
skeleton
Rebuilding industry
for a net-zero future.
The high power energy storage company.

A Pan-European Company

European value chain, European energy storage innovation

skeleton

Tallinn, Estonia

- Software development
- Electronics engineering
- Module & system development

Großröhrsdorf, Germany

- SuperBattery R&D and production
- Supercapacitor research & development center
- Main production location from cells to systems

Markranstädt, Germany

- The largest and most modern supercapacitor factory in the world
- Start of production in 2024

Bitterfeld-Wolfen, Germany

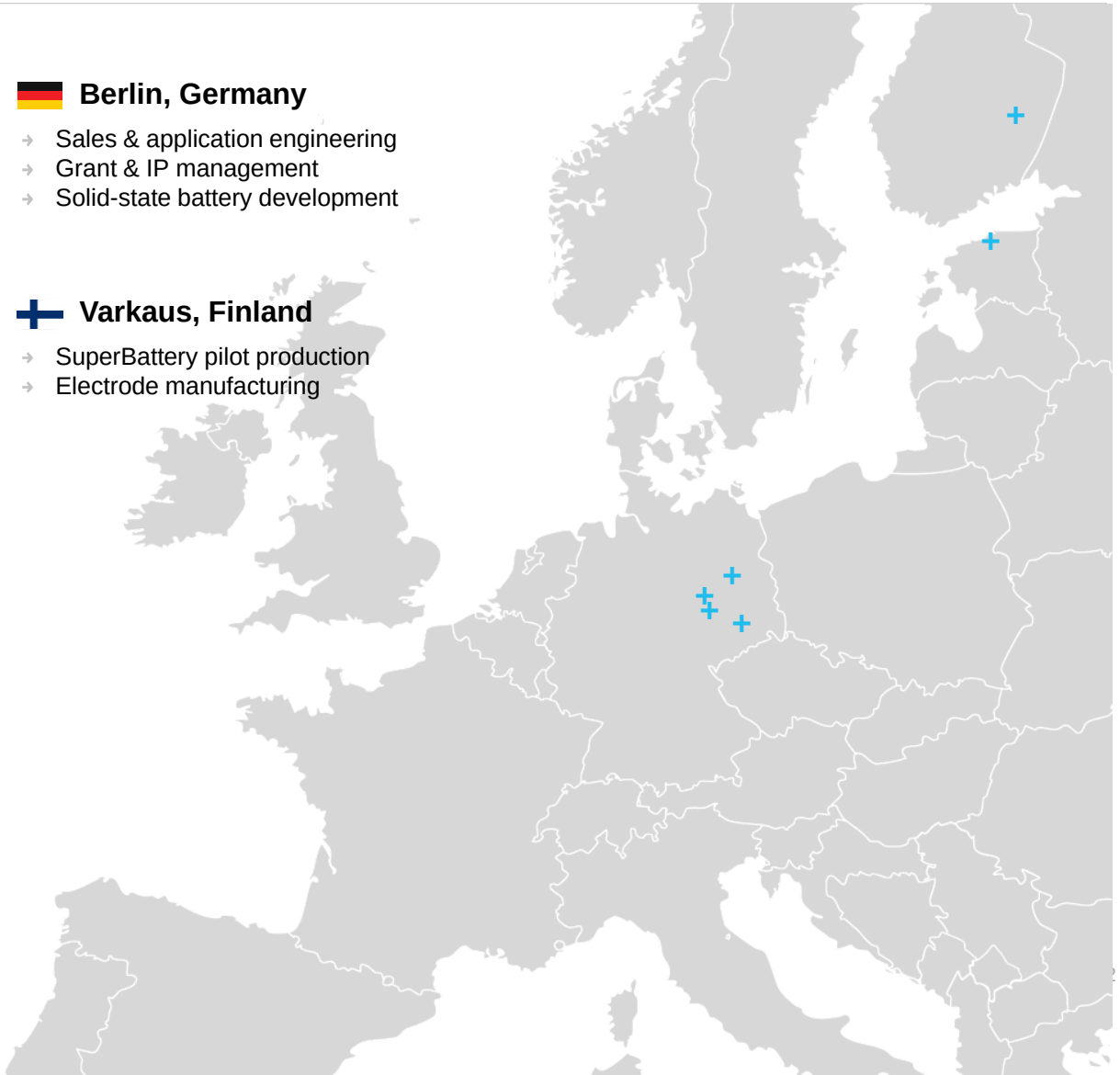
- Curved Graphene synthesis and production
- Material pilot & development plant
- Solid-state material research

Berlin, Germany

- Sales & application engineering
- Grant & IP management
- Solid-state battery development

Varkaus, Finland

- SuperBattery pilot production
- Electrode manufacturing



Technological Advantage Through Superior Carbon Raw Material

Backed by the largest R&D team in the industry

Li-ion Batteries

use a chemical reaction to store energy

Slow

- Limited power density (0.5 kW/kg)
- **High energy density** (205 Wh/kg)
- Limited cycle life (<3000)
- Slow charge rate (1.5 C)
- Safety concerns
- Lithium, nickel, cobalt

Supercapacitors

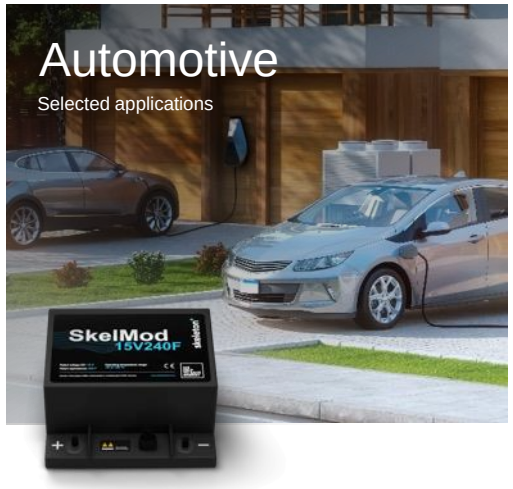
use an electric field to store energy

Fast

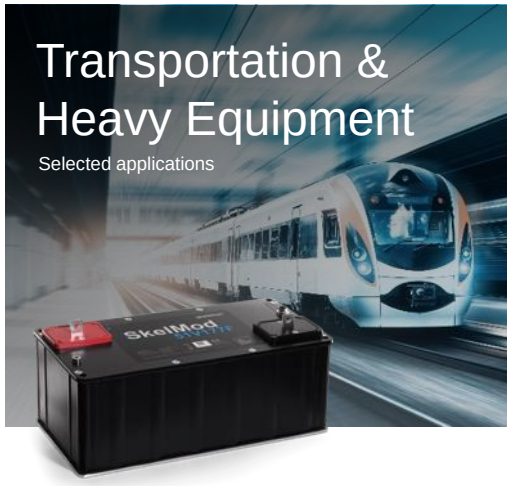
- **High power density** (up to 60 kW/kg)
- Limited energy density (up to 16 Wh/L)
- Extreme cycle life (>1 million)
- Extremely fast charge rate (2000 C)
- High inherent safety
- No rare metals

Key Enabling Technology to Power Electrification Across Industries

A qualified supplier & system provider to industry leaders



- Fuel cell power support solutions
- 48V active suspension
- KERS / Push-to-pass
- 12V board net stabilization & back-up solutions



- KERS for light rail
- Engine start
- Mild hybrid bus energy storage
- Fuel cell power support solutions for rail and bus transportation

- Wind turbine pitch control
- Virtual inertia / Grid forming in STATCOMs
- Microgrid power back-up and quality

- Peak load shaving to cover short-term peak power demands
- KERS for port cranes, forklifts, and elevators
- Fast-charging for warehouse AGVs and shuttles

Backed by a Strong Investor Base – Over 250M EUR of Capital Invested

Committed to supporting the company becoming a global market leader by 2024

skeleton

Marubeni

eit InnoEnergy Knowledge Innovation Community

HARJU ELEKTER

MMG MM GRUPP

FIRSTFLOOR CAPITAL

Founder of CTEK MAXIMIZING BATTERY PERFORMANCE

Co-founder of adyen

Co-founder of wise

“ **Enabling carbon-neutral electrification** is a key priority for us and Skeleton Technologies fits in our portfolio perfectly. The company has **validated its competitive advantage** in **real-life applications** and has shown **strong commercial traction**. ”

Masayuki Omoto
COO, Next Generation Business Development
Marubeni Corporation

Led by a World-class Management Team of Industry Veterans

Energy storage experts, entrepreneurs, and experienced leaders

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

COO

- 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

Erkki Raasuke

CFO

- Long experience in finance and banking as CFO at Swedbank, Managing Director at LHV Bank, and CEO at Luminor Bank
- Previously Chairman of Estonian State-Owned Companies Nomination Committee
- Previously Chairman of the Board at Eesti Energia and Estonian Air

Ants Vill

CCO

- Extensive experience in lean manufacturing and Kaizen consulting.
- Co-founded and sold an Estonian energy savings engineering company
- Member of the strategic advisory board at TalTech
- Previously VP of Product and COO at Skeleton.

Julian Feiler

VP Engineering

- Formerly Head of Engineering Battery Segment Asia at Vitesco Technologies, Mechanical Design Lead for 48V Battery Systems at Continental.
- Degrees in Mechanical Engineering (B.Eng.) & Technology and Innovation Management (M.Sc.)

Oliver Osters

VP Technology

- Long experience in cell & module development and industrialization in multi GWh scale in automotive industry as Project Manager at Mercedes-Benz AG and Volkswagen AG
- Strong background in electrochemistry and material science with a PhD in solid state chemistry from Technical University of Munich

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.

Dr. Anti Perkson

Materials Science Consultant

- Co-founder of Skeleton Technologies
- PhD in Theoretical and Computer Chemistry form University of Tartu, Estonia
- 20+ years in nanomaterials R&D, co-author of 20+ peer-reviewed research articles and 10+ patents in nanoporous carbon and energy storage.
- Previously CEO and R&D Director of Silmet AS

From Single Cells to Full Energy Storage Systems

The only full value-chain manufacturer on the market

Raw Material

Curved Graphene

Single Cells

300-5000F

Industrial supercapacitors

Industrial Modules

From low to high voltage needs

Supercapacitor modules with smart balancing and management systems

Systems

MWs of immediate power

Modular, supercapacitor-based energy storage systems

Technology Advantage Throughout the Entire Energy Storage Industry

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

2017

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)

2024

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

2024

SuperBatteries

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

Independent 3rd Party Verified Advantage

Superior power and energy densities in energy storage

skeleton+

"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

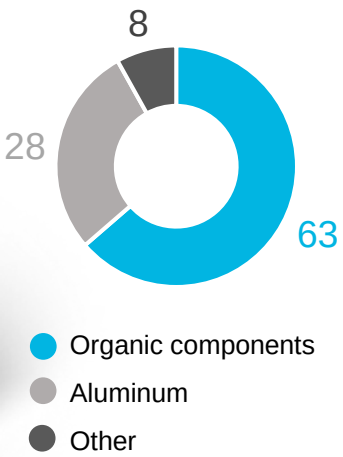
Uniquely fast charge times with high energy density

60 sec skeleton+

Charge time of 10 min *Competition*

Increased Safety Compared to Lithium-ion Batteries

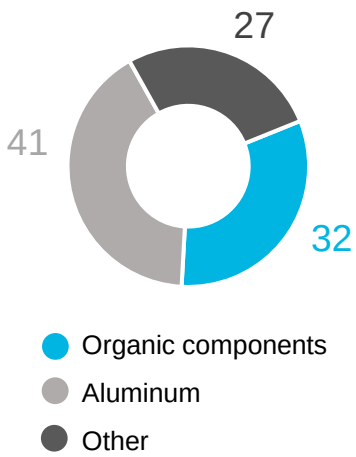
Lower cost due to Curved Graphene and abundance of other raw materials



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

The Most Versatile Product Portfolio in Supercapacitor Energy Storage

The only full value-chain manufacturer on the market

GEN 1
supercapacitor cells and modules

SkelCap
300-3400F
cells

SkelStart
12V & 24V
engine module

SkelMod 17V
5.8F
supercapacitor
module

SkelMod 51V
166F
supercapacitor
module

SkelMod 51V
177F
supercapacitor
module

SkelMod 102V
supercapacitor
module

SkelMod 131V
supercapacitor
module

SkelMod 171V
supercapacitor
module

Custom Skelpacks
Laser-welded
supercapacitor packs

GEN 2 Curved Graphene
supercapacitor cells and modules

SkelCap SCX
5000F

SkelMod 54V
supercapacitor
module

SkelMod 162V
supercapacitor
module

Modular, Intelligent Supercapacitor Energy Storage Systems

MWs of power, immediately available

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Systems

SkelGrid energy storage system

Supercapacitor-based turn-key energy storage solutions for high-power needs

High Performance Energy Storage - Made in Europe

Fully integrated production – control over the entire manufacturing chain

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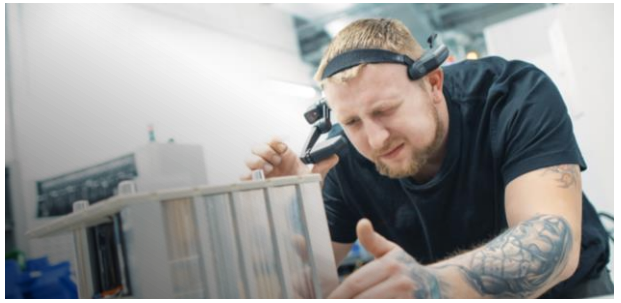

Skeleton Materials

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
COO

"**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

ATTABOTICS

WRIGHT

German automotive OEM

Hitachi Energy

North-American Truck OEM

mjr Power & Automation

MAJA

GE

CAF Power & Automation

Danfoss

MITSUBISHI

Honda Racing HPD

esa

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

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

CAF Power & Automation

"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**.

Enabling Environmentally-Friendly E-Commerce

Recharging in seconds along the route, no charging space required

"Skeleton's development work on the ultracapacitor pack provides our system the **power and reliability for constant operation**."

Scott Gravelle
CEO, Attabotics

Solving Issues in Hydrogen Fuel Cell Transportation

The ideal combination of high power and energy technologies

”Wrightbus is working with world-class leaders such as Skeleton Technologies for supercapacitors. **Supercapacitors and fuel cells are the ideal combination for better performance and lower cost of ownership**.”

Jo Bamford
Chairman, Wrightbus

Key Benefits

To working with us

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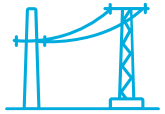
IATF-certified & the **largest supercapacitor factory** in Europe



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

Unique technology & product roadmap with **Curved Graphene**, protected by more than 30 granted/pending 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

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