



## **BATTERY BALANCING SYSTEMS**

Энергия ДВИ  
Энергия СВЕТ



**PROBLEMS WITH THE OPERATION  
OF BATTERIES INSTALLED IN  
GROUPS**

# THE MAIN PROBLEMS OF OPERATION OF BATTERIES IN A GROUP



## Connected in series

The totality of these violations leads to the occurrence of a voltage imbalance in the battery group:

Chronic undercharging or overcharging

The lack of CTC

Continuous presence of batteries in the floating mode - no charge or discharge cycles

Violation of the sequence of actions when performing a leveling charge – performing a leveling charge without first discharging the battery.

Failure to comply with the requirements of the battery operating instructions

# CHARGE/DISCHARGE

Without the use of balancing devices

Charge



If we do not use a balancer, then in the battery group, due to the individual characteristics of each element, the charging process does not proceed evenly.

Discharge



During the discharge process, we have the following picture - not the full return of the battery group capacity.



**HOW TO ELIMINATE THE  
IMBALANCE IN THE BATTERY  
GROUP?**

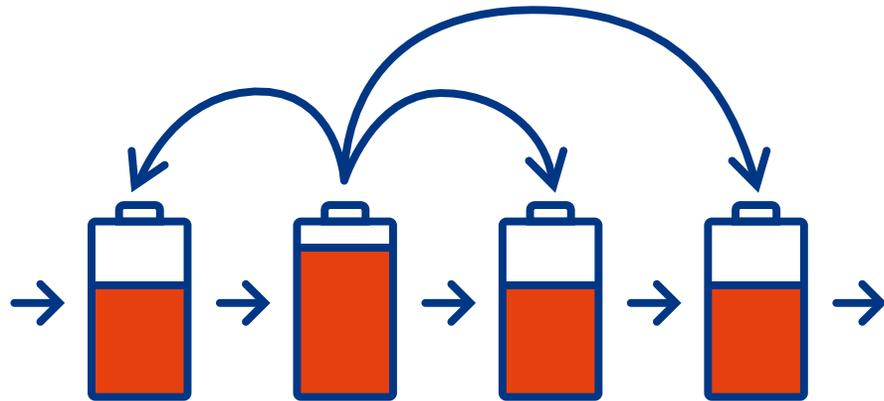
# HOW TO ELIMINATE THE IMBALANCE IN THE BATTERY GROUP?



Manually, using equalizing charge	Automatically, by means of balancing devices
High labor costs	The process of balancing happens all the time – 24/7
High time costs	No human involvement required
Availability of qualified personnel	Does not require the decommissioning of batteries
Temporary decommissioning of batteries	No negative impact on the battery
The battery resource is consumed, because the charge is produced by high voltage	

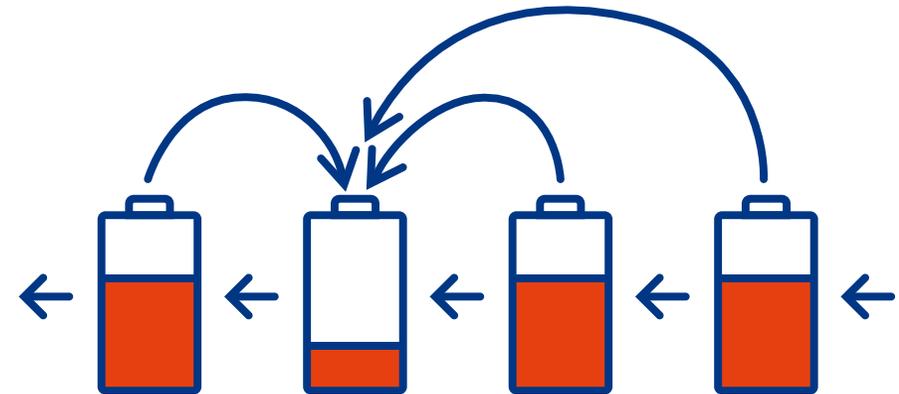
# AUTOMATIC LOAD BALANCERS

## Charge



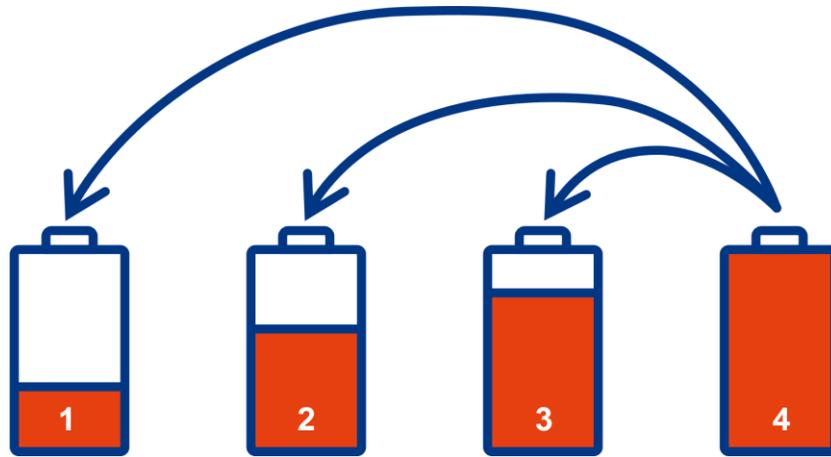
The simplest and most inexpensive devices that work only when charged.

## Discharge



Complex devices with microprocessor control that are designed to actively transfer part of the energy both when charging and when discharging.

# WHAT HAPPENS DURING THE BALANCING PROCESS OF CHARGING

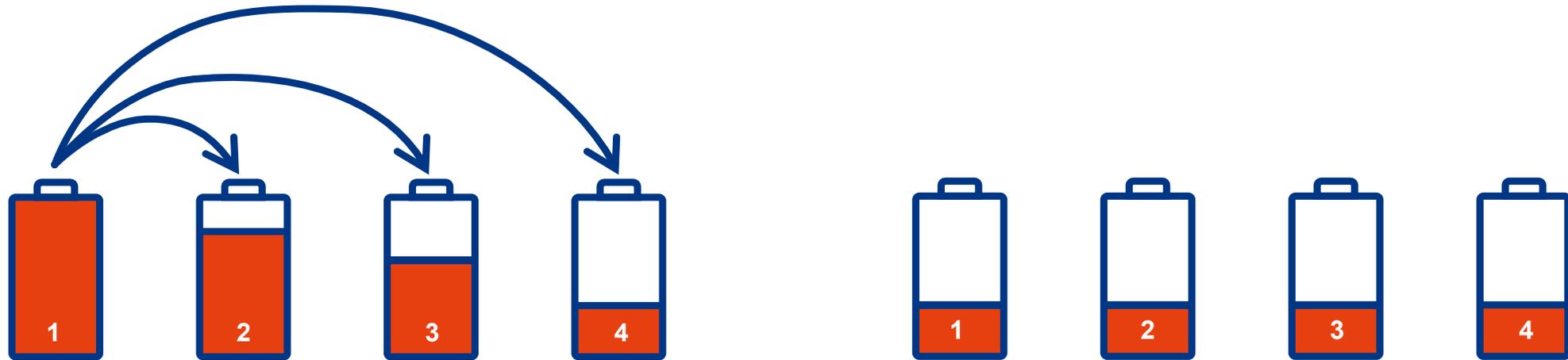


During the charge, the energy is redistributed from the more charged battery in the group to the less charged battery.



The use of a balancer makes it possible to level out the heterogeneity of the batteries, receiving an equal voltage on all the batteries installed in the group when charged.

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**MODEL RANGE OF LOAD  
BALANCERS**

# FORMATION OF THE MODEL RANGE



All load balancers pass under the full name: ASTERION BATTERY EQUALIZER

**Group - a single device mounted on a group of batteries:**

M1-24/12V

M2-48/12V

M3-48/2V

**Single - a single device mounted on each battery module installed in a group:**

S1-12V

S2-2V



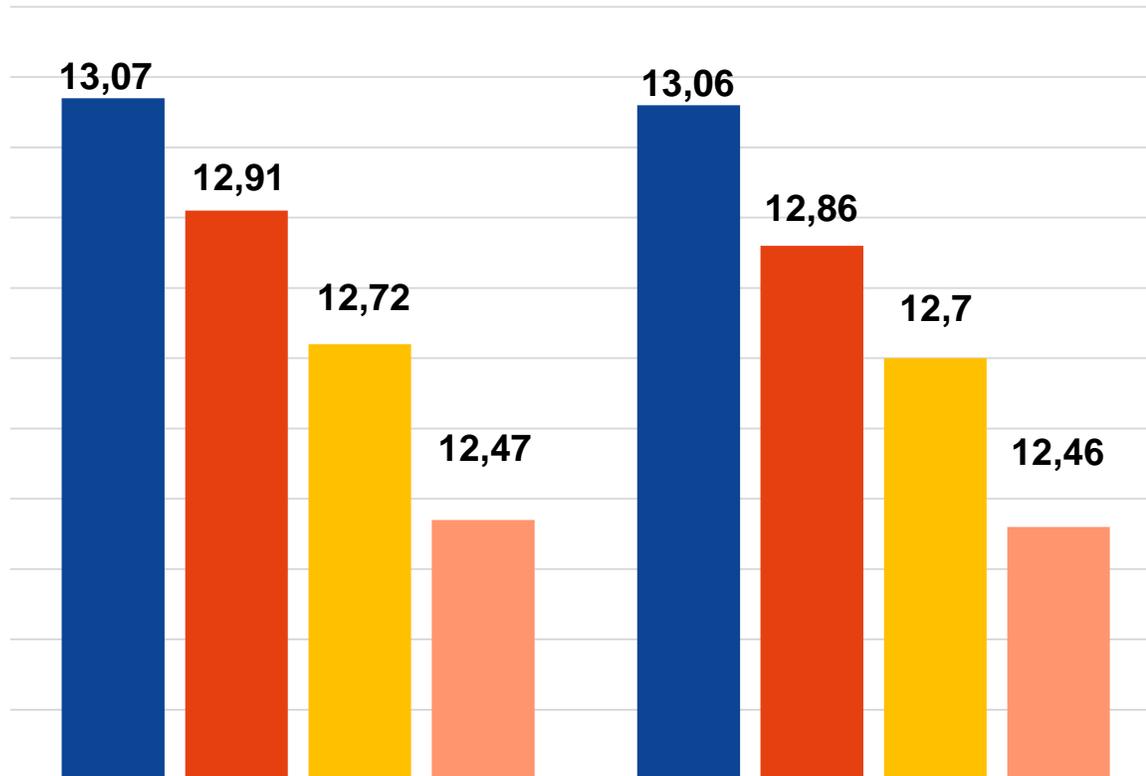
**WHAT DOES THE USE OF LOAD  
BALANCERS PROVIDE?**

# THE USE OF LOAD BALANCERS PROVIDES

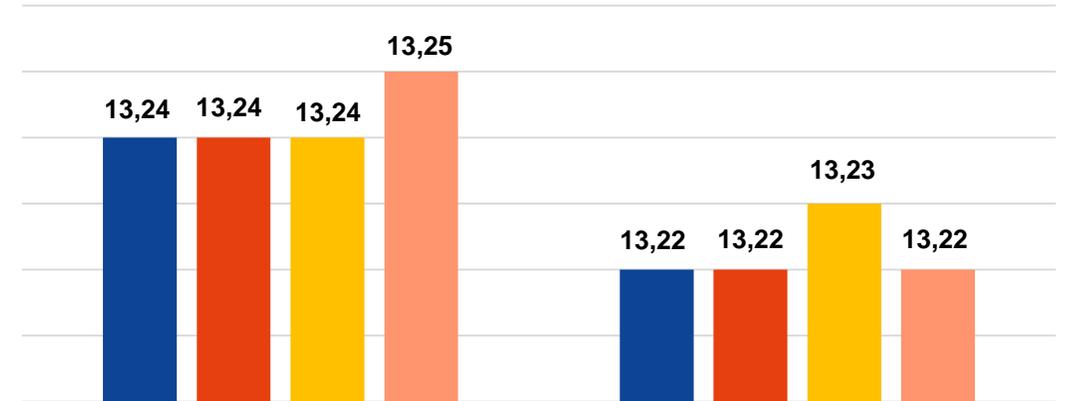
- 1 Voltage balance in the battery group – the voltage difference does not exceed 10 MV
- 2 Use of the full capacity of all the batteries installed in the group
- 3 Reducing the negative impact of the battery group's stay in the floating mode
- 4 Slowing corrosion processes and processes of sulfation of the battery
- 5 Reduced time and operating costs
- 6 Automation of part of the battery operation processes
- 7 Approximation of the actual operating life of the battery installed in the group to the design indicators

# THE EFFECTIVENESS OF THE USE OF LOAD BALANCERS

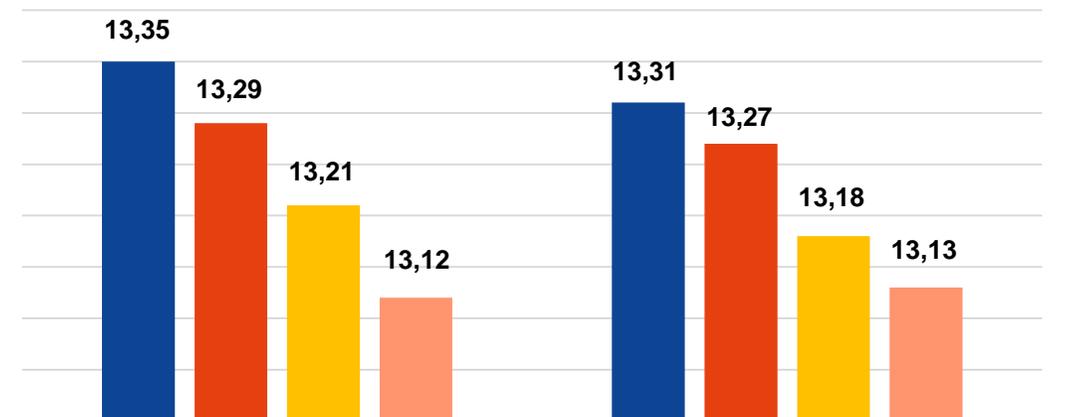
Battery discharge before testing



21 h. of battery charge with automatic load balancer



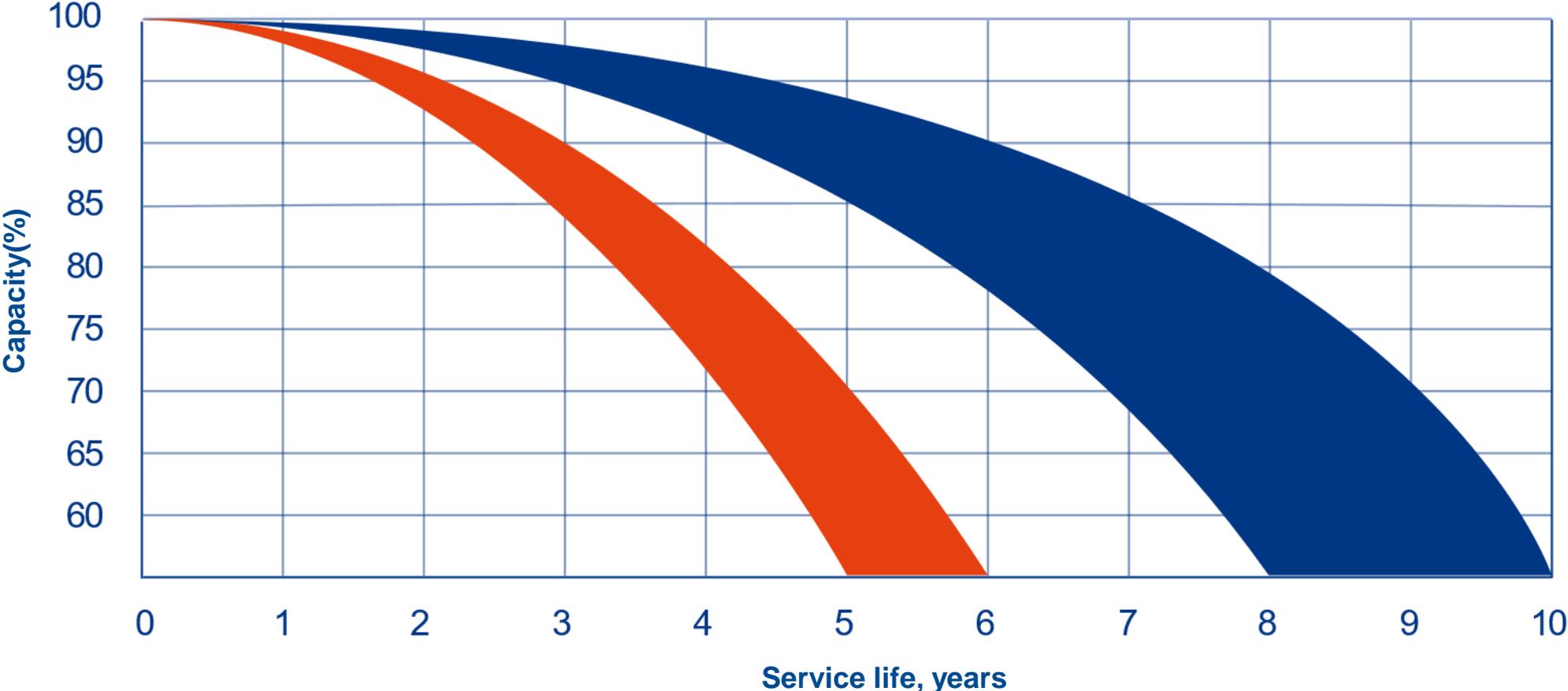
72 h. of battery charge without automatic load balancer



# THE SERVICE LIFE OF THE BATTERY



■ Including automating the operation processes      ■ Without automating the operation processes





**THANK YOU FOR  
YOUR ATTENTION**