



BMZ GROUP

COMPANY PRESENTATION

2022

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MARKETS &
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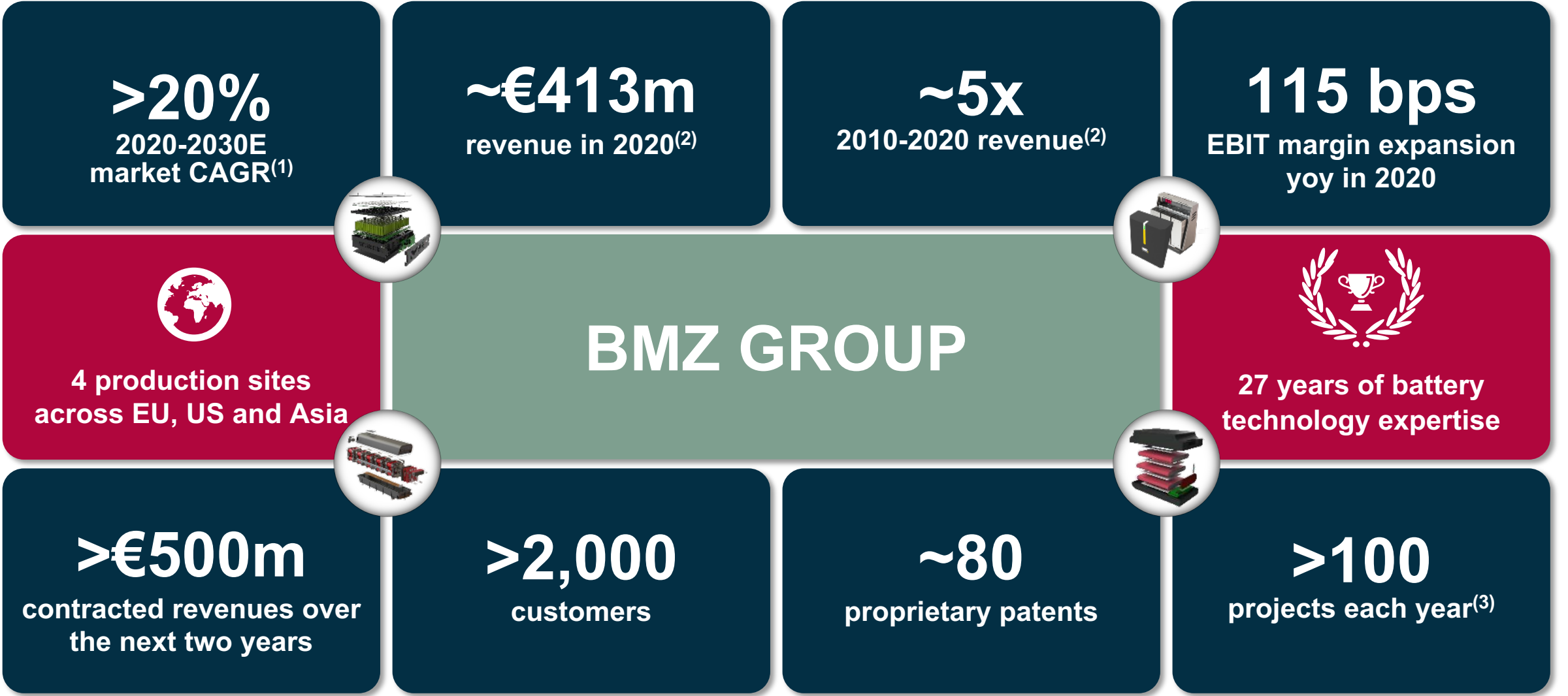
04

FURTHER
OFFERINGS

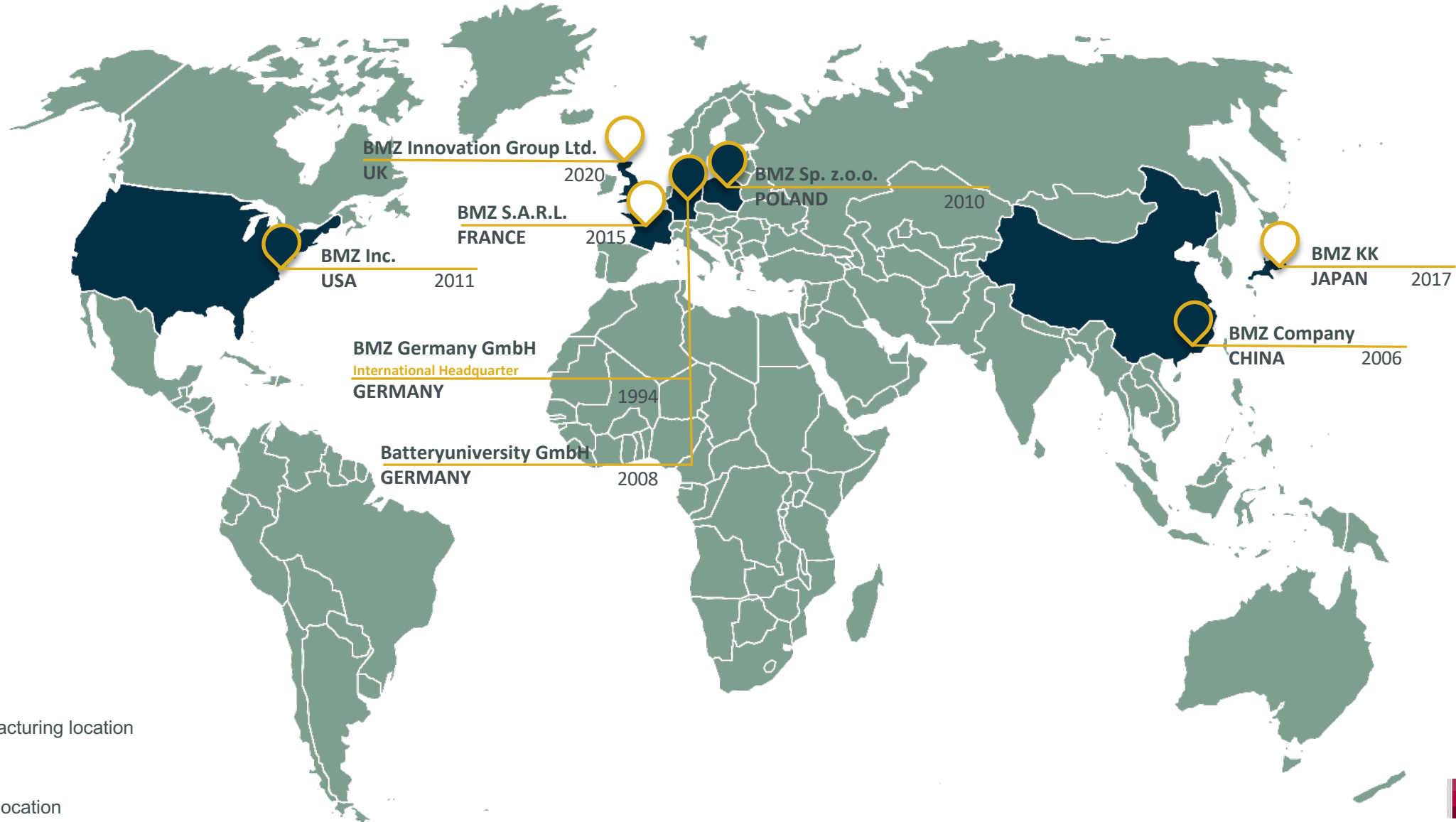
01 GROUP & TECHNOLOGY



01 DATA & FACTS



01 BMZ GROUP WORLDWIDE



- Manufacturing location
- Sales location

01 VERTICALLY INTEGRATED PRODUCTION FACILITIES WORLDWIDE

KARLSTEIN






 Founded in 1994
 ~790 employees
 72,000m²
 €60m invested 2018-2020





Battery cell production	Module production	System manufacturing	Application assembly	Recycling
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STRONG LOGISTICS INFRASTRUCTURE

GLIWICE



 Founded in 2010
 ~570 employees
 77,000m²
 €30m invested 2018-2020





Battery cell production	Module production	System manufacturing	Application assembly	Recycling
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CAPACITY OPTIMIZATION

VIRGINIA BEACH

 Founded in 2011
 ~40 employees
 2,400m²
 €2m invested 2018-2020

Battery cell production	Module production	System manufacturing	Application assembly	Recycling
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PROXIMITY TO CLIENTS

SHENZHEN




 Founded in 2006
 ~420 employees
 35,000m²
 €20m invested 2018-2020

 In-house part production
(injection-moulded parts, displays, chargers etc.)

Battery cell Production ⁽¹⁾	Module production	System manufacturing	Application assembly	Recycling
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STRONG LABOUR SUPPLY



> 1,800
Employees
Worldwide



> 100
Projects /
Year



Worldwide
Development
Centers

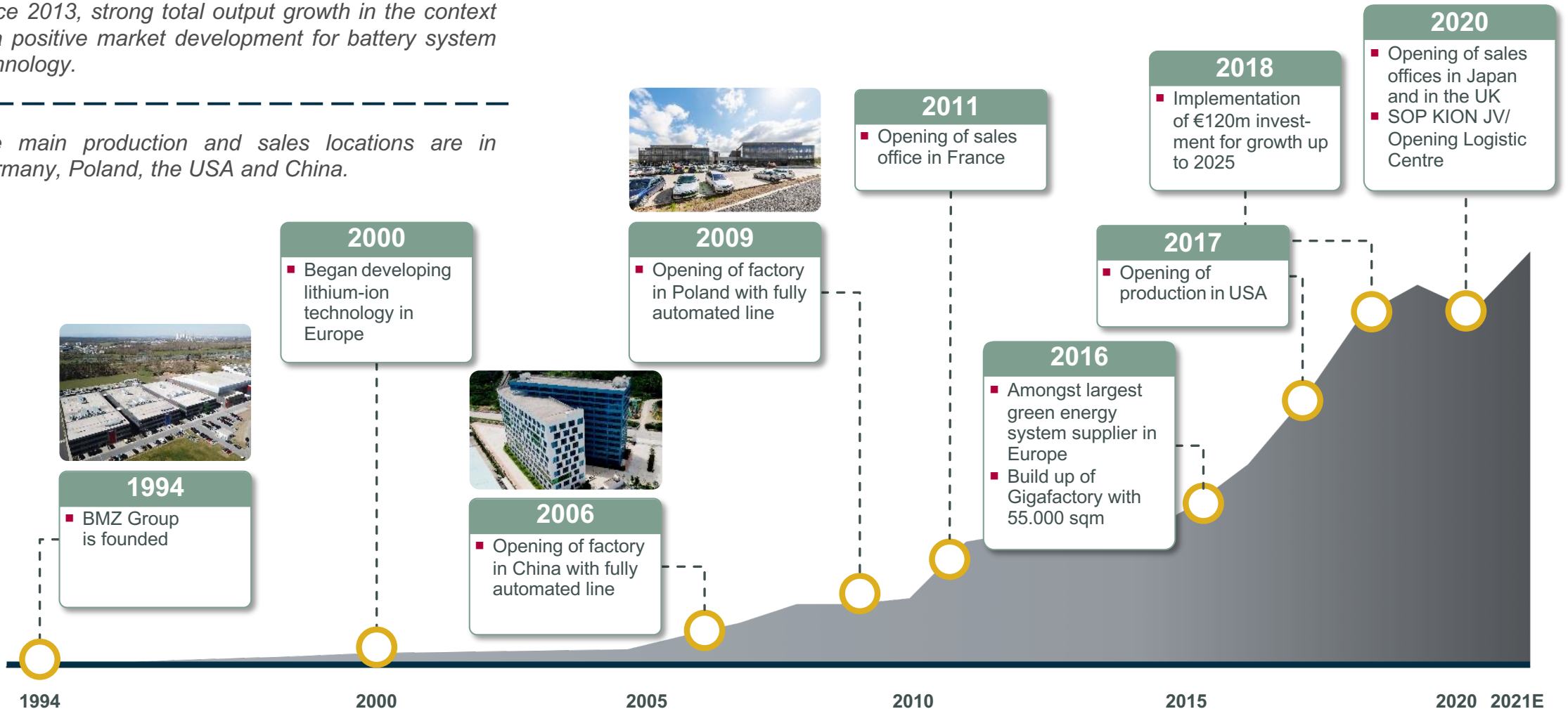
Note: (1) Battery cell production will start 2024.

01 27 YEARS OF BATTERY TECHNOLOGY EXPERTISE

History & Revenue BMZ Group

Since 2013, strong total output growth in the context of a positive market development for battery system technology.

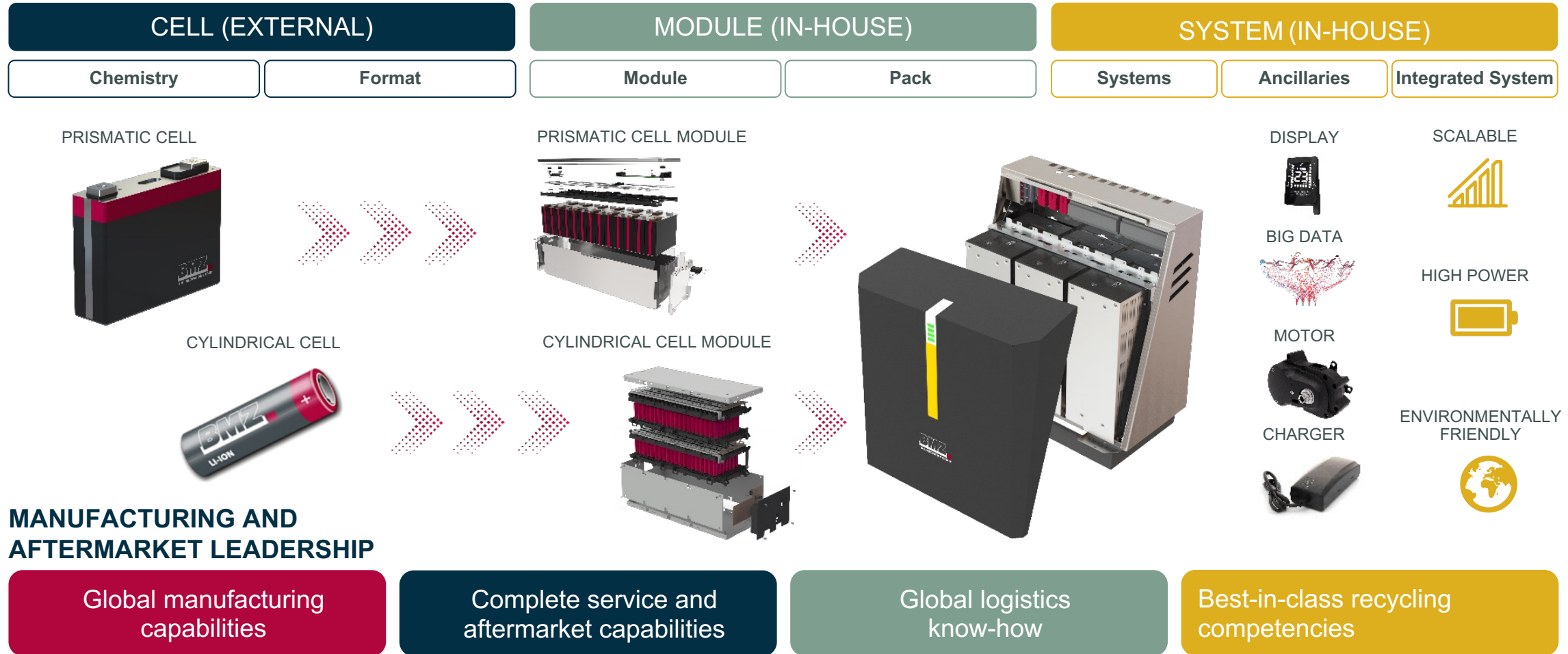
The main production and sales locations are in Germany, Poland, the USA and China.



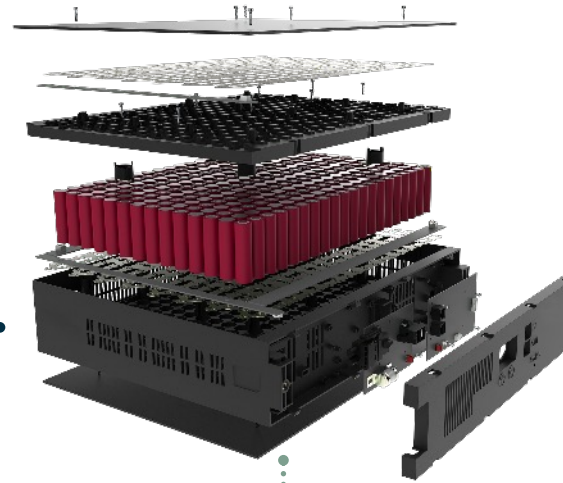
01 BROAD BATTERY SOLUTIONS AND ENGINEERING SPECIALIST



Diverse Product Portfolio across End-Market Applications




01 PROVIDING KEY SOLUTIONS FOR COMPLEX BATTERY SYSTEMS



CHALLENGES FOR BATTERY SYSTEMS...


...SOLVED BY BMZ

DESIGN CHALLENGES

- 
- Slow development cycle
 - Complex design architecture
 - Costly experimental testing




PRODUCTION CHALLENGES

- 
- Large number of consecutive steps
 - High complexity of full-scale serial production
 - Database on traceability



QUALITY CHALLENGES

- 
- Increased energy density
 - Demands in lifetime, cycles, temperature, weight and safety
 - Ongoing development and improvements



As a manufacturer of complex battery systems, BMZ solves current key technical challenges, in turn becoming the technology partner of choice for clients globally.

01 FUTURE PROOF BATTERY CELLS SOURCING CAPABILITIES

In-House Capabilities Complemented by Long Standing Agreements
with Subcontractors for Battery Cells



“MADE IN GERMANY” QUALITY 

PLAN FOR IN-HOUSE BATTERY CELL PRODUCTION IN CHINA

OWN PROCESS AND MATERIAL IMPLEMENTED

SUPPORTED BY GOVERNMENT GRANTS

01 DEEP ENGINEERING KNOW-HOW AND TECHNICAL EXPERTISE



FIRST INNOVATION SUPPLIER
IN BATTERY SYSTEMS⁽¹⁾

27

years of Battery System
competence

*Serial high-performance battery
systems pioneer with superior
industry track record*



GERMAN
ENGINEER TEAM

10%

of total employees
active in R&D

*Joint R&D and close collaboration
with clients in development,
homologation and testing*



IP RIGHTS AND FULLY
AUTOMATION EXPERTISE

>4,500

products
electrified

*BMZ is leading the way with a
significant technological and
production superiority⁽¹⁾*



GLOBAL CERTIFICATION
WITH OWN LABORATORY

10,000

world wide approval from UL,
IEC, UN⁽²⁾ to supply globally

*Through its long-standing technical
expertise, BMZ has built up a strong
global certification footprint*



Battery Platform for
Broad Applications



Battery Design
Engineering



Hardware & Software
Engineering In-house



Industrial Engineering
Team



Global
Logistics



Service, Aftersales
& Recycling

01 END-TO-END CAPABILITIES SUPPORTING CUSTOMERS



Continuous Flow of Contact Fostering Close Partnerships with Clients



1. TECHNICAL SALES

- In-house technical sales and marketing team
- Long standing client relationships



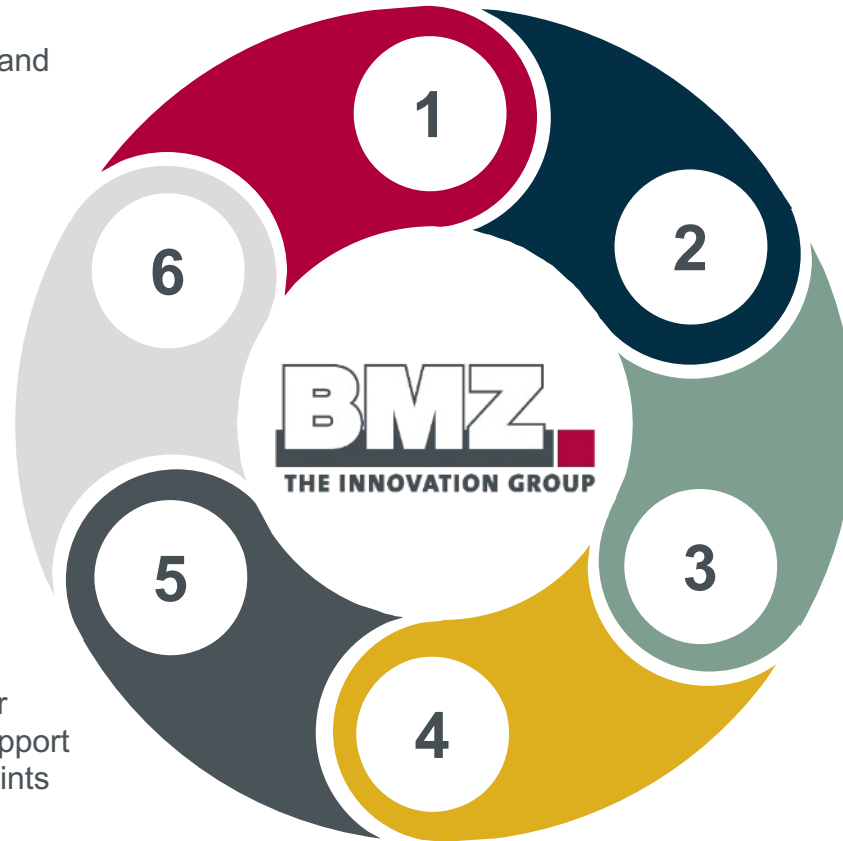
6. RECYCLING AND 2ND LIFE

- Strict regulations around recovery of battery packs at the end of the 1st useful life



5. AFTER MARKET

- Global teams with 24hour dedicated aftermarket support
- 9 international service points



2. SOLUTION DESIGN

- Development, testing and fine tuning of the prototype



3. CERTIFICATION CAPABILITIES

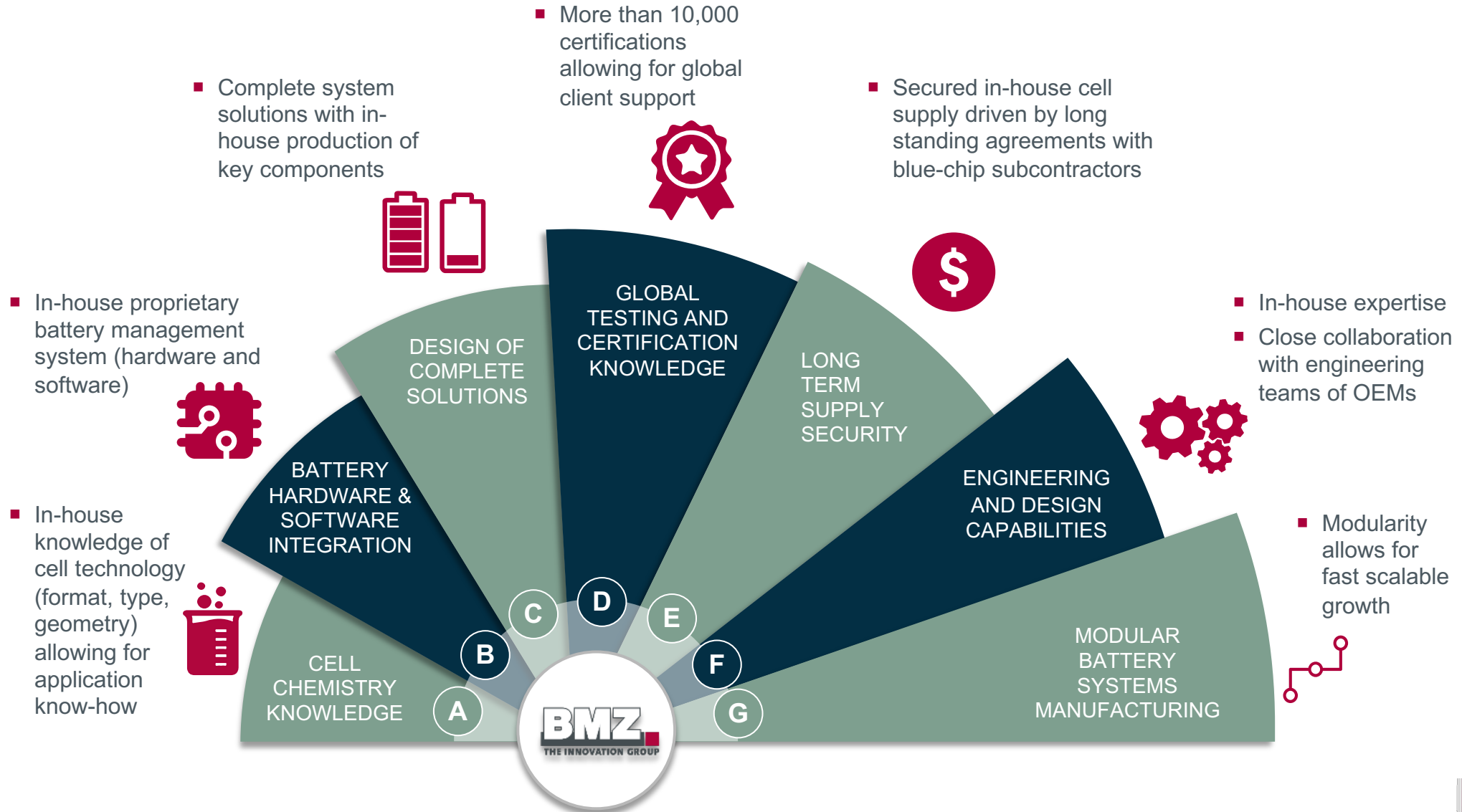
- Extensive tests and stringent validation / certification process
- In-house expertise in regulatory affairs globally



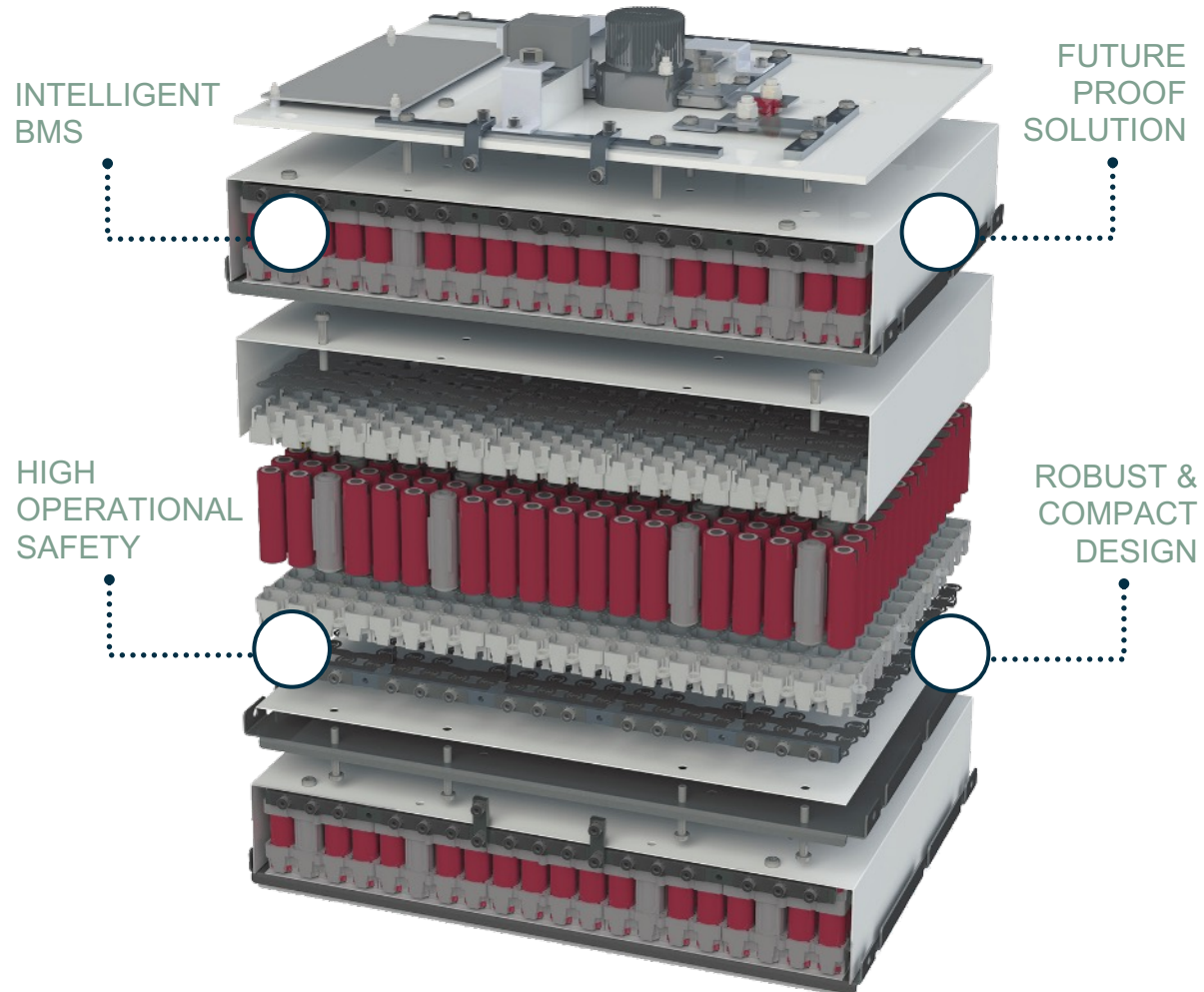
4. SERIES PRODUCTION

- Industry leading production capabilities in key global locations
- Ability to deliver solutions in close proximity to clients' locations

01 BMZ DIFFERENTIATED ENGINEERING CAPABILITIES



01 DIFFERENTIATED ENGINEERING AND DESIGN CAPABILITIES



INTELLIGENT BMS

- Monitoring of cell voltage, cell temperature, current, derating and passive balancing



FUTURE PROOF SOLUTION

- Reduction of energy costs
- Lifetime up to 20 years
- Environmentally friendly



HIGH OPERATIONAL SAFETY

- Overvoltage and undervoltage monitoring for each cell string with redundant battery cut-off
- Protection against a reboot after deep discharge or any other serious error



ROBUST AND COMPACT DESIGN

- Double metal housing
- Up to 5,000 cycles

01 ATTRACTIVE WAREHOUSING SERVICES INFRASTRUCTURE



BMZ Logistics Center



Best-in-Class Offering

- ✓ **State-of-the-art logistics centre** with 7,000m² of space and 10,000+ pallet spaces
- ✓ **Designed and built especially for storage of lithium-ion batteries/ hazardous goods**
- ✓ **Unique fire protection and extinguishing system**, tested and approved by the VDS test centre and thus **accepted in the insurance market**



Strong Value Proposition for Our Clients

- ✓ **Safe and secure storage** of lithium-ion batteries
- ✓ **Dangerous class 9 approved** as the only one in Europe
- ✓ **Fast processing & worldwide shipping**
- ✓ **Flexibility** for short-term requirements

MARKETS & PRODUCTS



E-MOBILITY



DRIVE SYSTEMS



ENERGY STORAGE SYSTEMS



INDUSTRIAL



MEDICAL



POWER- & GARDENTOOLS



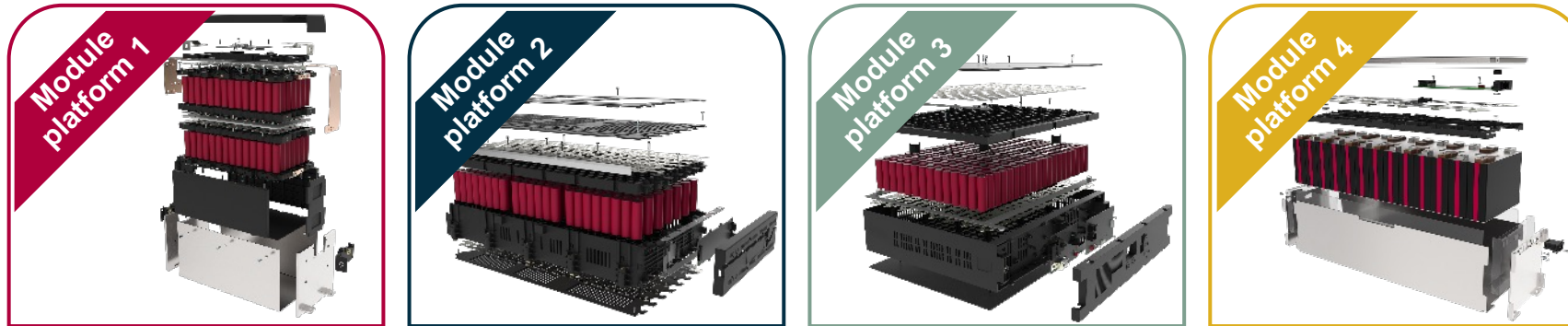
02 E-MOBILITY

Product Range



02 E-MOBILITY

Product Range



CAPACITY & VOLTAGE LEVEL	4 kWh – 200 kWh 48 V – 80 V	50 kWh – 300 kWh 400 V – 800 V	20 kWh – 80 kWh 126 V – 800 V	300 kWh – 500 kWh 680 V – 1000 V
WEIGHT	50 kg – 2,500 kg	200 kg – 800 kg	300 kg – 500 kg	2,500 kg
CYCLE LIFE (AT 70% EOL)	4,500	3,000	2,500	2,500
SELECTED APPLICATIONS				
CUSTOMERS				

LONG LIFE-CYCLE	CIRCUIT PROTECTION	LIGHTWEIGHT	MAINTENANCE FREE

02 DRIVE SYSTEMS

BMZ
THE INNOVATION GROUP



02 DRIVE SYSTEMS

Product Range



02 DRIVE SYSTEMS

Product Range



BENEFITS	Lightest version + biggest distance range	Fast Charging	110 newton meters torque	Navigation, distance control, IoT
INTEROPERABILITY	✓	✓	✓	✓
LIFETIME	8 Years	10 Years	10 Years	8 Years

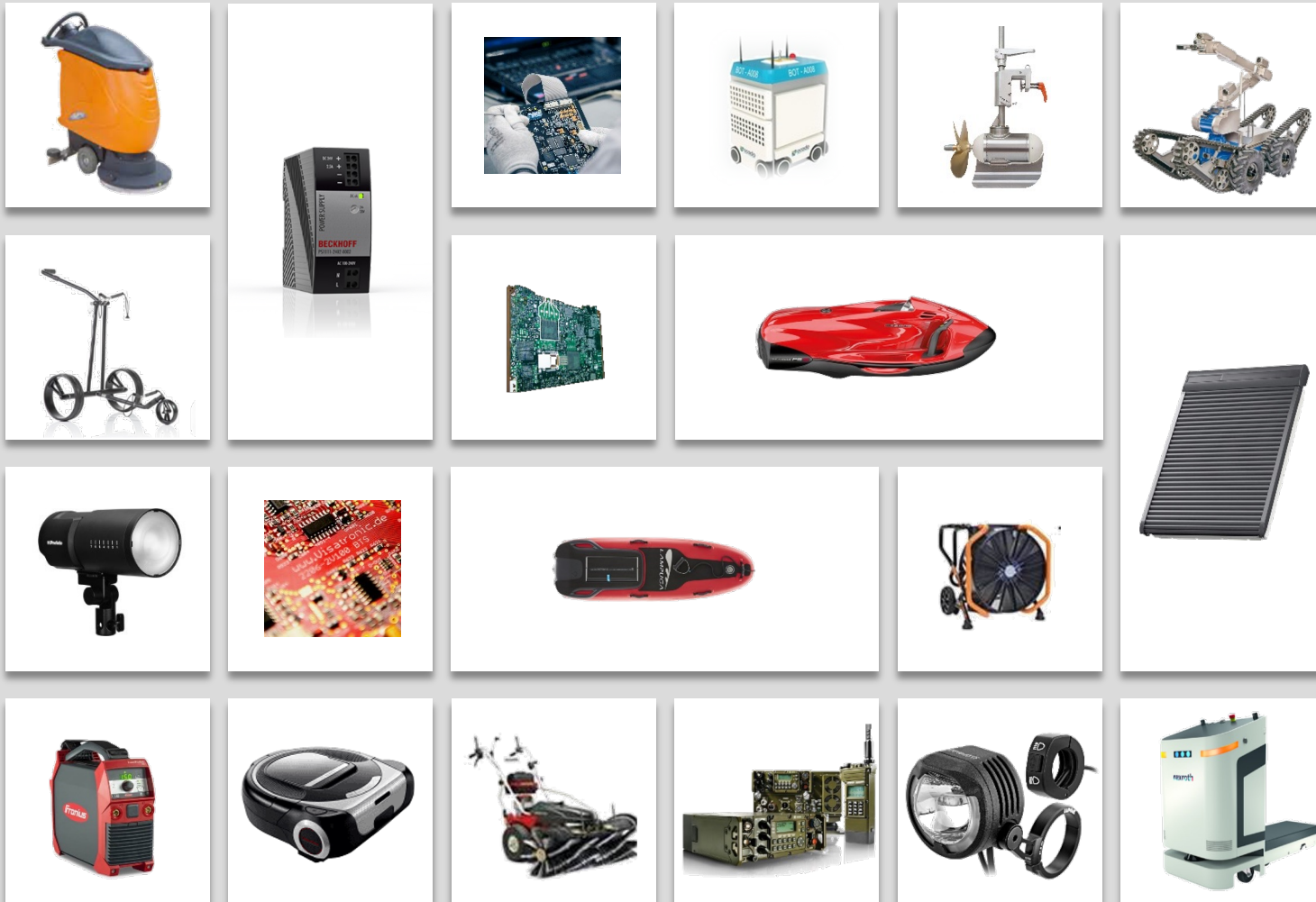
FULLY INTEGRATED SOFTWARE PLATFORM



Our drive systems product portfolio provides all necessary drive motor components to clients allowing us to create a comprehensive drive systems solutions suite



02 INDUSTRIAL





02 MEDICAL



PHILIPS
Healthcare

drive

Ulrich
medical

ZIMMER BIOMET

LÖWENSTEIN
medical

ottobock.

AESCULAP.

TRIXELL

varian
A Siemens Healthineers Company

+ medicassist

LRE Medical

LEVO
THE EXPERTS IN STANDING

alber

Dentsply
Sirona

Liko.

ResMed

DePuy Synthes
a Johnson & Johnson company

STEPHAN

LENUS
Infusionstechnik

MAQUET
GETINGE GROUP

Roche

medos
cardiopulmonary solutions

02 POWER- & GARDENTOOLS



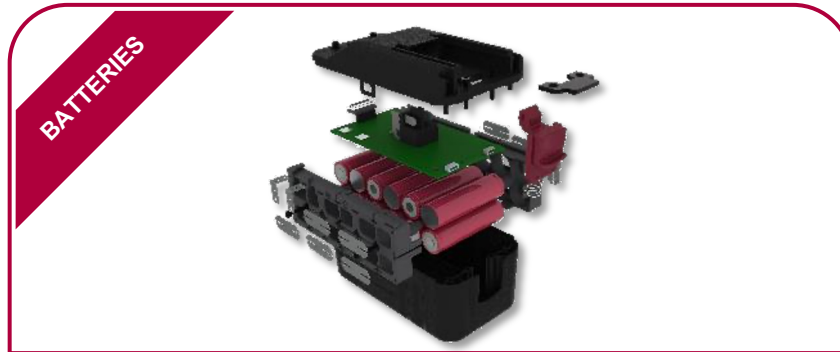
02 POWER- & GARDENTOOLS

Product Range



02 POWER- & GARDENTOOLS

Product Range



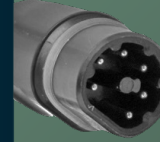
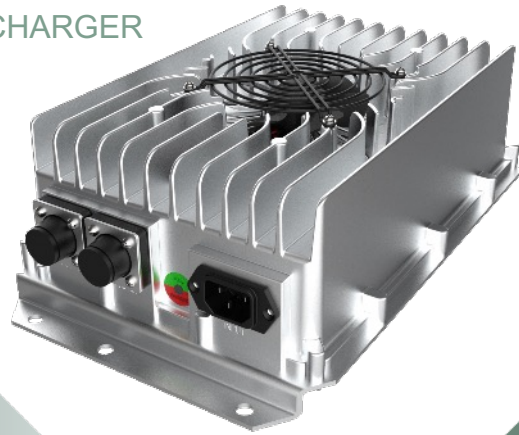
ELECTRIC CHARGE	1.5 Ah – 20 Ah
WEIGHT	400 g – 8,000 g
CYCLE LIFE (AT 70% EOL)	1,500
CUSTOMERS	

BMZ batteries for power & garden tools provide customers exceptionally high performance while ensuring a long life cycle

02 CHARGER

Supplies Solutions

ON-BOARD
CHARGER



OPTIONAL
PLUGS



WALLPLUG
CHARGER

DESKTOP
CHARGER



UPCOMING
SOLUTIONS



CUSTOMIZED
CHARGER



02 ENERGY STORAGE

BMZ
THE INNOVATION GROUP



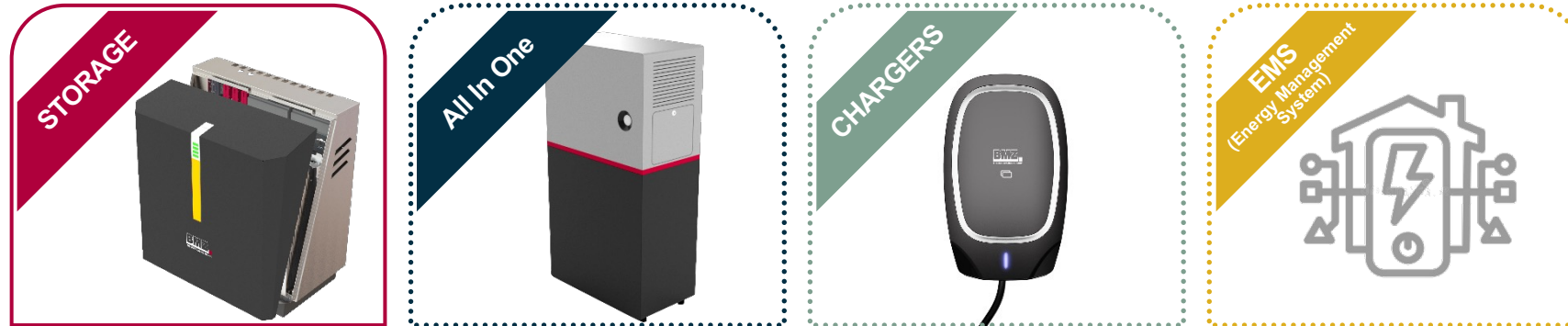
02 ENERGY STORAGE

Product Range



02 ENERGY STORAGE

Product Range



BENEFITS	Off-grid energy solution, compatible with most converters	Fully integrated into company-owned home Energy Storage System	7KW and 11KW charging	Based on open EMS platform allows for seamless connection of devices
INTEROPERABILITY	✓	✓	✓	✓
CALENDAR LIFE	10 Years	10 Years	10 Years	Continuous developments & updates
APPLICATIONS	Commercial and residential use	Commercial and residential use	Commercial and residential use	Monitoring and controlling Energy Management System



We offer uniquely integrated solutions utilizing cross-compatible elements while enabling additional usage insights through our software capabilities

02 ENERGY STORAGE – Hyperion

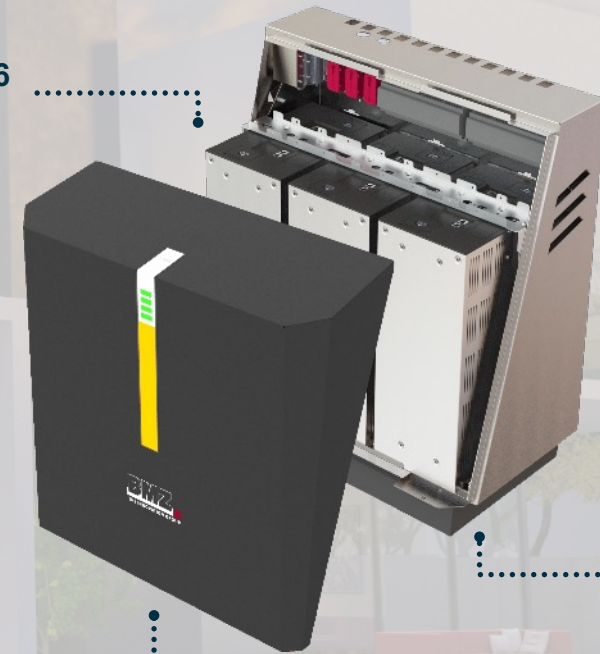
HV System – HYPERION: Best HV ESS System compatible with leading inverters including hybrid



USABLE
CAPACITY:
7.5 TO 15 kWh

3 TO MAX. 6
MODULES

MODULAR &
EXTENDABLE



ROBUST &
SAFE

EMERGENCY
POWER-CAPABLE

02a ESS Information - Hyperion

TECHNICAL DETAILS	3 MODULES	4 MODULES	5 MODULES	6 MODULES
Energy (usable)	7.5 kWh	10 kWh	12.5 kWh	15 kWh
Nominal Voltage	155 V	207 V	258 V	310 V
Charge End Voltage	170 V	227 V	284 V	340 V
Discharge End Voltage	134 V	179 V	224 V	268 V
Capacity (usable)	48.7 Ah			
Max. Charge Current	29 A			
Max. Discharge Current (3s)	40 A			
Max. Discharge Capacity (3s)	6.2 kW	8.3 kW	10.3 kW	12.4 kW
Max. Discharge Power	4.6 kW	6.2 kW	7.7 kW	9.3 kW
Weight	107 kg	129 kg	151 kg	173 kg
Dimensions (WxHxD)	751 x 870 x 423 mm			
Single Module: Weight	22 kg			
Single Module: Dimensions (WxHxD)	546.1 x 216.8 x 155.3 mm			
Discharge Operating Temperature	-15 up to 55 °C			
Charge Operating Temperature	0 up to 45 °C			
Storage Temperature	-20 up to 60 °C			
Compatibility (Interface)	According to BMZ compatibility list			
Battery Chemistry	Li-Ion NCA/NMC			
IP Protection Class	IP 21			

- SAFE
- ROBUST
- MODULAR
- EXTENDABLE
- EMERGENCY POWER*



*Emergency or backup power operation only with emergency or backup power-capable inverters. For details on the functions and requirements, please contact the inverter manufacturer.

02a ESS Information – ESS Z

TECHNICAL DETAILS

TECHNICAL DETAILS	ESS Z
Energy (nom. / usable)	8.87 kWh / 7.1 kWh
Nominal Voltage	54.75 V
Charge End Voltage	61.5 V
Discharge End Voltage	45.0 V
Capacity (nom. / usable)	162 Ah / 129.6 Ah
Max. Charge	81 A
Max. Discharge Current	300 A (3 Sec.)
Max. Discharge Power	18 kW*
Weight	98 kg
Dimensions (W * H * D)	638 x 421 x 487 mm
Communication	CAN - SMA Ready
Battery Management System	Monitoring of cell voltage, cell temperature, current, derating and passive balancing
Energy Density (Weight)	90.5 Wh / kg
IP Protection Class	IP 21

*depends on the respective inverter

ADVANTAGES OF BMZ-ENERGY STORAGE

- Store during the day; use day and night
- Independent from daylight and public grid
- Robust, safe and space saving
- Economic, cost-cutting and ecofriendly
- Modular installation:
The storage capacity can be adapted to your needs



02a Hyperion Installation

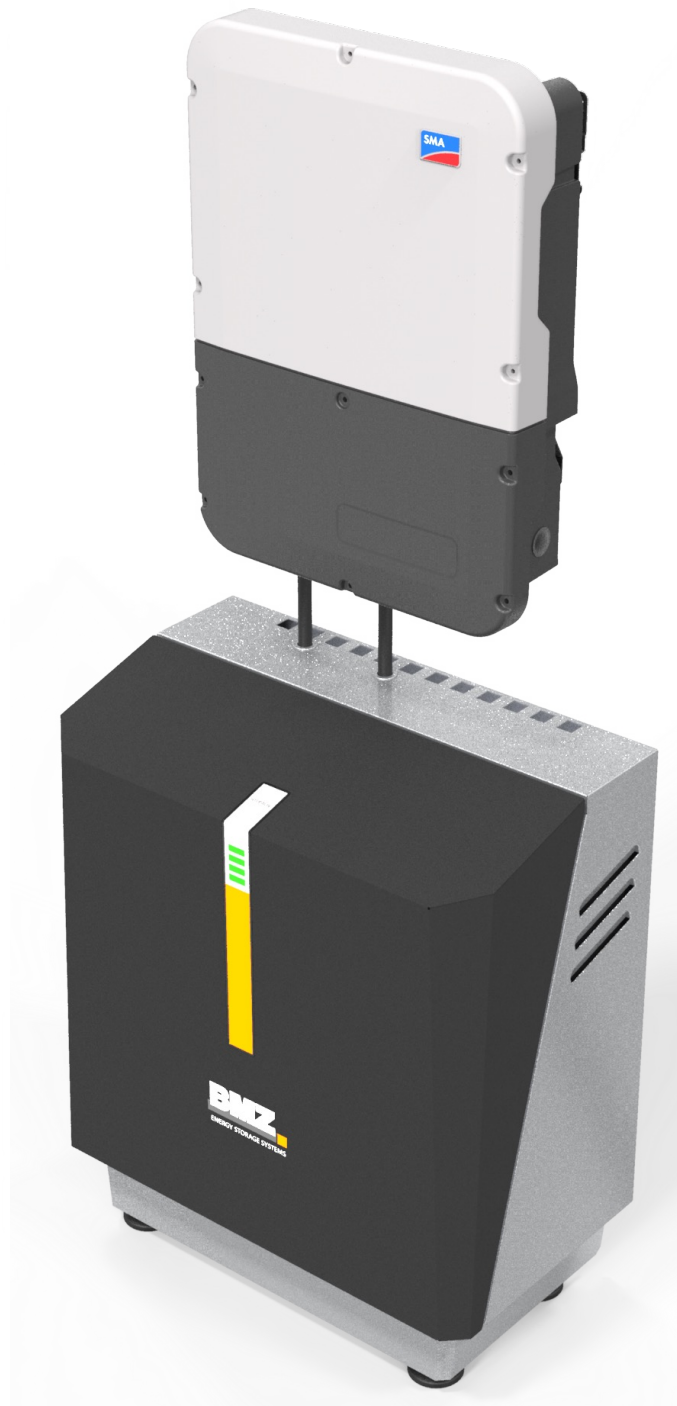


KOSTAL



Kostal Plenticore Plus / BI

02a Hyperion Installation



03 COMPANY STRATEGY



May June July August September October November December

84% 71% 98% 65%

03 BMZ - ONE STOP SHOP



One of the biggest Global Player



ENGINEERING

- Development
- Design for manufacturing
- Design to cost



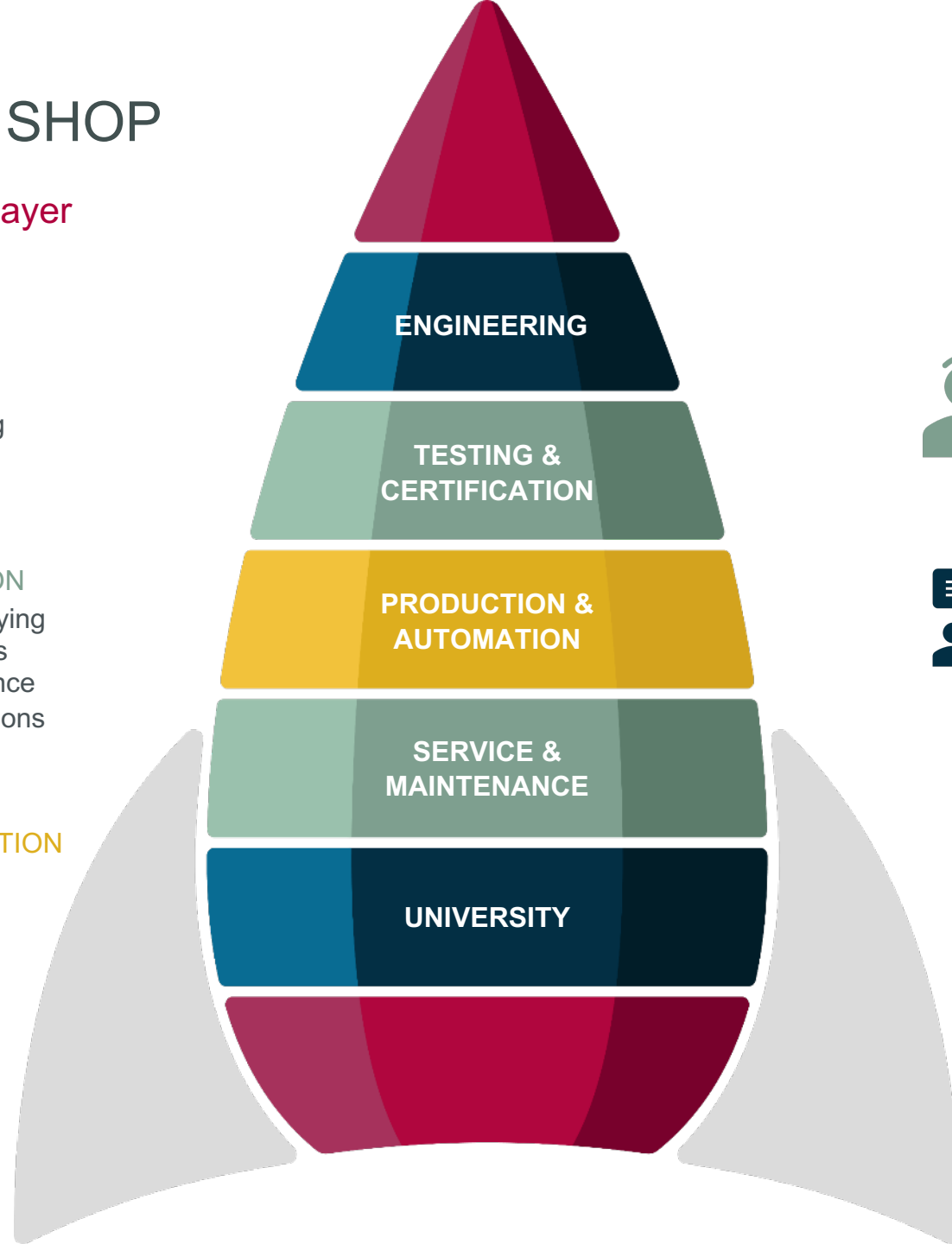
TESTING & CERTIFICATION

- Development-accompanying and standard-based tests
- Certifications in accordance with international regulations



PRODUCTION & AUTOMATION

- Production
- Automation
- Quality Management
- Supply & International
- Transport Handling



SERVICE & MAINTENANCE

- Central Service
- Storage
- Disposal & Recycling



UNIVERSITY

- Trainings & Further Education

03 BMZ CENTRAL SERVICE

Our Services Ensure a
Seamless Customer Experience



Spare parts availability
within 24 hours



48-hour mobility guarantee



Service Level Agreement of
3 days for incident handling



Incident escalation when required



Diagnosis, error analysis,
repair and final inspection



Integrated data enabling continuous
improvement and predictive
maintenance



E-BIKE ONLINE SHOP

ESS ONLINE SHOP

03 BMZ CENTRAL SERVICE

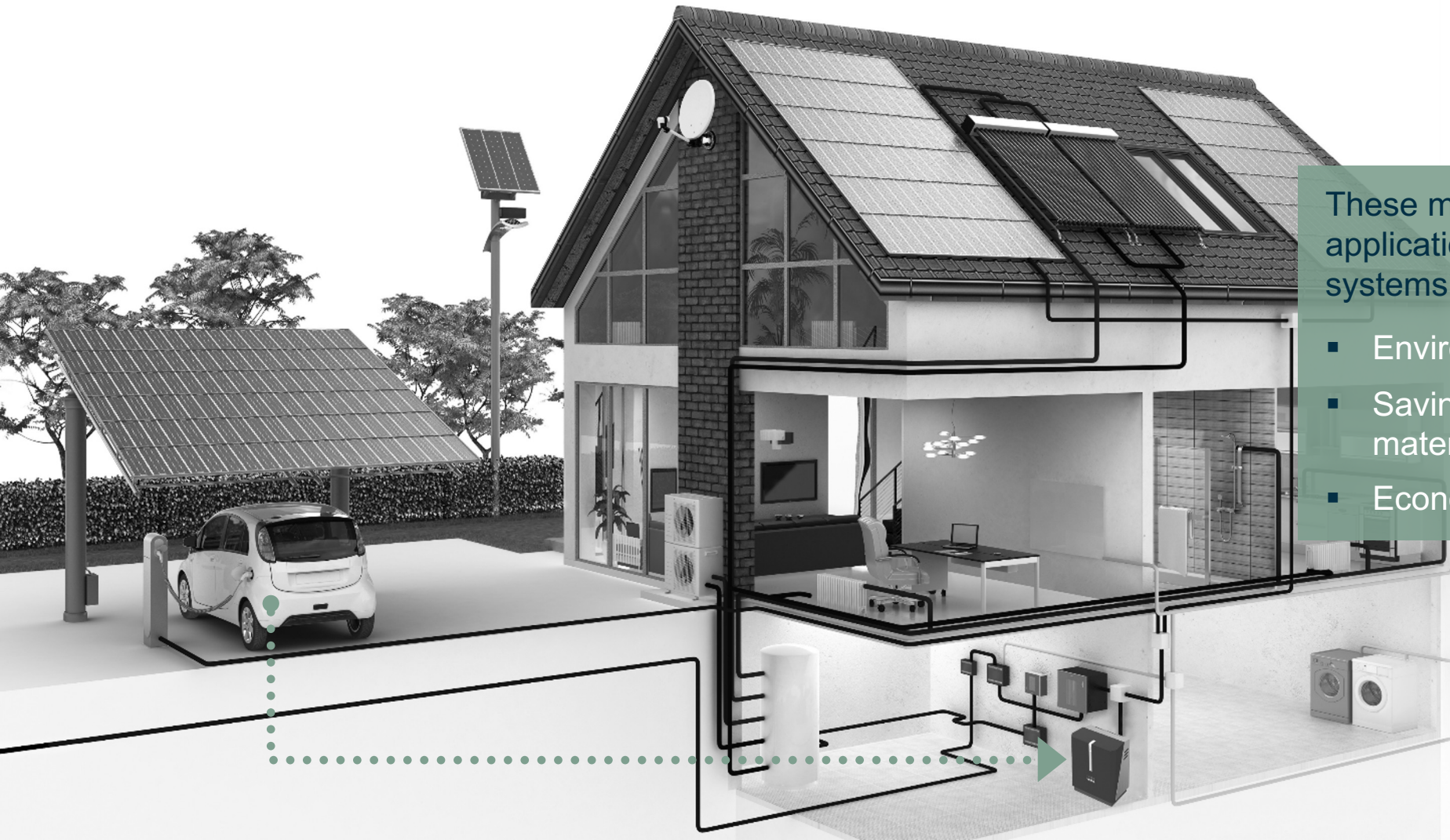
Disposal & Recycling

1. Manufacturers market their batteries
2. Old batteries and chargers get collected
3. Sorting of cells, electronic components and plastic parts before they get recycled
4. Recovery of materials, including toxic heavy metals (like nickel, cadmium, mercury, etc.)



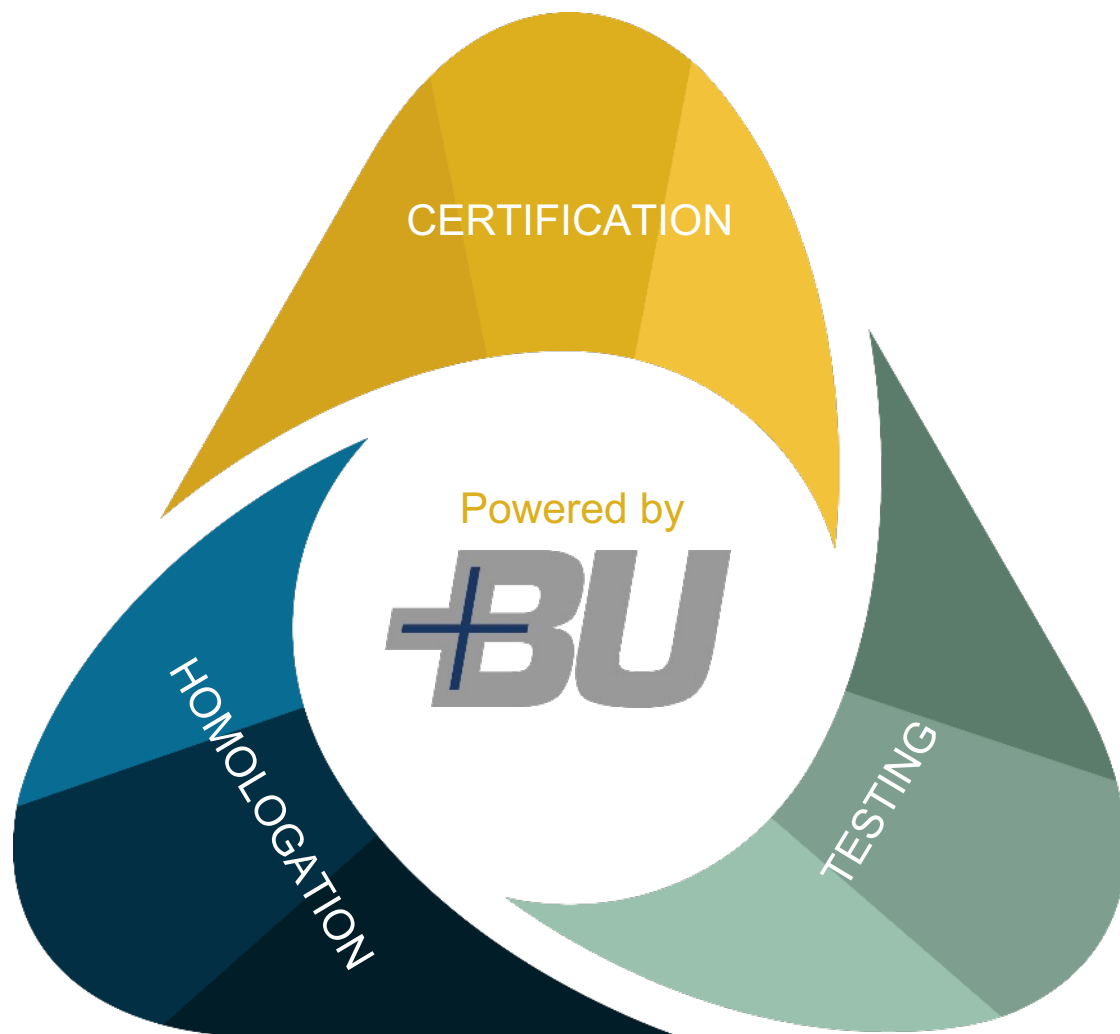
03 2ND LIFE APPLICATIONS

Lithium-ion batteries still have about 80% capacity after 10 years of use.



These modules can be used for other applications such as Energy storage systems, which relieve the power grid.

- Environmentally friendly
- Saving resources such as raw materials, rare metals, etc.
- Economically efficient



CERTIFICATION

- UN 38.3 Transportation Tests
- IEC 62133-2:2017 Safety Tests For Portable Batteries
- IEC 62619
- ECE R-100 and more

HOMOLOGATION

- Cycle Life Tests
- Global Standards

TESTING

- Customised Tests
- Abuse Testsc



>10,000
UN Certifications

>2,000
UN Tests

>10,000
Active Customers

04 BATTERYUNIVERSITY TRAININGS & FURTHER EDUCATION

- Extensive training program with around 50 seminars
- Versatile topics
- Knowledge transfer from experts for experts
- Transfer of practical experience

Powered by



Batteryuniversity GmbH

GLOBAL PLAYER IN LITHIUM-ION BATTERY SYSTEMS

Over **27 years experience** in
Lithium-Ion Battery Solutions

Competency beyond **production** and
development, After-sales Service and
support, storage, certification, recycling

Covering the **entire value chain**

Worldwide network



BMZ GROUP

START ELECTRIFICATION ... **NOW**

YOUR CONTACT: ✉ Rudolf.Frikker@bmz-group.com

☎ +49 (0)151 4222 5394