MOLL BATTERIEN



Next Generation Battery Production

OVER 80 YEARS OF BATTERY EXPERTISE FROM BAVARIA

TWO SITES. ONE MISSION.

BAD STAFFELSTEIN, BAVARIA
BUSINESS UNIT AUTOMOTIVE



SINCE 1946
Specialist in starter batteries with the highest quality standards.



TWO PLANTS.
ONE CULTURE OF INNOVATION.

We develop reliable battery solutions with responsibility – today and for generations to come.

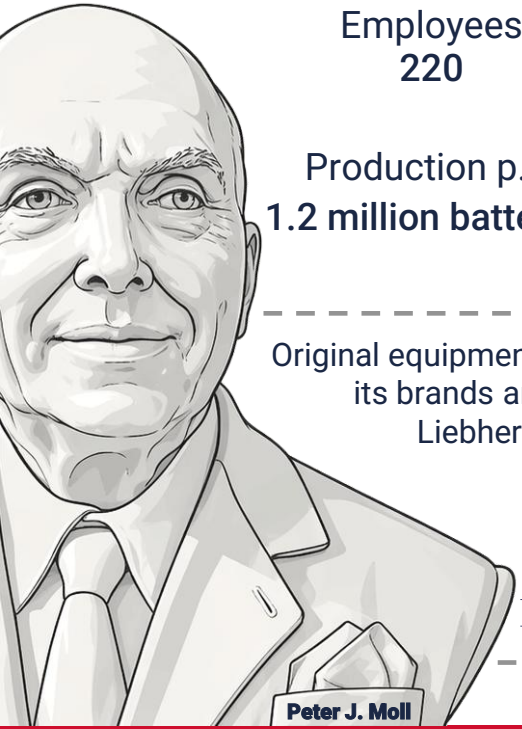
LICHTENFELS, BAVARIA
BUSINESS UNIT BESS



FROM Q2 / 2027
Germany's first industrial sodium-ion battery production for modern battery energy storage systems (BESS), Uninterruptible Power Supply (UPS), Data Systems and Military.

MOLL KEY FACTS

BUSINESS UNIT AUTOMOTIVE



Employees
220

Location
Bad Staffelstein

Production p.a.
1.2 million batteries

Production capacity p.a.
1,0 GWh

Original equipment supplier to the VW Group with all its brands and to other manufacturers such as Liebherr, Mercedes-Benz, INEOS, KAESER, Tadano Faun, Ammann.

BUSINESS UNIT BESS

Employees
120

Location
Lichtenfels

Production p.a.
1.4 million cells

Production capacity p.a.
1,0 GWh



CERTIFIED MANAGEMENT SYSTEMS









IATF 16949
✓ Automotive quality management

ISO 9001
✓ Quality management

ISO 14001
✓ Environmental management

ISO 50001
✓ Energy management

MILESTONES OF INNOVATION

1946



Peter J. Moll starts MOLL in Bad Staffelstein

1953



MOLL Kamina Battery
Central degassing

1976



Sealing ring patent
Prevents leakage currents and increases vibration resistance

1985



Ocean Power
Deep-water battery

1990



Adapter-frit patent
Effective backfire protection

2012



Inventor of the EFB battery
Development of the EFB battery for VW, Audi, Seat, Skoda, Porsche, Mercedes, and others

2022



MOLL AFB start-stop
Premium AGM replacement that outperforms AGM in many areas

2023



Licensing model
Establishing an international licensee network

2026/27



SIB Gigafactory
Germany's first industrial sodium battery production

GLOBALLY WELL CONNECTED

TOGETHER FOR INNOVATIVE BATTERY STORAGE SOLUTIONS

STRONG SUPPORT



Support from politics and industry as the basis for innovation and growth.

LARGE NETWORK

Together with strong partners from industry, research, and associations

IHK für Oberfranken Bayreuth

Ghorfa غرفة التجارة والصناعة العربية الألمانية Arab-German Chamber of Commerce and Industry e.V.

NUMOV Nah- und MittelOst-Verein e.V. German Near and Middle East Association

zvei electrifying ideas

Cluster Offensive Bayern

INTERNATIONAL PROJECTS



Project implementations in an international context (e.g. Algeria, Colombia).

SODIUM-ION VS. LITHIUM-ION

PARAMETER	SODIUM-ION BATTERY	LITHIUM-ION BATTERY (NMC / LFP / LTO)
Abundance in the earth's crust	23,000 ppm	20 ppm
Gravimetric energy density	100 - 150 Wh/kg	140 - 280 Wh/kg
Volumetric energy density	250 - 400 Wh/l	250 - 750 Wh/l
Cycles	2,000 - 18,000	2,000 - 12,000
Fast-charging capability (max.)	3C charge / 10C discharge	NMC <3C · LFP <2C · LTO <6C
Operating temperature	-20 °C to +60 °C	0 °C to +45 °C
Safety · Transport	Transport possible at 0 V	Transport at 30 - 50 % SoC

Sodium is 1,150 × more abundant than lithium in the earth's crust · No cobalt, no nickel, no lithium **· Inherently safe**
Post-lithium technology

AREAS OF APPLICATION

Sodium-Technology
Sustainable. Secure. Available.

Safe & Robust
Stable under extreme conditions

Economically
Cost-effective & durable

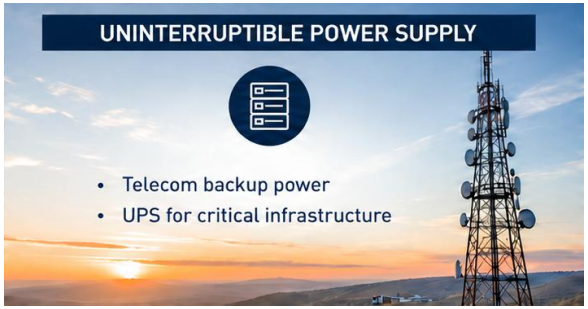














SODIUM-ION
LARGE-SCALE STORAGE SOLUTIONS

SODIUM-ION BESS FOR A SUSTAINABLE
AND SECURE ENERGY FUTURE



SIB SCALABLE BESS PLATFORM

SCALABLE ENERGY STORAGE SOLUTION FROM 125 kWh INTO THE MWh RANGE



125 kWh

500 kWh

2.4 MWh

LARGE-SCALE STORAGE SOLUTIONS

COMMERCIAL-SCALE

≤ 5 MWh

- SMEs & commercial
- Supermarkets & retail
- Agriculture
- Logistics & e-fleets



UTILITY-SCALE

>10 MWh

- Energy utilities
- Grid operators
- Energy trading
- Grid stabilization



Turnkey solutions: planning · delivery · installation · operation & maintenance

PRISMATIC NA+ CELL

THE BASIS FOR MODULAR RACKS AND SCALABLE BESS SOLUTIONS.



KEY FACTS

- **Sodium-ion cell**
  with carbon anode
- **Capacity:** 170Ah
  Nominal voltage: 2.85 V
  Nominal energy: 485 Wh
- **Organic electrolyte**
- **Dimensions (W x D x H):**
  174 x 72 x 207 mm
- **Cycle life:**
  8,000 - 10,000 cycles
  (80% SOH)



CELL > RACK > BESS

HIGH-PERFORMANCE MOLL SODIUM-ION CELL

High efficiency: energy efficiency >95.5%, nominal capacity 170 Ah;

Long life: up to 8,000 cycles at 25°C

Wide temperature range: discharge from -40°C to 60°C for harsh environments;

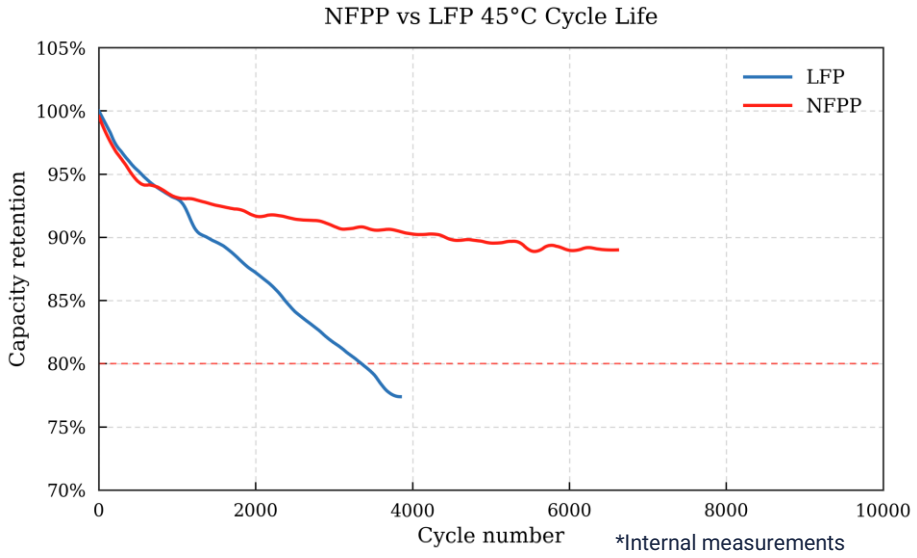
Excellent safety: no fire or explosion under overcharge, short-circuit, or crush tests;

High power output: supports 1.0C continuous charge/discharge with strong power capability;



ITEM	SPECIFICATION
Battery type	Sodium-ion battery
Cell form	Prismatic type
Cell dimensions	206*72*174mm
Nominal capacity	170Ah
Nominal voltage	2.85V
Operating voltage range	2.0～3.3V
Standard charge rate	0.5C
Standard discharge rate	0.5C
Max. charge rate	1C
Max. discharge rate	1C
Charge temperature range	0 ~60℃
Discharge temperature range	-40 ~ 60℃
Weight	4.8 ± 0.2kg
Cycle life	8,000 – 10,000 cycles

PERFORMANCE of the MOLL-CELL



A comparison of LFP and NFPP shows significantly higher cycle stability for the NFPP cell compared to the LFP cell at 45°C.

CO_2 - FOOTPRINT COMPARISON

Chemistry	CO_2-Footprint Manufacturing	kg CO_2/kWh Energy Cycle	Energy Density in Wh/kg	Typical Cycles
Lead-Acid	25 - 40 kg CO_2/kWh*	0,033	30 - 50	500 - 1.500
NMC811	59 - 115 kg CO_2/kWh	0,058	240	1.000 - 2.000
LFP	54 - 69 kg CO_2/kWh	0,012	90 - 160	3.000 - 7.000
SIB in general	75 - 87 kg CO_2/kWh	0,027	100 - 160	2.000 - 4.000
MOLL SIB Cell	**51 - 73 kg CO_2/kWh****	**0,007**	**103**	**8.000 - 10.000**

** Due to high amount of recycled Lead in production (ca. 75%)*
*** Given range due to wet- vs. dry-coating*

COMPARISON - References

- Jasper, Friedrich B., et al. "Full life cycle assessment of an industrial lead–acid battery based on primary data." Energy Advances 4.7 (2025): 910-929
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- Peiseler, Leopold, et al. "Carbon footprint distributions of lithium-ion batteries and their materials." Nature Communications 15.1 (2024): 10301.
- Degen, Florian, Miriam Mitterfellner, and Achim Kampker. "Comparative life cycle assessment of lithium-ion, sodium-ion, and solid-state battery cells for electric vehicles." Journal of Industrial Ecology 29.1 (2025): 113-128
- Stanchev & Hinov (2025): "Comparative Techno-Economic and Life Cycle Assessment of Stationary Energy Storage Systems: Lithium-Ion, Lead-Acid, and Hydrogen", Batteries 11, 382
- Gorsch, Jonas, et al. "Contrasting a BYD Blade prismatic cell and Tesla 4680 cylindrical cell with a teardown analysis of design and performance." Cell Reports Physical Science 6.3 (2025).
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ADVANTAGES OF SODIUM-ION BATTERIES

Temperature resistant

Operational from -40°C to +60°C

Higher safety

Low flammability

Deep discharge without damage

Transport without restrictions

Fast-charging capable

>4C charge, >10C discharge

Sustainable

No critical raw materials

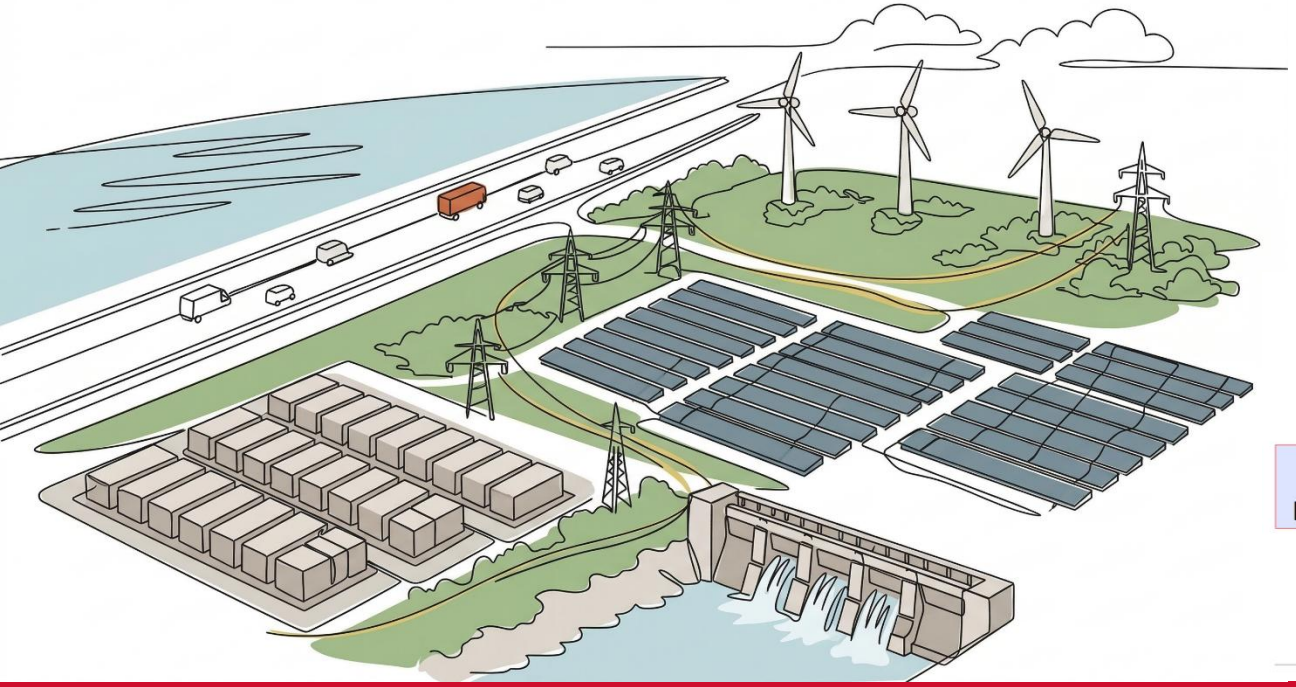
High cycle stability

Economical energy storage



THANK YOU FOR YOUR ATTENTION!

MOLL BATTERIEN



Aufbau einer Produktion von Natrium-Ionen-Batterien durch Moll Batterien GmbH

Dieses Projekt wird vom Freistaat Bayern und der Europäischen Union kofinanziert.

efre-bayern.de