



EUROPE'S BATTERY SYSTEM SUPPLIER

## Modular Energy Storage System

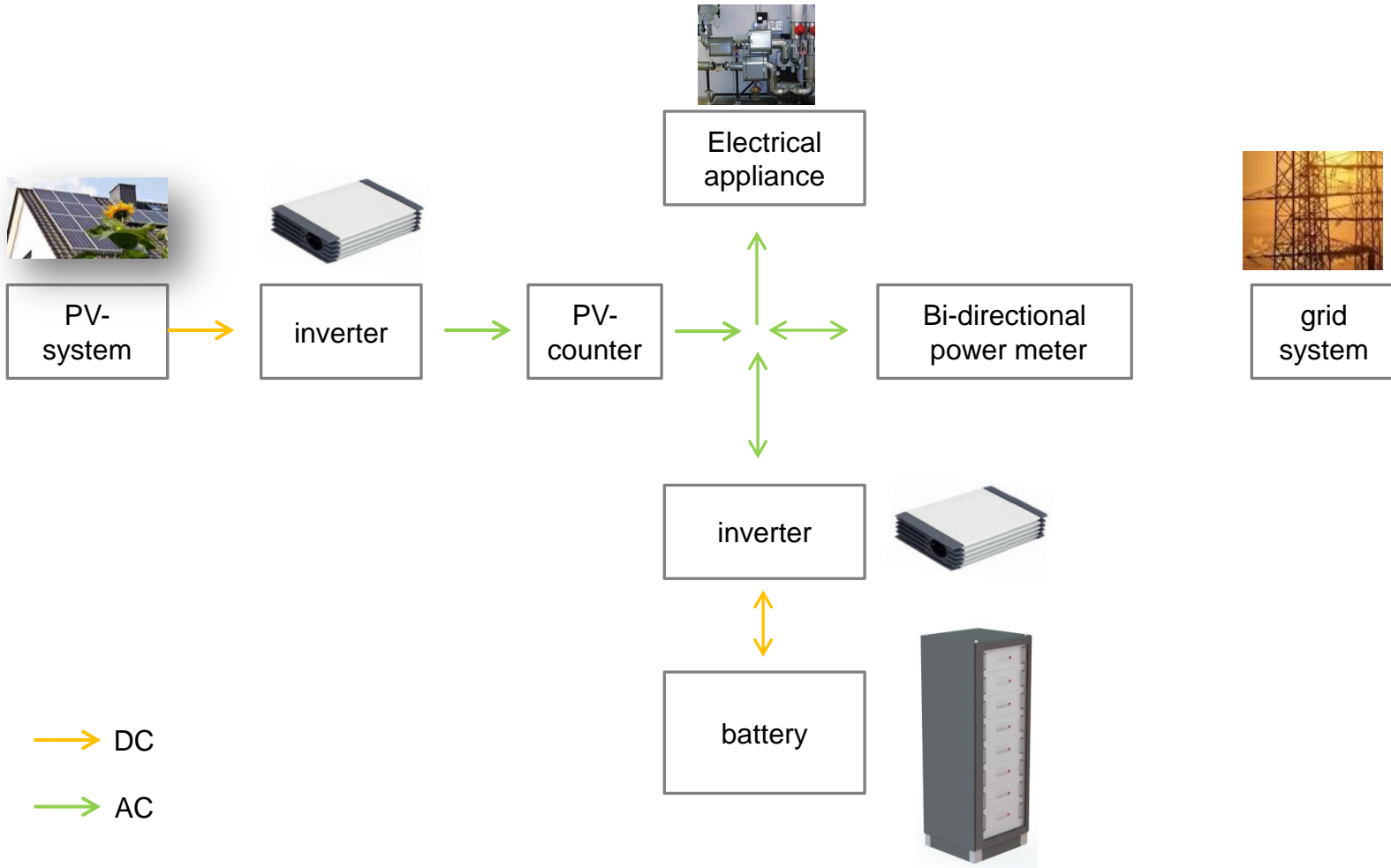
**ESS 1.0**

**ESS 2.1**

**ESS 3.0**

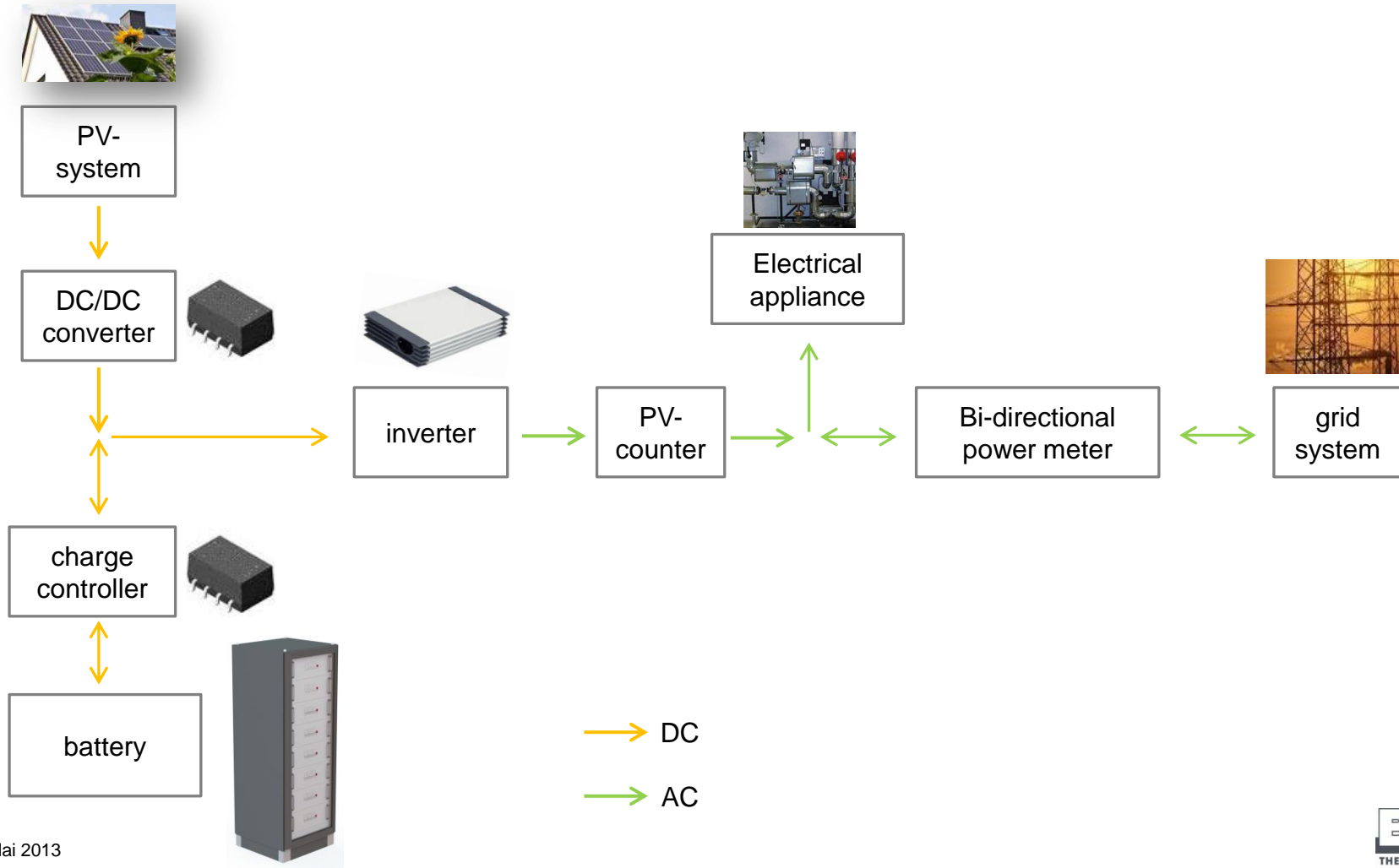
# STORAGE SYSTEM

## AC-solution for PV storage system



# SPEICHERSYSTEM

## DC-solution for PV storage system



# MODERNE LITHIUM TECHNOLOGIE

## For your independence

- ✓ In the daytime: **storage & use**
- ✓ In the evening & at night: **use**
- ✓ Independent of daylight
- ✓ Independent of power grid system
- ✓ Economic & reduces costs

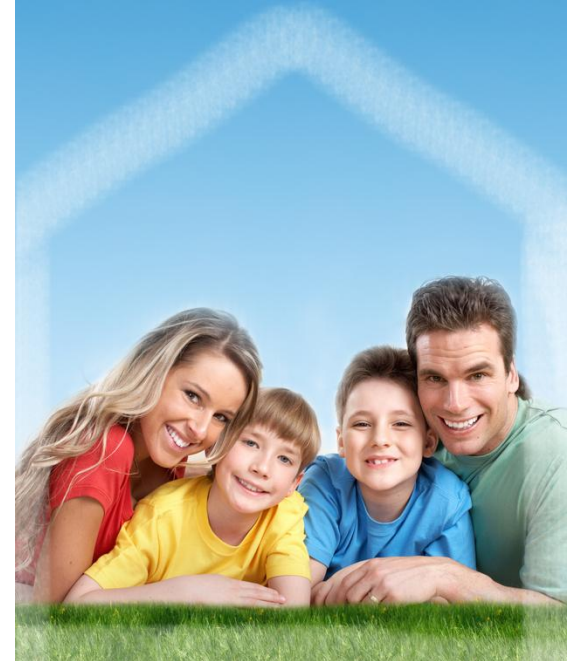
## Storage system with many advantages

- ✓ Modular concept
- ✓ Innovative technology
- ✓ Long life time
- ✓ Safe
- ✓ Environment friendly

# STORAGE SYSTEM

## Safety Concept

- ✓ Single cell monitoring
- ✓ Voltage monitoring
- ✓ Current monitoring
- ✓ Temperature monitoring
- ✓ Cell balancing
- ✓ State of charge determination (SOC)
- ✓ Battery monitoring (SOH)
- ✓ Integrated communication interface
- ✓ No memory effect
- ✓ Datalogging: data recording



# SHORT OVERVIEW

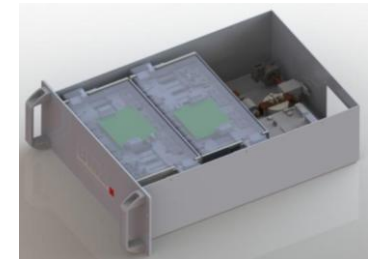
## ESS 1.0 with 18650 cylindric cells

Nominal voltage:	25.9V and 51.8V
Cell:	Sony V3 Li NMC Zelle with 2.25Ah
Dimension:	577 x 218 x 253 mm
Cell manufacturer:	Sony



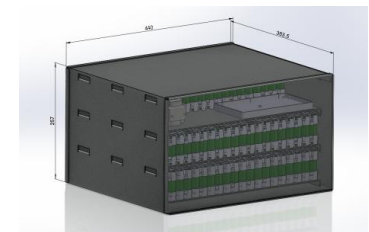
## ESS 2.1 with Samsung Li Motive cell

Nominal voltage:	51.8V
Cell:	Samsung Li Motive NMC mit 60Ah
Dimension:	19 Zoll plug in with 5HE
Cell manufacturer:	Samsung



## ESS 3.0 with 18650 cylindric cells

Nominal voltage:	55.5V
Cell:	Sony V3 Li NMC cell with 2.25Ah
Dimension:	450 x 400 x 260 mm
Cell manufacturer:	Sony



# ESS 1.0 STORAGE SYSTEM

## ESS1.0 Storage system with many advantages

- ✓ Powerful energy storage system
- ✓ New lithium ion technology: **7 years warranty**
- ✓ High efficiency: **97%**
- ✓ Large depth of discharge: **with 90% DOD**
- ✓ High operational safety
- ✓ High number of cycles: **4,000 complete cycles**
- ✓ light-weight and compact
- ✓ Modules for 25 V and 350 V
- ✓ Modules flexible configurable
- ✓ Integrated fanless cooling (passive)
- ✓ Financial support from German Government: **up to 30%**



Funding by



Bundesministerium  
für Umwelt, Naturschutz  
und Reaktorsicherheit



made in **GERMANY**  
BMZ approved quality



# ESS 1.0 TECHNICAL FEATURES

**Freely configurable**



25,9 V-version*	25.1	25.2	25.3	25.4	25.5	25.6
Capacity	108 Ah	216 Ah	324 Ah	432 Ah	540 Ah	648 Ah
Nominal voltage	25.9 V	25.9 V	25.9 V	25.9 V	25.9 V	25.9 V
Nominal energy content	2.7 kWh	5.4 kWh	8.1 kWh	10.8 kWh	13.5 kWh	16.2 kWh
Max. current discharge	180 A	360 A	540 A	720 A	900 A	1,080 A
BMS	integrated					
Communication	RS485					
Cooling system	passive					
Operating temperature charge	0°C to +45°C					
Operating temperature discharge	-20°C to +60°C					
Expected life time	20 years					
IP-class	IP67					
Weight	28 kg	56 kg	84 kg	112 kg	140 kg	168 kg

\* Max. configuration: 1S16P (max. 25.9 V/1,728 Ah/43.9 kWh)



# ESS 1.0 TECHNISCHE EIGENSCHAFTEN

Beliebig konfigurierbar



51.8 V-Version*	51.1	51.2	51.3	51.4	51.5	51.6
Capacity	108 Ah	216 Ah	324 Ah	432 Ah	540 Ah	648 Ah
Nominal voltage	51.8 V	51.8 V	51.8 V	51.8 V	51.8 V	51.8 V
Nominal energy content	5.4 kWh	10.8 kWh	16.2 kWh	21.6 kWh	27 kWh	32.4 kWh
Max. current discharge	180 A	360 A	540 A	720 A	900 A	1,080 A
BMS	integrated					
Communication	RS485					
Cooling system	passive					
Operating temperature charge	0°C to +45°C					
Operating temperature discharge	-20°C to +60°C					
Expected life time	20 years					
IP-class	IP67					
Weight	56 kg	112 kg	168 kg	224 kg	280 kg	336 kg

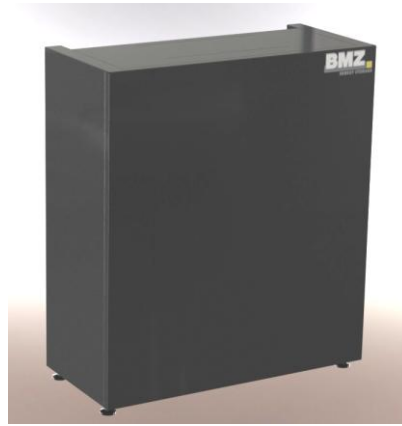
\* Max. configuration: 2S8P (max. 51.8 V/864 Ah/43.9 kWh)

# ESS 1.0 HOUSING MODULAR DESIGN

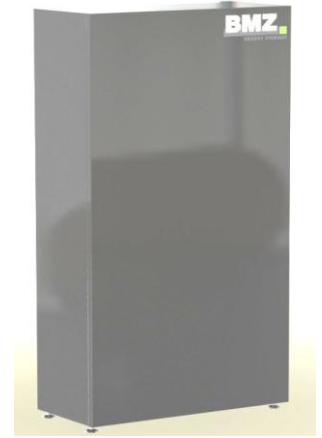
## Space saving housing in new desing



2er housing (815 x 715x 305 mm)



4er housing (1,450 x 715 x 305 mm)



It can be combined max. 16 X ESS 1.0 = 43.9 kWh

## ESS 2.1 SPEICHERSYSTEM

### System erfüllt alle Förderkriterien

- ✓ Maximal financial support: ~ **up to 30% - 650 €/KWp**
- ✓ Powerful energy storage system
- ✓ Maximum grant: **with 90% DOD**
- ✓ Powerful energy storage system: **7 years time value replacement warranty**
- ✓ High operational safety
- ✓ High number of cycles: **5,000 complete cycles**
- ✓ Light-weight and compact
- ✓ Modules cascadable
- ✓ Expected calendrical life time: **up to 20 years**

Förderung durch



Bundesministerium  
für Umwelt, Naturschutz  
und Reaktorsicherheit



# ESS 2.1 SYSTEM OVERVIEW – 19" SOLUTION

**PV system /  
inverter**



ESS Storage rack

**Master**

**Modul with 50V and 3.1kWh**

**Modul with 50V and 3.1kWh**

**Modul with 50V and 3.1kWh**

**Modul with 50V and 3.1kWh**



# ESS 2.1 WITH SAMSUNG LI-MOTIVE CELL

**Freely configurable**



51,8 V-Version*	51.1	51.2	51.3	51.4	51.5	51.6
Capacity	60 Ah	120 Ah	180 Ah	240 Ah	300 Ah	360 Ah
Nominal voltage	51.8 V	51.8 V	51.8 V	51.8 V	51.8 V	51.8 V
Nominal energy content	3.1 kWh	6.2 kWh	9.3 kWh	12.4 kWh	15.5 kWh	18.6 kWh
Max. current discharge	240 A	480 A	720 A	960 A	1,200 A	1,440 A
BMS	integrated					
Communication	CAN					
Cooling system	passive					
Operating temperature charge	-0°C to +55°C					
Operating temperature discharge	-30°C to +55°C					
Expected Life time	20 years					
IP-class	IP21					
Weight	42 kg	84 kg	126 kg	168 kg	210 kg	252 kg

\* Max. configuration: 12P (max. 51.8 V / 720 Ah / 37.2 kWh)

# ESS 3.0 STORAGE SYSTEM

## System fulfills all eligibility criterias

- ✓ Maximum financial support: ~ **bis zu 30% - 650 €/KWp**
- ✓ Powerful energy storage system
- ✓ Maximum grant: **with 90% DOD**
- ✓ Powerful energy storage system: **7 years time value replacement warranty**
- ✓ High operational safety
- ✓ High number of cycles: **5,000 complete cycles**
- ✓ Light-weight and compact
- ✓ Modules cascadable
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# ESS 3.0 STORAGE SYSTEM

## New! BMZ ESS 3.0

ESS 3.0	
Pack construction	15S52P (BMS integrated)
Used cells	Sony V3 18650
Nominal voltage	55.5 V
Nominal energy	6.5 kWh of that 5 kWh usable
Communication	CAN, CAN open*, R232*, RS485*, MOD*
Expected life time	15 years

### Information:

- Each storage block 5kWh usable energy
- Stackable Housing
- Modular expandable to 60kWh
- Compatible with a lot of inverter manufacturers

*Prototypes available from June 2014*

*\* Bus versions are possible , have to be adapted*



BMZ-housing

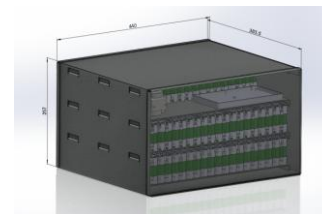


5kWh module



# ESS 3.0 TECHNISCHE EIGENSCHAFTEN

Ab September 2014 verfügbar



55.5 V-Version*	55.1	55.2	55.3	55.4	55.5	55.6
Capacity	117 Ah	234 Ah	351 Ah	468 Ah	585 Ah	702 Ah
Nominal voltage	55.5 V	55.5 V	55.5 V	55.5 V	55.5 V	55.5 V
Max. power	6.5 kWh	13.0 kWh	19.5 kWh	26.0 kWh	32.5 kWh	39.0 kWh
Max. current discharge	400 A	800 A	1,200 A	1,600 A	2,000 A	2,400 A
BMS	integrated					
Communication	CAN, CANopen* ;R232*; RS485*; MOD*					
Cooling system	passive					
Operating temperature charge	0°C to +45°C					
Operating temperature discharge	-20°C to +60°C					
Life Time	15 years					
IP Class	IP21					
Weight	70 kg	140 kg	210 kg	280 kg	350 kg	420 kg

Max. configuration: 12P (max. 55.5 V/ 1,404 Ah / 77.9 kWh)

\* Bus versions are possible , have to be adapted

# COMPARISON ESS - MODELS

Comparison of the models	ESS 1.0	ESS 1.0	ESS 2.1	ESS 3.0
Nominal voltage	25.9 V	51.8 V	51.8 V	55.5 V
Capacity	108 Ah	108 Ah	60 Ah	117 Ah
Max. Power	2.7 kWh	5.4 kWh	3.1 kWh	6.5 kWh
Max. current discharge	180A	180A	240A	400A
Cell type	cylindrical 18650	cylindrical 18650	prismatic	cylindrical 18650
Cell technology	NMC			
BMS	integrated			
Communication	RS485	RS485	CAN	CAN&CANopen*,R232*, R485*, MOD*
Depth of discharge	90% DOD	90% DOD	90% DOD	80% DOD
Cooling system	passive			
Operating temperature charge	0°C to +45°C	0°C to +45°C	0°C to +55°C	0°C to +45°C
Operating temperature discharge	-20°C to +60°C	-20°C to +60°C	-30°C to +55°C	-20°C to +60°C
Complete cycles	4,000	4,000	5,000	5,000
Life time	20 years	20 years	20 years	15 years
IP Class	IP67	IP67	IP21	IP21
Weight	28 kg	56 kg	42 kg	70 kg
Efficiency	97%			

\* Bus versions are possible , have to be adapted



THANK YOU FOR YOUR ATTENTION!

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