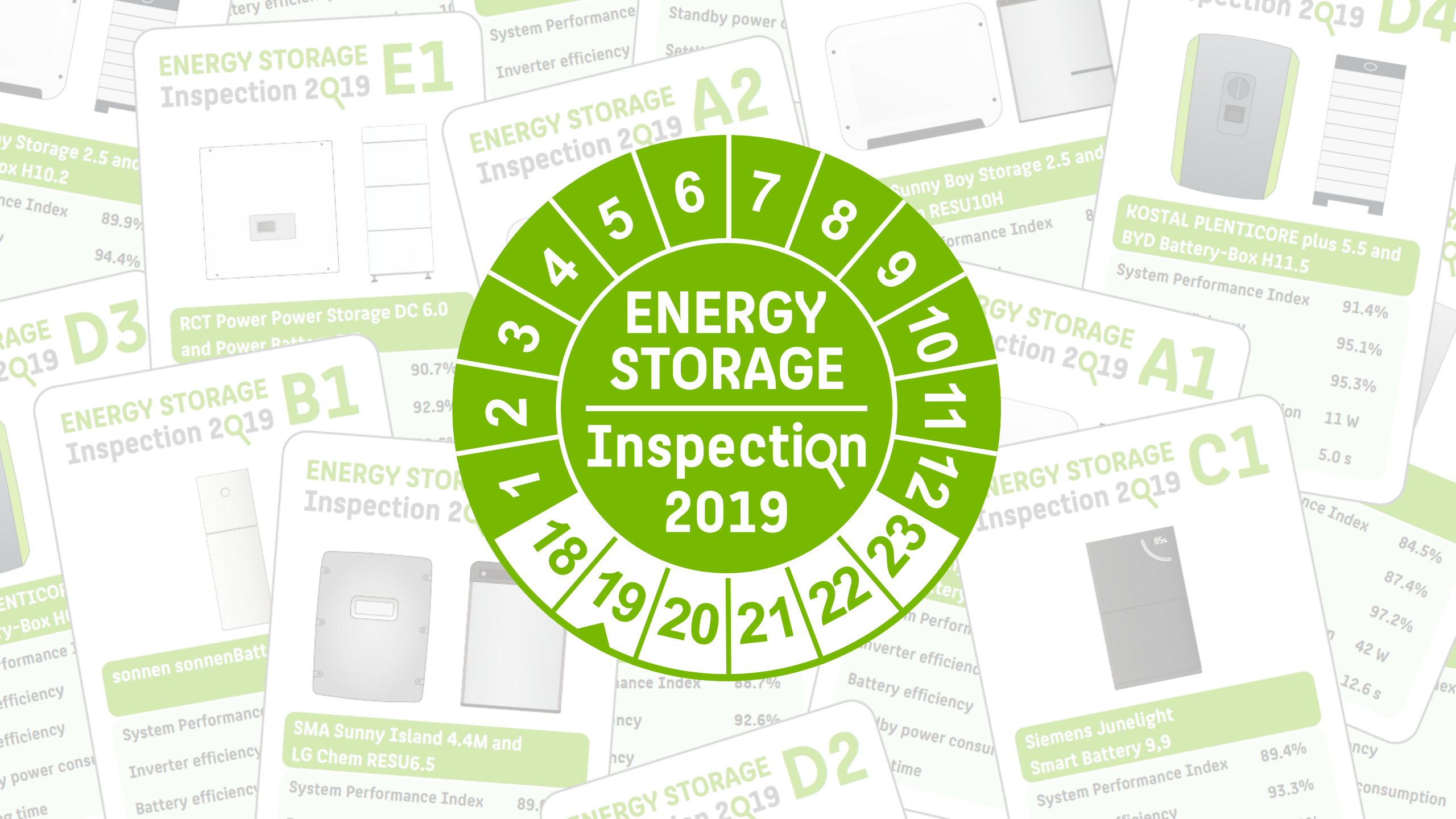
ENERGY STORAGE
Inspection 2019
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2
3
4
5
6
7
8
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10
11
12
18
19
20
21
22
23
ENERGY STORAGE Inspection 2Q19 E1
RCT Power Power Storage DC 6.0
ENERGY STORAGE Inspection 2Q19 A2
Sunny Boy Storage 2.5 and
RESU10H
ENERGY STORAGE Inspection 2Q19 D4
KOSTAL PLENTICORE plus 5.5 and
BYD Battery-Box H11.5
System Performance Index 91.4%
95.1%
95.3%
11 W
5.0 s
ENERGY STORAGE Inspection 2Q19 B1
sonnen sonnenBatt
ENERGY STORAGE Inspection 2Q19 A1
ENERGY STORAGE Inspection 2Q19 C1
Siemens Junelight
Smart Battery 9,9
System Performance Index 89.4%
93.3%
SMA Sunny Island 4.4M and
LG Chem RESU6.5
System Performance Index
ENERGY STORAGE Inspection 2Q19 D2
ENERGY STORAGE Inspection 2Q19 D3
System Performance Index
Inverter efficiency
Battery efficiency
Standby power consumption
84.5%
87.4%
97.2%
42 W
12.6 s

ENERGY STORAGE Inspection 2019

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Summary of the study

Energy Storage Inspection 2019

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Release

Version 1.0 (July 2019)

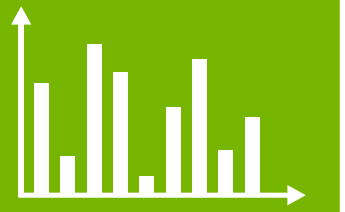
Website

www.stromspeicher-inspektion.de

Funding

This study is part of the project “EffiBat”, which is funded by the German Federal Environmental Foundation (DBU).

Main topics of the Energy Storage Inspection 2019

1	Comparison of the system properties on the basis of test reports according to the Efficiency Guideline	
2	Simulation-based assessment of the PV-battery systems with the System Performance Index (SPI)	SPI
3	Answers to frequently asked questions about the efficiency of PV-battery systems	FAQ

Short description of the methodology

- In March 2019, manufacturers of battery systems for residential buildings who are active in Germany were invited to participate in the **Energy Storage Inspection 2019**.
- **Eight manufacturers** answered the call and participated with measurement data of **sixteen system configurations**.
- The laboratory tests were carried out by independent testing institutes in accordance with the "**Efficiency Guideline for PV Storage Systems**".
- The efficiency of the PV-battery systems has been evaluated with the **System Performance Index (SPI)**.
- Each analyzed system has been assigned to a **system abbreviation** (e.g. A1).
- The participating companies were able to decide whether to **name** themselves in the study. Seven manufacturers have opted for this.
- Details on the methodology and interpretation of the results are given in the 2018 edition of the **Energy Storage Inspection**: www.stromspeicher-inspektion.de

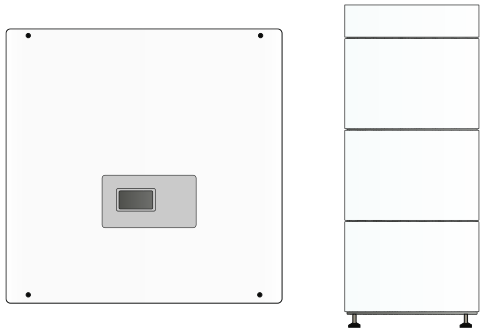
Most efficient systems of the Energy Storage Inspection 2019

KOSTAL PLENTICORE plus 5.5

and BYD Battery-Box H11.5

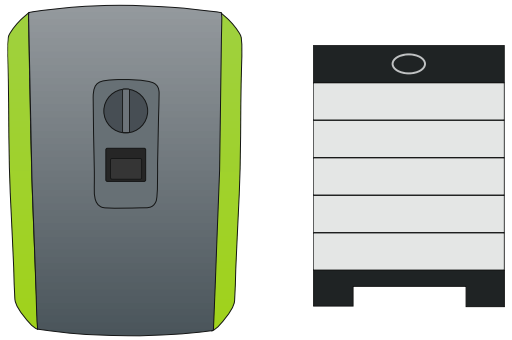
RCT Power Power Storage

DC 6.0 and Power Battery 5.7



KOSTAL PLENTICORE plus 5.5

and BYD Battery-Box H6.4



ENERGY STORAGE Inspection 2Q19

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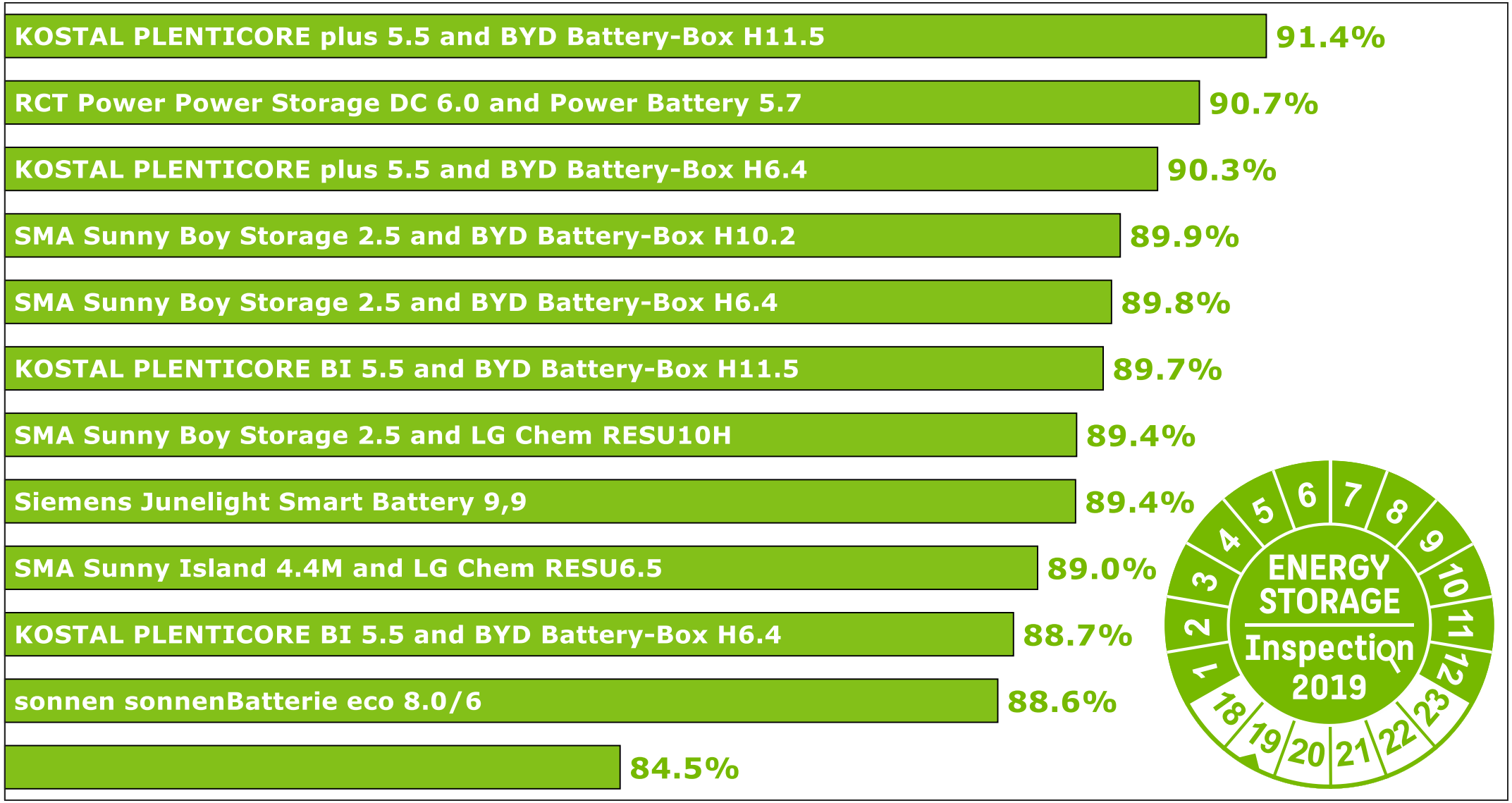
Results of the Energy Storage Inspection 2019

System Performance Index (SPI)



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Systems of the Energy Storage Inspection 2019

ENERGY STORAGE Inspection 2Q19 A1

SMA Sunny Boy Storage 2.5 and BYD Battery-Box H6.4

System Performance Index	89.8%
Inverter efficiency	93.4%
Battery efficiency	94.8%
Standby power consumption	7 W
Settling time	3.7 s

ENERGY STORAGE Inspection 2Q19 A2

SMA Sunny Boy Storage 2.5 and BYD Battery-Box H10.2

System Performance Index	89.9%
Inverter efficiency	94.4%
Battery efficiency	94.5%
Standby power consumption	7 W
Settling time	3.7 s

ENERGY STORAGE Inspection 2Q19 A3

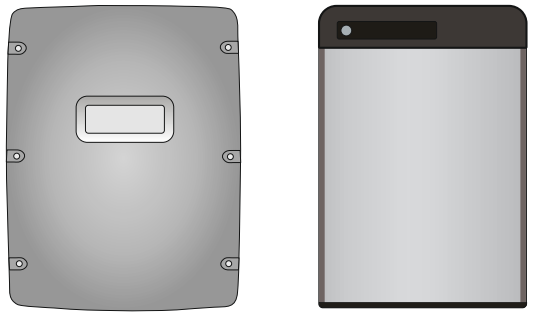
SMA Sunny Boy Storage 2.5 and LG Chem RESU10H

System Performance Index	89.4%
Inverter efficiency	95.1%
Battery efficiency	91.5%
Standby power consumption	5 W
Settling time	6.2 s

Inverter efficiency: Average pathway efficiency (BAT2AC), Standby power consumption: System consumption in standby mode

Systems of the Energy Storage Inspection 2019

ENERGY STORAGE Inspection 2Q19 A4



SMA Sunny Island 4.4M and LG Chem RESU6.5

System Performance Index	89.0%
Inverter efficiency	92.9%
Battery efficiency	96.3%
Standby power consumption	13 W
Settling time	7.7 s

ENERGY STORAGE Inspection 2Q19 B1

sonnen sonnenBatterie eco 8.0/6

System Performance Index	88.6%
Inverter efficiency	94.5%
Battery efficiency	93.8%
Standby power consumption	10 W
Settling time	3.9 s

ENERGY STORAGE Inspection 2Q19 C1

Siemens Junelight Smart Battery 9,9

System Performance Index	89.4%
Inverter efficiency	93.3%
Battery efficiency	96.9%
Standby power consumption	13 W
Settling time	3.8 s

Inverter efficiency: Average pathway efficiency (BAT2AC), Standby power consumption: System consumption in standby mode

Systems of the Energy Storage Inspection 2019

ENERGY STORAGE Inspection 2Q19 D1

KOSTAL PLENTICORE BI 5.5 and BYD Battery-Box H6.4

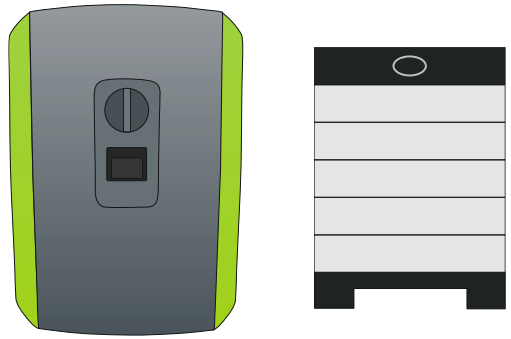
System Performance Index	88.7%
Inverter efficiency	92.6%
Battery efficiency	94.8%
Standby power consumption	11 W
Settling time	4.4 s

ENERGY STORAGE Inspection 2Q19 D2

KOSTAL PLENTICORE BI 5.5 and BYD Battery-Box H11.5

System Performance Index	89.7%
Inverter efficiency	95.3%
Battery efficiency	95.3%
Standby power consumption	11 W
Settling time	4.4 s

ENERGY STORAGE Inspection 2Q19 D3



KOSTAL PLENTICORE plus 5.5 and BYD Battery-Box H6.4

System Performance Index	90.3%
Inverter efficiency	92.9%
Battery efficiency	94.8%
Standby power consumption	11 W
Settling time	5.0 s

Inverter efficiency: Average pathway efficiency (BAT2AC), Standby power consumption: System consumption in standby mode

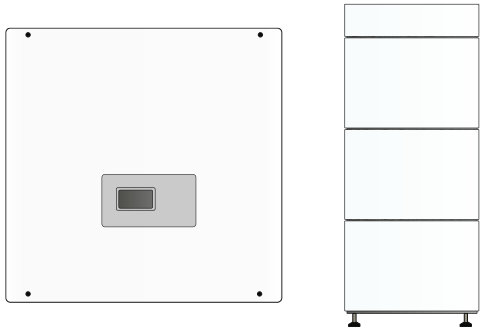
Systems of the Energy Storage Inspection 2019

ENERGY STORAGE Inspection 2Q19 D4

KOSTAL PLENTICORE plus 5.5 and BYD Battery-Box H11.5

System Performance Index	91.4%
Inverter efficiency	95.1%
Battery efficiency	95.3%
Standby power consumption	11 W
Settling time	5.0 s

ENERGY STORAGE Inspection 2Q19 E1



RCT Power Power Storage DC 6.0 and Power Battery 5.7

System Performance Index	90.7%
Inverter efficiency	92.9%
Battery efficiency	92.6%
Standby power consumption	6 W
Settling time	0.4 s

ENERGY STORAGE Inspection 2Q19 F1

System F1

System Performance Index	84.5%
Inverter efficiency	87.4%
Battery efficiency	97.2%
Standby power consumption	42 W
Settling time	12.6 s

Inverter efficiency: Average pathway efficiency (BAT2AC), Standby power consumption: System consumption in standby mode

Main findings of the Energy Storage Inspection 2019

- It depends crucially on the level of the efficiency losses, whether or not battery systems reduce **CO_2 emissions** in residential buildings with photovoltaic systems.
- The **conversion and standby losses** of the power electronics dominate the total system losses.
- A high **battery efficiency** is therefore no guarantee for a high system efficiency.
- Many of the systems investigated can score with a very high average **inverter efficiency** in the discharge mode of more than 95%.
- Almost all evaluated system configurations achieve a very good **System Performance Index (SPI)** above 88%.
- Furthermore, products are available on the market for which **no comparable technical specifications** are provided.
- System manufactures will have the opportunity to **participate in the next issue** of the Energy Storage Inspection by the end of 2019.

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