

# CASE STUDY: DEFENCE

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# MILITARY BASE

## ARMED FORCES OF PARAGUAY, PARAGUAY

### Hybrid off-grid system for a remote military base (PV + Diesel Generator)

#### The Case

A Military base in Paraguay on the border with Bolivia with no grid infrastructure available was powered only by a Diesel Generator. The costs for fuel and maintenance of the Diesel Generator were extremely high. A decision was taken to find a solution combining several input sources to optimize the costs and provide uninterruptible power supply, which is critical for the Military base.

#### The Challenge

The Military Base is located in a remote area with extreme harsh weather conditions -high temperatures and high humidity. A reliable solution had to be offered to provide uninterruptible power supply – a system, which can operate in high temperatures up to 55°C and humidity up to 98%.

#### The Solution

IPS designed and built a custom-made EXERON system. During the day the generated power from the PV modules is used for powering the load and charging the batteries. At evenings or in days without enough sunshine the load is powered from the energy stored in the battery. When the battery is discharged and there is no sun, the Diesel Generator switches on automatically.

Monitoring and Control Unit  
(MCU) and Distribution Board

Rectifier Modules

Inverter Modules



MPPT Solar Charge  
Controller Modules

Inverter Modules

# The IPS Configuration

Turnkey Solution

System Requirement	Exeron CM Configuration
PV system 42 kWp polycrystalline	21 x 2 kWp MMPT charge controllers SML2000
DG input 64 kW	32 x 2 kW Rectifier modules ML2000
Total output power 36 kW (3-phase)	9 x 4 kVA inverter modules I4000B
Battery 48V / 5000Ah	

## Optimal System Performance

The Hybrid solar mini-grid system with Exeron as energy conversion unit ensures unmatched reliability and uninterruptible power supply to the Military base. The use of the Diesel Generator is optimized, with annual OPEX savings post hybridization of more than 50%. The price per kWh is 0.27 \$/kWh. The payback period is 4,8 years.

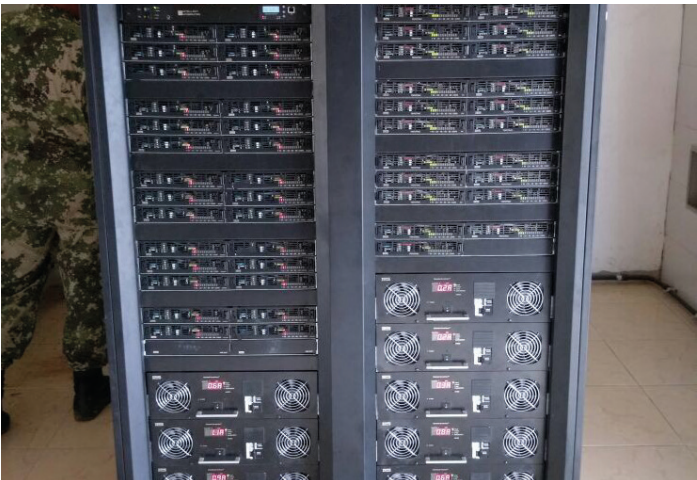
The Military Base



Site Overview



The Exeron System



The PV Array

