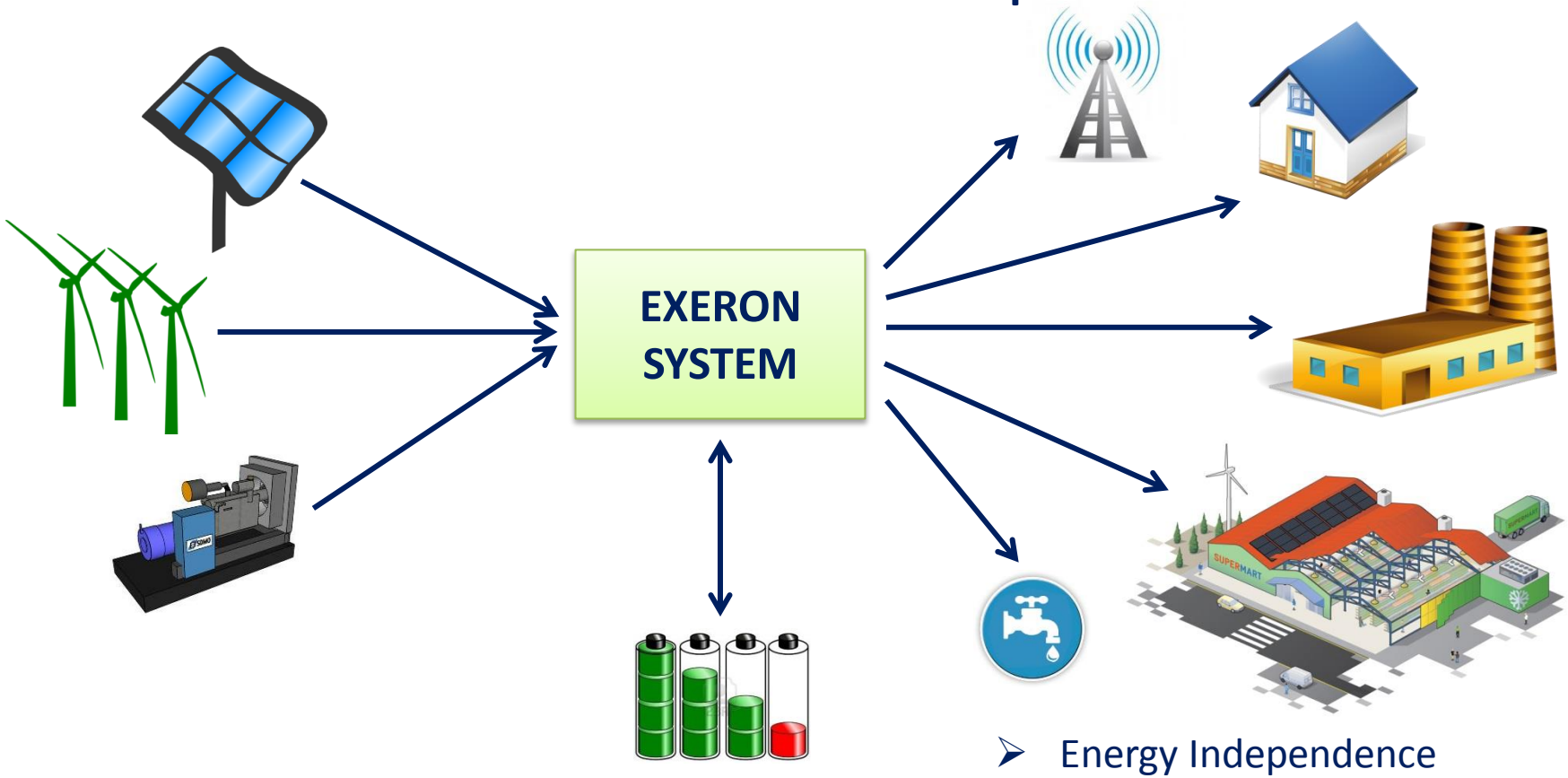
International Power Supply

25 YEARS OF EXPERIENCE

Headquarter Sofia

EXERON - The Concept



- Flexible, Scalable, Compact and Modular Design
- Easy and Fast Installation and Maintenance
- Low Cost of Ownership, minimized OPEX

- Energy Independence
- Energy Efficiency
- Full Energy Autonomy
- Smart Energy Management
- Unlimited Energy Storage

Applications

Power outputs: DC voltage, pure sine wave AC voltage

Output voltages: 48 VDC; 110 VAC; 230 VAC; 50 Hz / 60 Hz; 1-phase / 3-phase

Telecom

Diesel replacement

Data centers

Houses

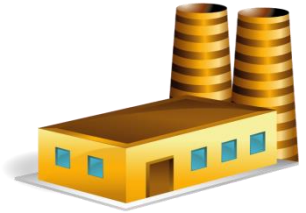
Hotels, office buildings

Residential areas

Water supply, cooling and heating

Agriculture, farming, irrigation systems

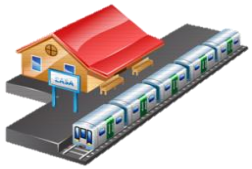
Warehouses, small size productions



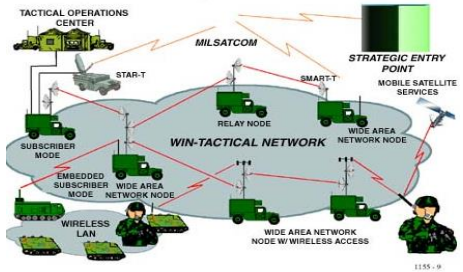
Factories, large size productions

ATM's, banks

Airports



Transport stations

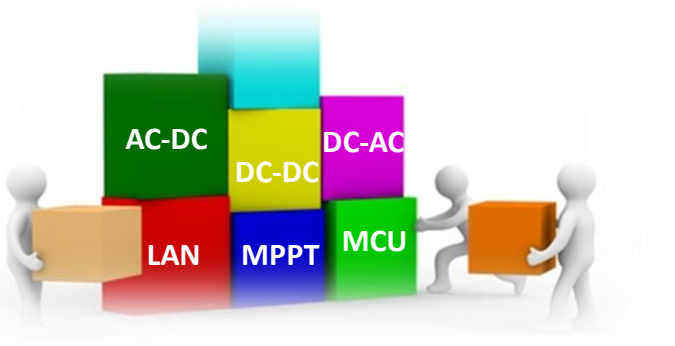


Desert camps, remote objects, tactical military systems etc.

What makes IPS different

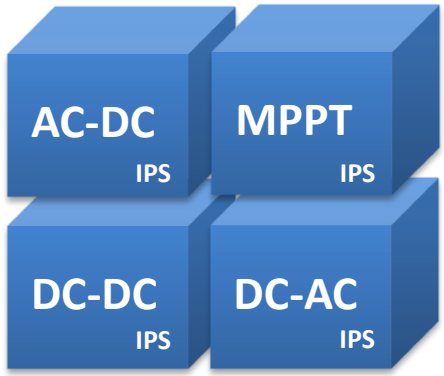
COMPETITORS

- Assembling of OEM modules different producers
- No scalability possible
- Limited monitoring function
- Low efficiency due to different kind of modules
- Low frequency circuit solutions
- No unified communication between the modules
- No load sharing between the modules
- Mean time to repair (MTTR) ~ 10-30 days
- No intellect features, impossible to act as a unified system and to take decisions



IPS

- Own development of all kind of system modules
- Full integration of all components in 1 unified system
- Unlimited scalability possible
- Unified monitoring over all system components
- Highest efficiency through perfect modules adjustment
- High frequency circuit solutions
- Unified communication between the modules
- Full load sharing between the modules
- MTTR < 10 s
- Intellect features, ability to decide



What makes IPS different

WHY trying to **assemble** a system from different kind of components…

COMPETITORS

…when you have a solution that is from only 1 manufacturer, fully integrated and unified?

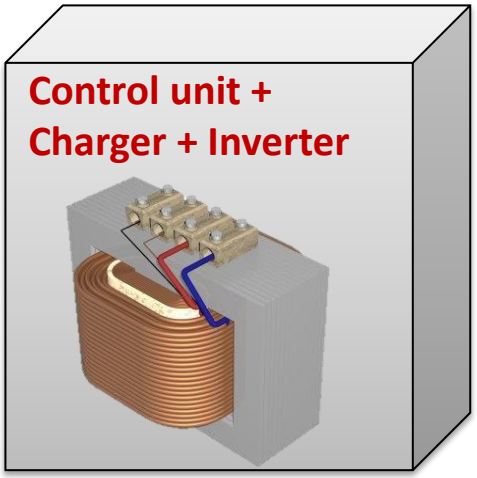
UNIFIED AND INTEGRATED SYSTEM

IPS

What makes IPS different

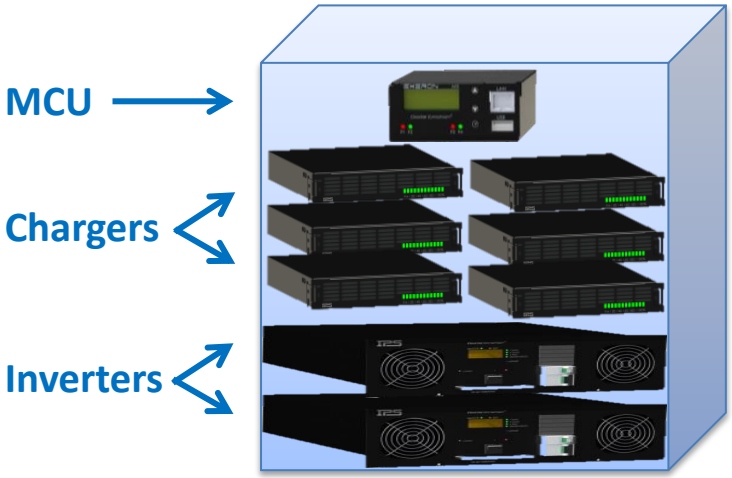
COMPETITORS

- A cabinet or a box which includes Control unit, charger and inverter.
- Low efficiency due to low frequency circuits
- Low reliability. In case of any failure the whole system is down.



IPS

- Physically separated and fully integrated plug and play modules – MCU, chargers, inverters.
- High efficiency due to high frequency circuits
- Highest reliability. In case of failure in one of the modules only this module is down. Because of the load sharing the other modules takes the load.

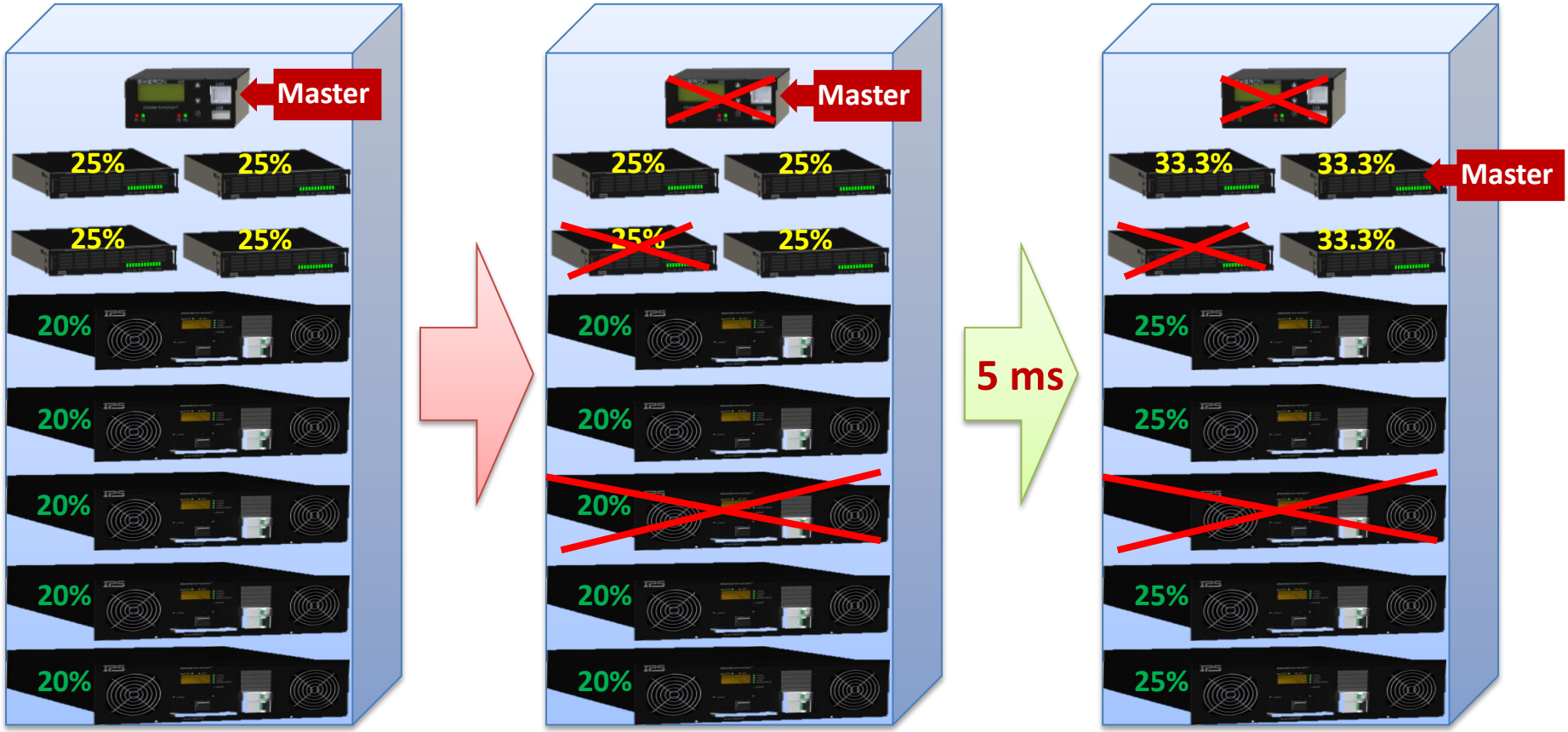


Redundancy & Modularity

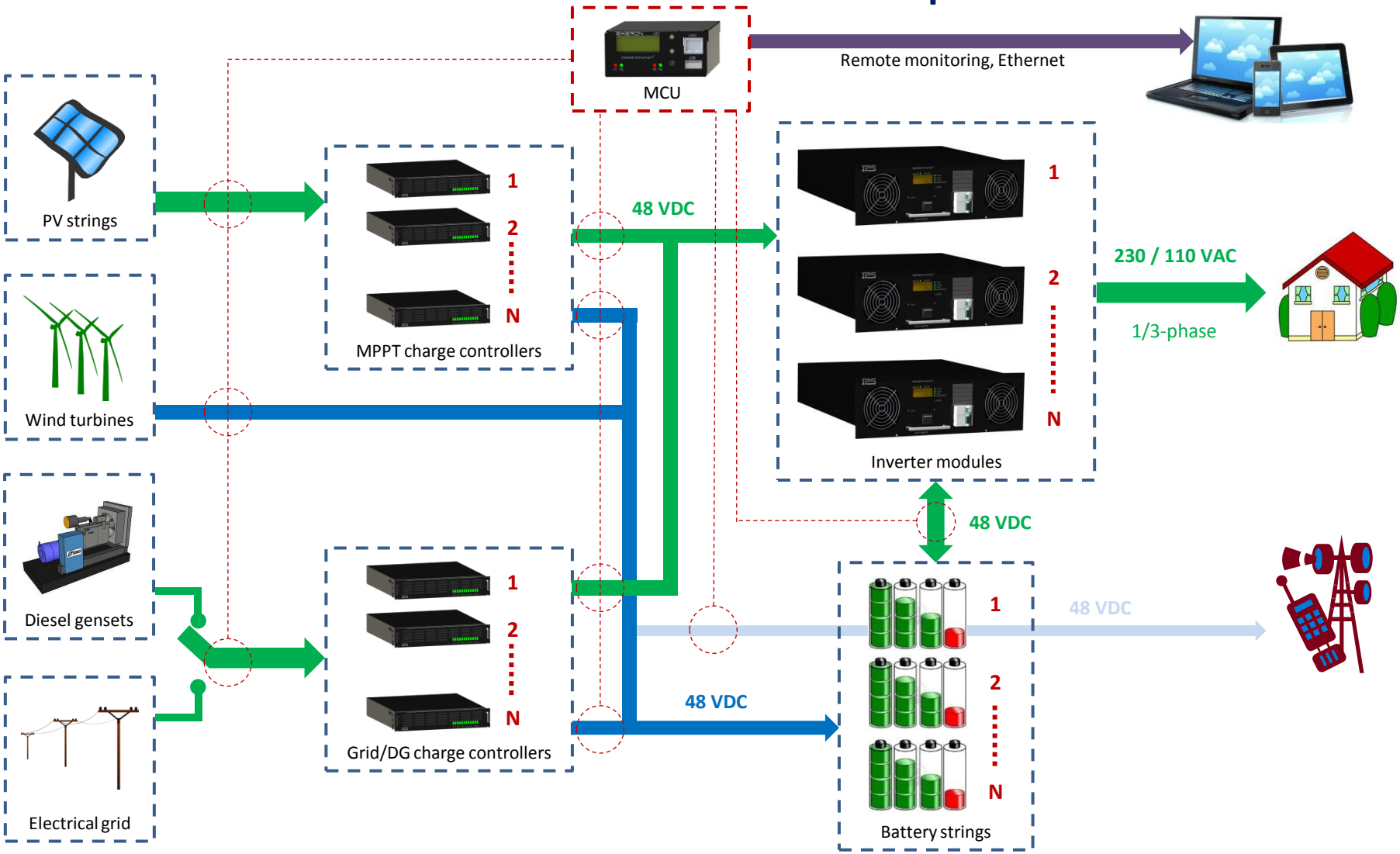
t_0: Load distribution before failure

t_1: Failure in some modules

t_2: Load sharing done



EXERON - The Concept



Standard EXERON configurations

- Free scalable
- Easy modular configuration
- As much power modules as you need

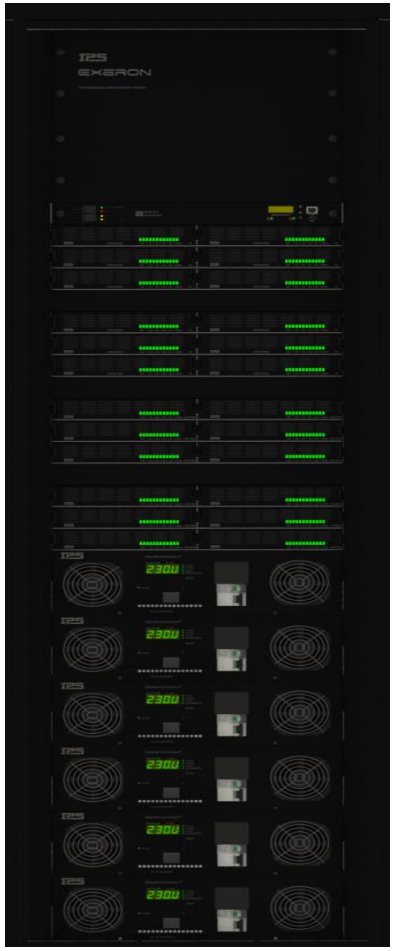
From 2 kW to 4 kW

Exeron SX

From 2 kW to 12 kW

Exeron MX

From 2 kW to 24 kW



Exeron FX

EXERON system

Features

- Modular design
- MPPT solar charge controllers
- U_{OC}: 140 VDC ÷ 450 VDC (min ÷ max)
- U_{MPPT}: 140 VDC ÷ 450 VDC (full range)
- Unified design for all charge controllers
- N x power unlimited design
  - Input: N x 2 kW charge controllers
  - Output: N x 4 kVA inverter modules
- Poly-, Mono-, Thin-film modules
- Redundancy (N + 1)
- Easy configuration and installation
- Fast module exchange
- Plug & Play modules
- Hot swap technology
- Small size and light weight

What makes EXERON unique?

Advantages

- Full integration of all types of modules – MPPT chargers, rectifiers, inverters
- Unique communication protocol allows parallel connection of up to 65 MW modules (each 2 kW)
- Self diagnostic and failure prevention through special IPS software
- Extreme redundancy through load sharing between the modules
- Extremely fast MPP tracking algorithm leading to 12% efficiency improvement
- MPP tracking covers the full input range which leads to 14% efficiency improvement
- Integrated CPU in each power module – the hologram principle
- Automatic and manual bypass
- AVR and automatic start/stop of diesel gensets
- Intelligent power input prioritizing
- Small and light hot plug power modules – MTTR < 10 s
- Unlimited parallel connection of battery strings through virtual charger outputs
- Extend the battery life with more than 3 years or 1200 cycles
  - *Temperature compensation of the charging voltage*
  - *Battery asymmetry control*
  - *Automatic periodical battery capacity test*
  - *Automatic float and boost charging mode*
  - *Specific charging algorithms*

Cost analysis

Two facts can be considered from the drawing:

1. IPS Exeron's initial investment is higher, but as a long-term investment is clearly economically better, because of the almost maintenance free operation and the long-life design thanks to the implemented military standards.
2. Compared to using only diesel generator, the OPEX costs are dramatically lower when replacing with hybrid off-grid.