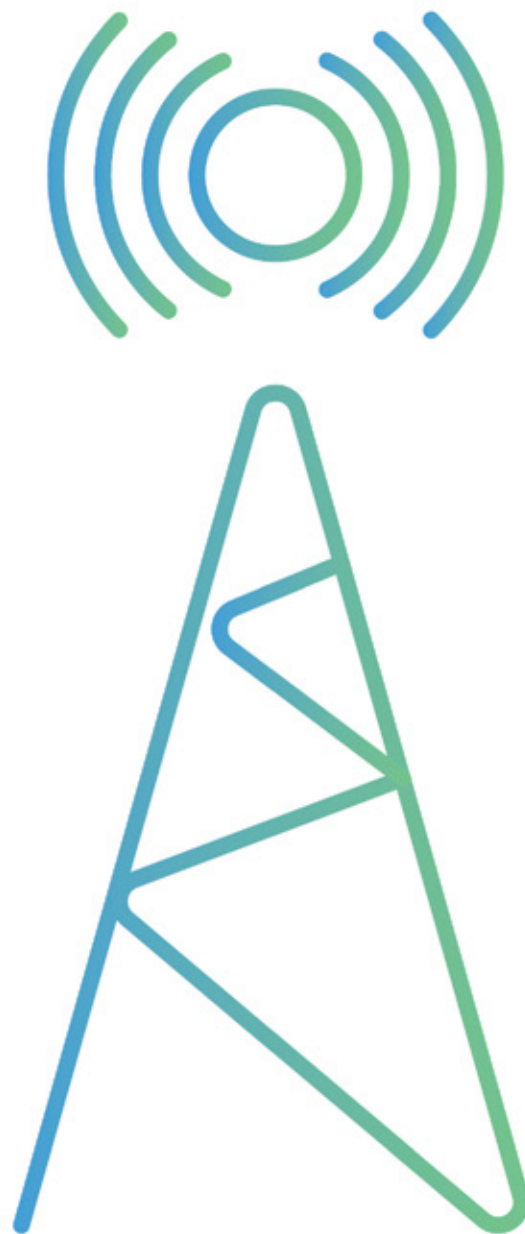


TELECOM SOLUTIONS



Key advantages of our Telecom products



Outdoor power systems:

- **All from one Manufacturer:** 100% integration of rectifiers, solar charge controllers, inverters, DC-DC converters, MCU, sensors, A/C etc.
- **Unique IPS software for manual and automatic battery capacity test :** increase battery life
- **Solar ready:** fast upgrade with solar system. MPPT solar charge controllers under the same MCU, monitoring and control
- **IPS OPEX controller:** unique IPS software for fuel save and diesel generator running hours reduction
- **Maintenance-free air conditioning unit (A/C):** zero OPEX
- **Complete hybrid outdoor power system design:** cost savings, zero OPEX, space savings, integrated cooling system
- **Customized design:** maximum customer's requirement satisfaction
- **NATO AQAP quality standard:** robust and reliable design, long life in harsh conditions



Hybrid Off-Grid Power System EXERON

DC load 1.5 kW, PV 6 kWp, DG 18 kVA
Total OPEX savings -86%

Outdoor Cabinet COOLRACK, double walls, A/C, 19" free space for clients equipment

Outdoor Cabinets - models & main advantages

Outdoor System Solutions

We develop, design and manufacture the following types of outdoor systems

Unique maintenance free IPS developed air-conditioner



Air conditioning
Double walls

IPS heat exchange technology



Heat exchange, Forced ventilation
Double walls



Forced ventilation
Single walls (low cost solution)

CHARACTERISTICS	MOSTLY USED	EXERON	BENEFITS
A/C unit, maintenance	Requires regular maintenance	Maintenance-free	No maintenance costs, Operating range from 20° C up to +55° C.
A/C unit, consumption	Acceptable energy consumption	Low energy consumption, intelligent control	Lower energy costs, overall OPEX costs reduction.
A/C unit, mounting	Door mounted	Modular and roof mounted, easily detachable	Ease of mounting and transportation.
A/C unit, airflow	Locally distributed	Equally distributed from top to the bottom	Efficient cooling capacity.
Customized cabinet design	Standardized design, few options	Customized design, perfect fit for every site setup	More effective air conditioning, CAPEX optimization, OPEX costs reduction.
Solar controllers, fuel save controller, inverters	Site upgrade with components from different producers	Site upgrade with unified and 100% integrated components	Higher efficiency, increased performance, longer battery life.
NATO AQAP design	Acceptable civil design requirements	Military design	More robust, ability to work in harshest conditions (humidity, sand, dust, high temperature etc.)
Scalability in power output (rectifiers, inverters, solar chargers)	Limited scalability	Unlimited scalability for all the system components	No extra costs, smooth communication and integration between all system components.
Remote monitoring	Basic	Unlimited options for the connection of external alarms to the system's MCU and Cloud based monitoring platform	No additional costs, as all the components are monitored by the system's MCU.

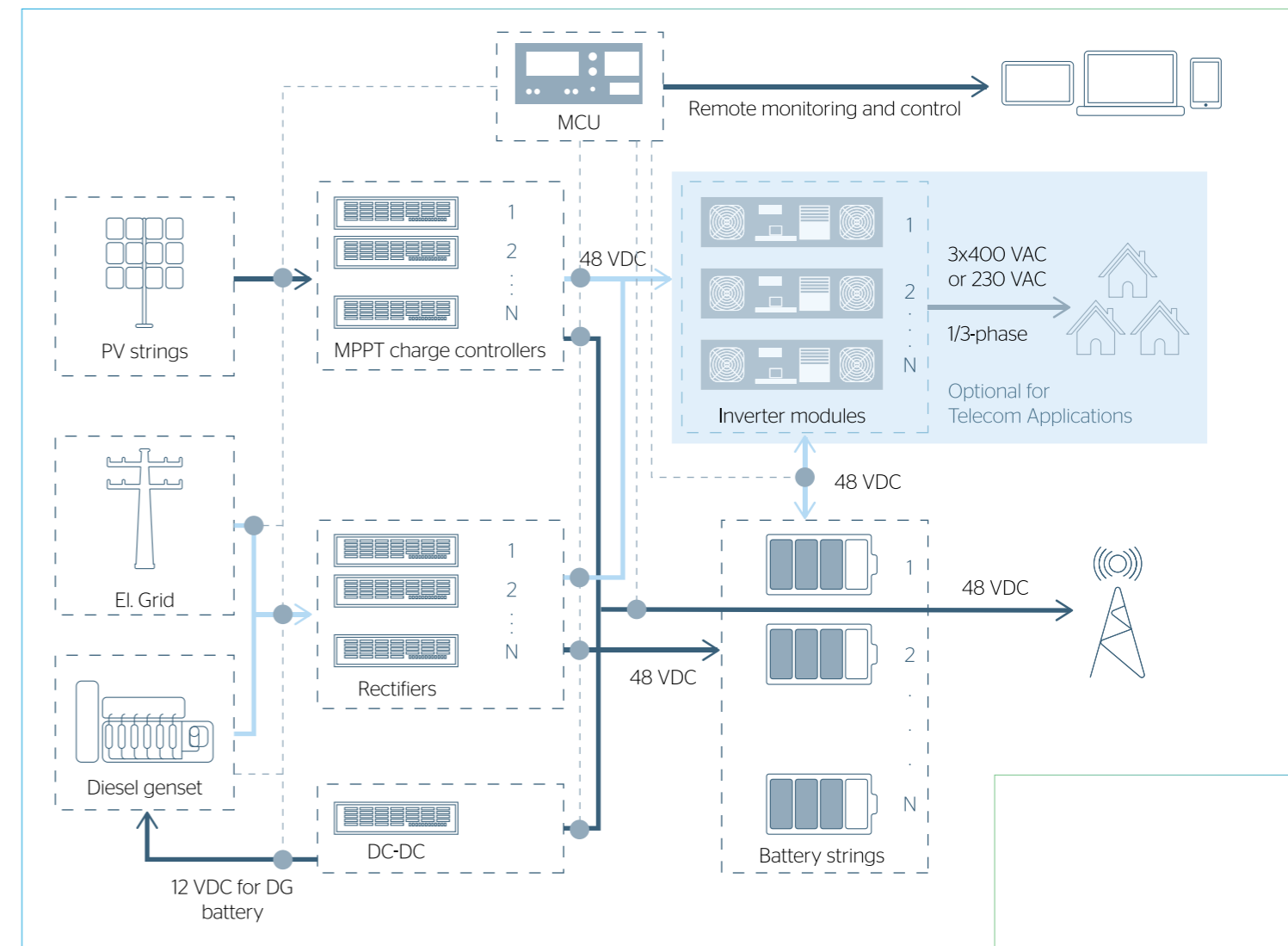
Telecom Hybrid Systems - main highlights & system schematics

EXERON is the ideal solution if you:

- operate diesel generator powered sites / facilities
- pay high fuel costs
- pay high fuel supply costs
- want to reduce diesel generator running hours
- operate off-grid and remotely
- pay high generator maintenance costs
- do not have access to reliable electricity
- want to reduce OPEX costs
- want to be power independent
- want to have a reliable power system
- want to have a maintenance-free power system
- want to become eco-friendly

ROI < 16 months

EXERON



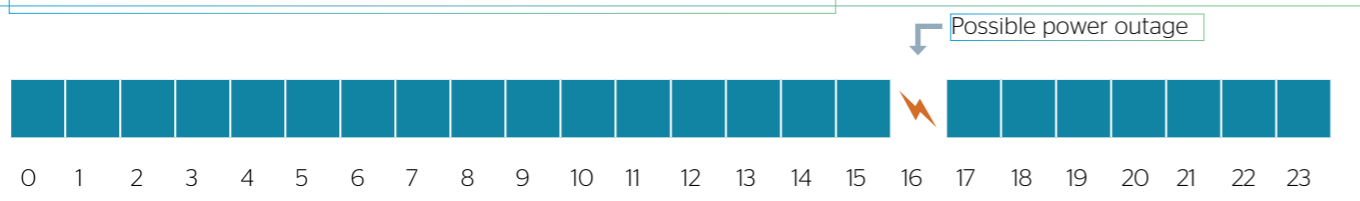
Case Study: 1.5kW Telecom site

TELECOM SITE EXAMPLE

AC source	Average load	Energy consumption per 24h in kWh	PV power	Battery capacity	Usable battery capacity	Hybrid mode duration PV + Battery	Pure battery back-up time
DG	1.5 kW	36 kWh	6 kWp	760 Ah	292 kWh	24 h	approx. 20h

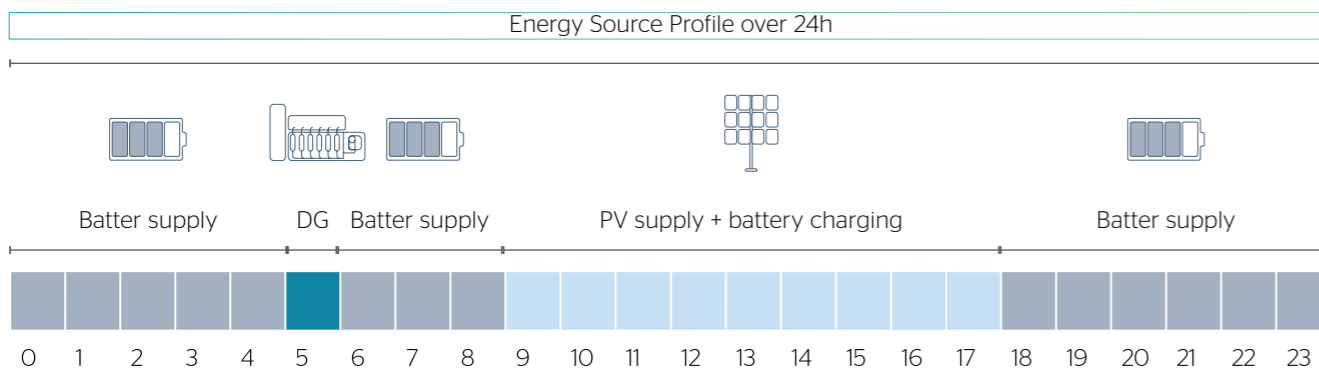
BEFORE EXERON SITE UPGRADE:

24h diesel generator supply with possible power outages



EXPECTED PERFORMANCE AFTER EXERON SITE UPGRADE:

IPS HYBRID EXERON + battery storage



- Solar Hybrid System
- Battery
- Diesel Generator
- ⚡ Power Outage



Case Study: Performance Report

MONTHLY PERFORMANCE REPORT

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Weekly average
							Mostly sunny
24.08.2015 DG : 0h	25.08.2015 DG : 0h	26.08.2015 DG : 0h	27.08.2015 DG : 0h	28.08.2015 DG : 0h	29.08.2015 DG : 0h	30.08.2015 DG : 0h	DG : 0h
							Partly cloudy
31.08.2015 DG : 2.5h	1.09.2015 DG : 0h	2.09.2015 DG : 0h	3.09.2015 DG : 0h	4.09.2015 DG : 2.7h	5.09.2015 DG : 0h	6.09.2015 DG : 0h	30.08.2015 DG : 5.2h
							Mostly cloudy and rainy
7.09.2015 DG : 2.1h	8.09.2015 DG : 0h	9.09.2015 DG : 2h	10.09.2015 DG : 0h	11.09.2015 DG : 2.2h	12.09.2015 DG : 2h	13.09.2015 DG : 2h	DG : 10.3h
							Partly sunny
14.09.2015 DG : 0h	15.09.2015 DG : 0h	16.09.2015 DG : 0h	17.09.2015 DG : 0h	18.09.2015 DG : 0h	19.09.2015 DG : 2h	20.09.2015 DG : 0h	DG : 2h

DIESEL GENERATOR vs EXERON

MONTHLY STATISTICS				
Weather			DG	
Sunny days	Cloudy days	Rainy days	Running hours	Fuel consumption
15	11	2	175 h	66 l

MONTHLY REPORT		
	EXERON (AFTER)	DG (BEFORE)
Weather conditions	Mostly sunny	Mostly sunny
Hybrid mode operation (PV + Battery)	654.5 h	0
DG running hours	175 h	672 h
Battery cycles	29	0
Fuel consumption	66 l	1344 l

MONTHLY SAVINGS		
DG running hours savings	Fuel savings	Total OPEX savings
974 %	951 %	96.3 %

Case studies and reference projects

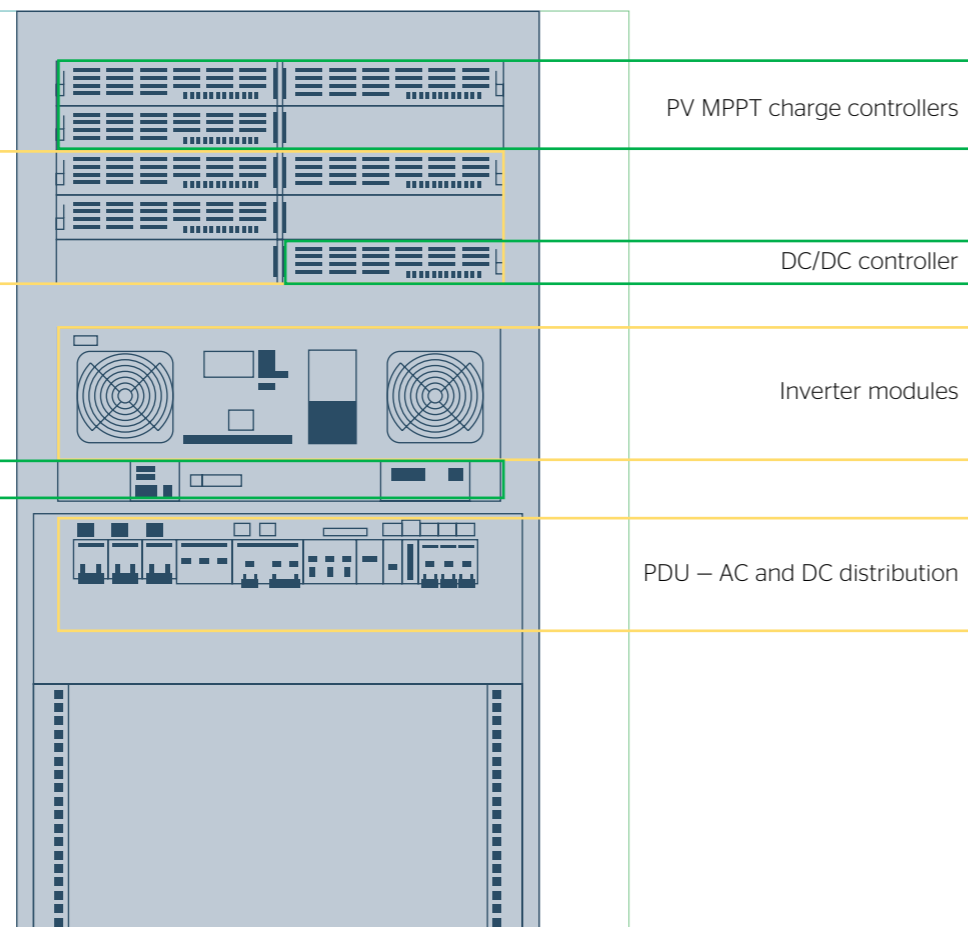
Hybrid Off-Grid power supply system for remote sites in Afghanistan

The case:
Afghan Telecom was looking for a new solution for its off-grid telecom sites based on solar energy, minimizing DG running time.

- The challenge:**
- Harsh environmental conditions
 - Minimum 16 hours battery autonomy
 - Additional AC output requirement for satellite equipment

- The solution:**
- Customized IP55 cabinet with forced ventilation
 - Customized PDU
 - 6kWp PV system
 - 6kW diesel generator input
 - DC-DC converter for DG battery charging
 - 500VA Inverter output

- The results:**
- 200 units delivered and installed
 - Excellent system performance



Hybrid Off-Grid power supply system for remote sites in harsh environment

The case:
A new wireless operator in Nigeria, aimed to cover a big territory with an ultra-fast LTE network. During the first test phase of the project 12 sites had to be installed.

- The challenge:**
- Rural area
 - Best OPEX optimization required
 - High ambient temperature and humidity (95-98%)

- The solution:**
- IP55 cabinet with forced ventilation, max $\Delta T \leq 7^\circ C$
 - 4kWp PV system
 - 6kVA diesel generator for back-up
 - 48V/380Ah battery
 - 12U free space

- The results:**
- 39 sites installed since project start
 - Excellent performance of the autonomous LTE sites
 - OPEX close to zero



Outdoor power supply with A/C for WiMAX operator

The case:
The wireless operator's goal was to cover the largest cities in Bulgaria with the first and fastest WiMAX network in Europe and later to extend it with LTE. During the first phase of the project around 100 sites had to be deployed.

- The challenge:**
- Wide temperature range: +44°C to -25°C
 - High reliability needed
 - Constant temperature of 22°C required inside the cabinet

- The solution:**
- IP65 cabinet with modular A/C, -30°C to +55°C range
 - 4kW/48VDC power output
 - 48V/150Ah battery
 - 12U free space

- The results:**
- 546 sites installed since project start
 - Lifetime of batteries expected to exceed 2x the period requested by the client



Who we are



About METKA IPS

METKA IPS results from the combination of resources and expertise of METKA and International Power Supply (IPS), building on the strong technical expertise of IPS in the R&D and precision manufacturing of power electronics and energy conversion technologies, backed by the project execution capability and know-how of METKA, as a leading international EPC contractor, in addition to its robust financial resources. Through this joining of forces, METKA IPS is well positioned to meet the challenges of the rapidly growing hybrid and off grid power market, serving the needs of customers around the world with affordable and efficient solutions suitable for a wide range of applications, such as: telecoms, mini-grid, industrial, etc. For more information please visit www.exeron.com.

About EXERON

EXERON is an intelligent hybrid power system with various areas of application. The system can combine effectively the power from different energy sources like sun, wind, diesel generator and grid. The unused energy is saved in the battery for further reuse. The EXERON hybrid power system consists of AC and DC charge controllers, battery, DC-AC inverter and a microcomputer unit for monitoring and control. Further information is available at: www.exeron.com.

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