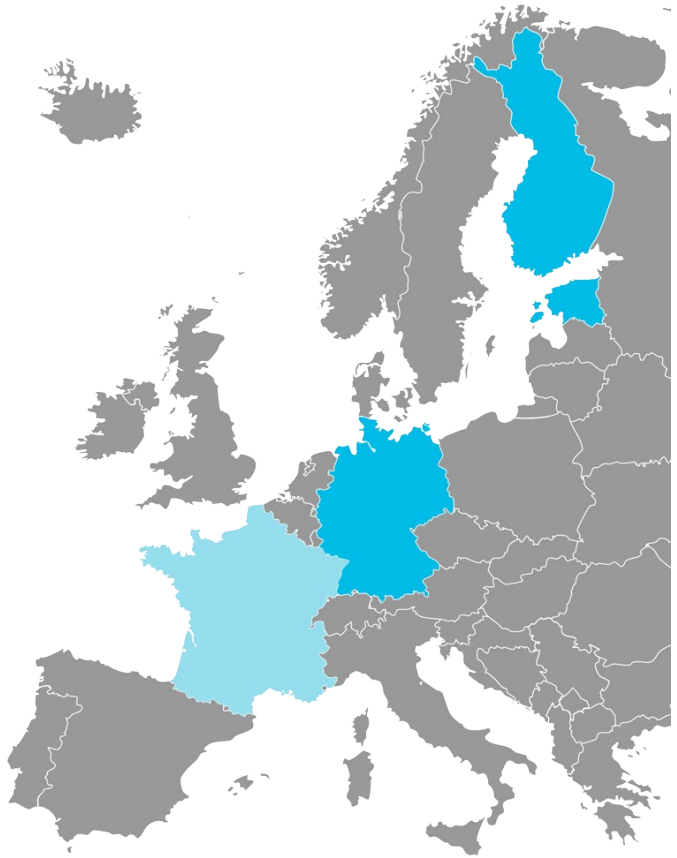
Raised since the founding of the company in 2009

~330

employees worldwide, from more than 30 different nationalities across three corporate locations

Skeleton Technologies overview

+ Focused on short duration applications, where Li-ion batteries are not suitable
+ Products in the field today, serving customers such as Hitachi Energy, Siemens, Honda, and other automotive and transportation OEMs
+ Building an industrial scale plant near Leipzig, Germany, with start of operations in the 2nd half of 2025



+ Manufacturing in Germany and Finland
+ Development in Estonia
+ R&D laboratory in France

Selected existing investors

Marubeni, INNO, Owners of CAF, SIEMENS, CBMM, Co-founders of: adyen

Selected existing customers

Hitachi Energy, SIEMENS, esa, Honda Racing HPD, ŠKODA, Danfoss

Led by a World-class Management Team of Industry Veterans

Energy storage experts, entrepreneurs, and experienced leaders

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Oliver Ahlberg

Chairman of the Board

- Co-Founder of Skeleton Technologies
- Successful exits in e-commerce and digital marketing

Taavi Madiberk

CEO

- Co-Founder of Skeleton Technologies
- Member of the board in the European Innovation Council
- Former Chairman of the Supervisory Board of Estonian Railways

Dr. Linus Froböse

CTO

- PhD in solid-state batteries from Technische Universität Braunschweig
- Previously Head of operations at Vitesco Technologies, and Head of Manufacturing Technology Battery and Electric Engines at Continental

Timo Koljonen

COO

- Over two decades of operation and manufacturing leadership in complex production environments
- Formerly Director of Operations at Danfoss Power Solutions, Chief Operating Officer at Visedo, and VP Operations at ElFys, Inc.

Tero Järveläinen

CPO

- Previously R&D Director at Danfoss Power Solutions, leading R&D activities in Danfoss' eMobility division; CTO at Visedo, a smart hybrid and electric drive train manufacturer; Research Engineer and Team Lead at Robert Bosch

David Arsenault

SVP Business Development

- 15+ years of experience with supercapacitors and heavy-duty vehicle hybridization and electrification as founder of Effenco, acquired by Martinrea
- PhD in Mechanical Engineering from École de Technologie Supérieure in Montréal, Canada

Arnaud Castaignet

VP Government Affairs & Strategic Partnerships

- Previously Director of Political outreach of DIGITALEUROPE, the leading tech lobby in Brussels, and Communication Officer for the French President François Hollande.
- French Foreign Trade Advisor, appointed by the French Prime Minister

Dr. Jaan Leis

Materials Science Consultant

- Co-founder of Skeleton Technologies
  PhD in Theoretical and Computer Chemistry from University of Tartu, Estonia
- 20+ years in nanomaterials research and co-author of more than 65 peer-reviewed research articles and 20+ patents in the fields of nanoporous carbon and energy storage.

Key Enabling Technology to Power Electrification Across Industries

A qualified supplier & system provider to industry leaders

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- Peak shaving for AI data centers
- BBU (Battery Backup Unit) energy storage for data centers

- 12V boardnet stabilization & backup power solutions
- 48V active suspension
- Engine starting
- High power storage for alternative drivetrains

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

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

Hitachi Energy · ŠKODA · SIEMENS · CAF Power & Automation · Danfoss · Honda Racing HRD · esa · MITSUBISHI · MEDCOM · Brush Traction

Technological Advantage Through Superior Carbon Raw Material

Backed by the largest R&D team in the industry

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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)

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

Technology Advantage Throughout the Entire Energy Storage Industry

Highest performance and quality for every energy storage application, powered by Curved Graphene

SkelCap supercapacitors (Gen 1)

- 4x power density compared to competitors
- High power (up to 60x compared to batteries)
- 1,000,000+ lifecycles
- Ultrafast charging times (<1 s)

Graphene supercapacitors (Gen 2)

- +72% increase in energy (16 Wh/L), while maintaining high power
- 1,000,000+ lifecycles
- Ultrafast charging times (<1 s)
- Increased efficiency & lower footprint

SuperBatteries

- High energy density (65 Wh/kg)
- 50,000+ lifecycles
- Fast charging (60s)
- Extremely competitive cost-base compared to similar energy storage technologies

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

Fast charging

<1s to 60s | 1-5 min | 1-15 min | >15 min

Independent 3rd Party Verified Advantage

Superior power and energy densities in energy storage

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"Your cells have very low resistance so are truly high-power devices. I think **they are the best in the world of the carbon/carbon type.**"

Dr. Andrew F. Burke

UC DAVIS
UNIVERSITY OF CALIFORNIA

"One property **that stands out is the ESR of the Skeleton capacitor**, which is significantly less than the others."

C. N. Nybeck, D. A. Dodson, D. A. Wetz and J. M. Heinzel, "Characterization of Ultracapacitors for Transient Load Applications," in IEEE Transactions on Plasma Science, vol. 47, no. 5, pp. 2493-2499, May 2019

Supercapacitors

4X power density vs competitors

64.3 kW/L skeleton

15.6 kW/L UCAP Maxwell TECHNOLOGIES

SuperBattery

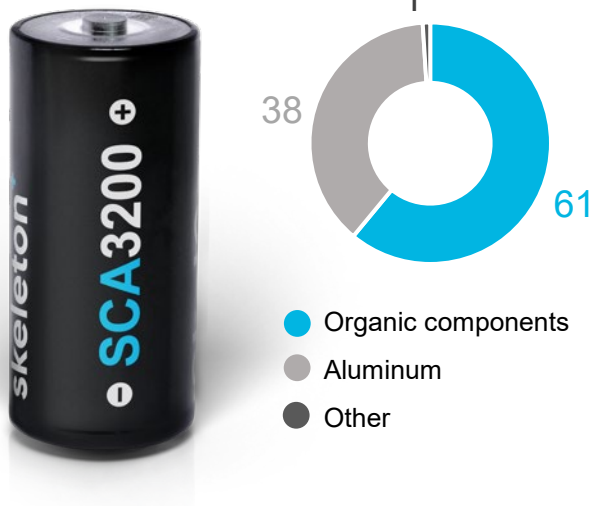
Uniquely fast charge times with high energy density

60 sec skeleton

Charge time of 10 min *Competition*

Increased Safety Compared to Lithium-ion Batteries

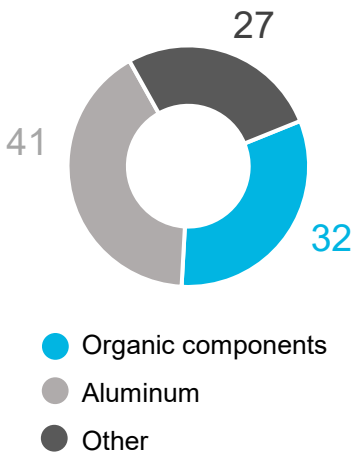
Lower cost due to Curved Graphene and abundance of other raw materials



Supercapacitor

Composition

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



SuperBattery

Composition

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

Curved Graphene

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

Sustainable Products And Production Process

From supercapacitors to SuperBatteries

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

Leipzig Superfactory

State-of-the-art supercapacitor production

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Building the **largest supercapacitor factory** in the world

(Markranstädt, Germany)

Varkaus Factory

SuperBattery manufacturing

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First industrialization of SuperBattery

(Varkaus, Finland)

Skeleton Materials

Curved Graphene production facility in Bitterfeld, Germany

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

Led by world-class material scientists and researchers, Skeleton Materials 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 GEN 2 supercapacitors, SuperBatteries, and solid-state batteries.

German Quality, Certified According to the Highest Standards

Qualified supplier to some of the largest OEMs in the world

Linus Froböse
CTO

"**Quality is the bedrock of Skeleton's success** and something we have put an enormous amount of work in – to produce the most robust and long-lasting products for our customers."

Certified

9001:2015 14001:2015 IATF 16949

Compliance and selected product certifications

A Qualified Supplier & System Provider to Industry Leaders

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

skeleton

ŠKODA

mjr Power & Automation

MAJA

German automotive OEM

Hitachi Energy

North-American Truck OEM

Honda Racing HPD

CAF Power & Automation

SIEMENS

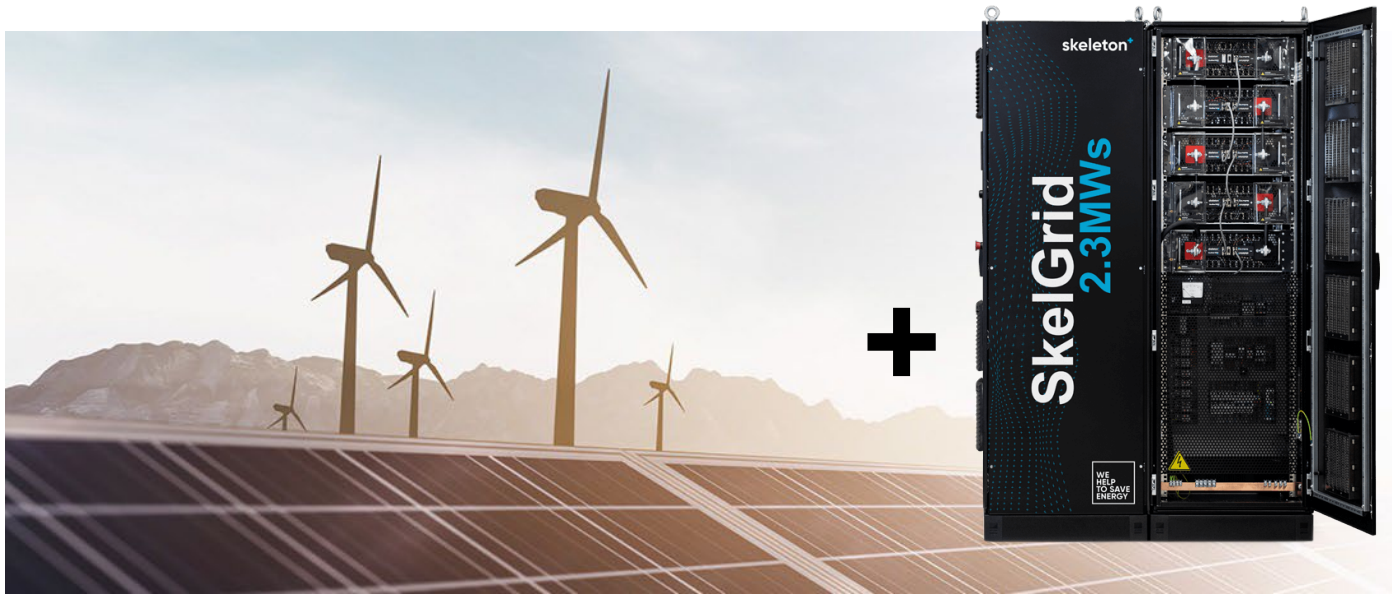
Danfoss

esa

MITSUBISHI

Enabling Higher Penetration of Renewable Energy & Stabilizing Power Grids

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 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

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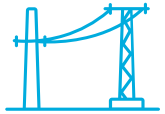
IATF-certified & the **largest supercapacitor factory** in Europe



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 **350+ professionals** with vast experience in energy storage development & production

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Thank you!

For more information contact us:

www.skeletontech.com

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