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HYREI

NEW ENERGY GENERATOR

H⚡REI
NEW ENERGY GENERATOR

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Efficient and Smart Generator for Grid-connected and Off-grid applications

- UP TO 90% CONSUPTION SAVING
- 24H POWER AVAILABILITY
- OPTIMIZED MANAGEMENT
- TRANSITION FROM NATIONAL GRID TO BATTERIES WITH NO INTERRUPTION
- VOLTAGE REGULATOR
- MODULAR CASES
- SELF-LEARNING SYSTEM
- SIMULTANEUS USE OF RENEWABLE ENERGY SOURCES

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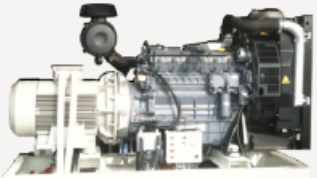
HyREI IS YOUR SMART GRIDS


Fuel Cells


Photovoltaic Modules


Wind Turbine


Hydroelectric System


Diesel generator


National Grid*


Users

*OPTIONAL CONNECTION TO NATIONAL GRID

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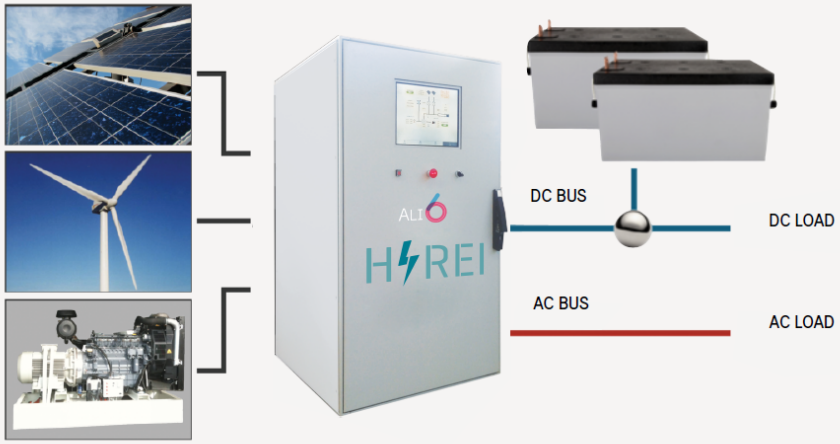
OPERATING MODE

1. SMART GENERATOR MODE

2. HYBRID GENERATOR MODE



3. FULL RENEWABLE MODE

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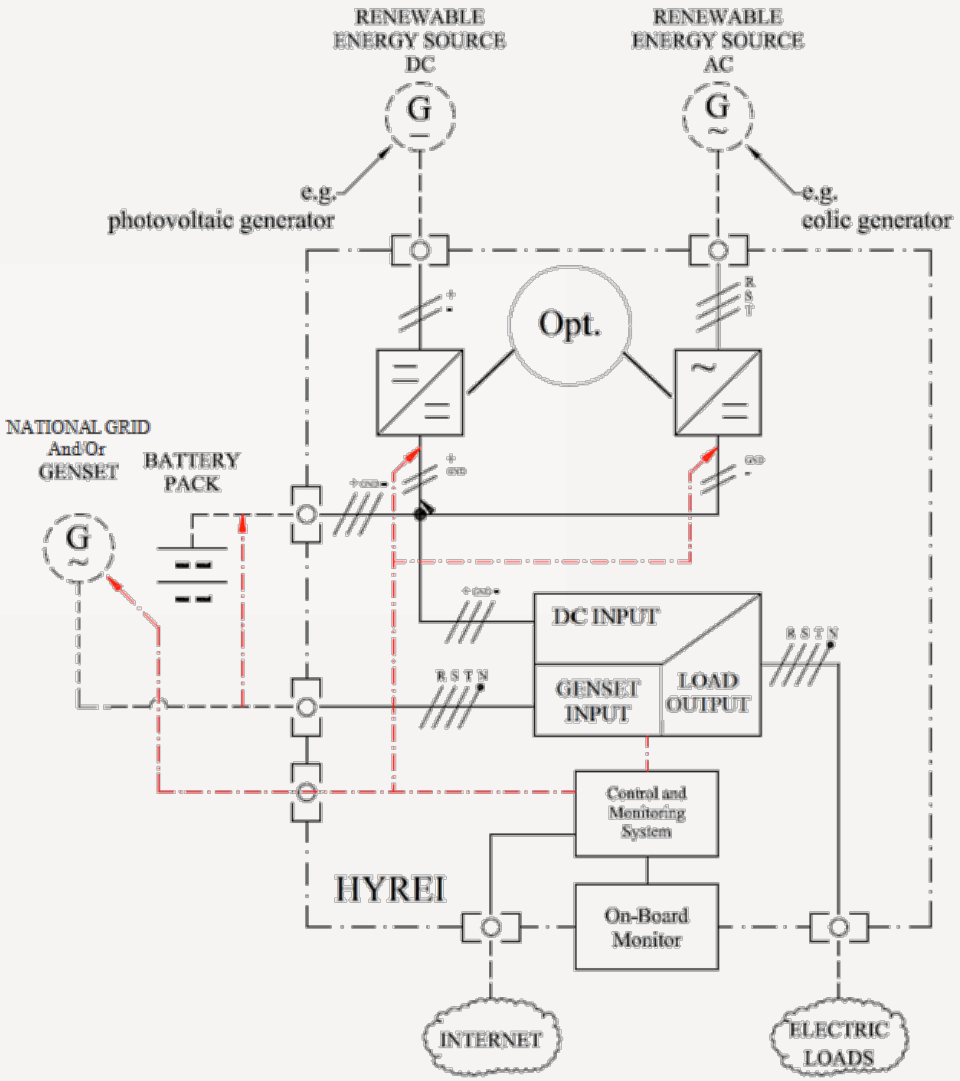
ELECTRICAL SCHEME



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APPLICATIONS

HOUSING AND VILLAGE ELECTRIFICATION

PUMP AND WATER TREATMENT

STREET LIGHTING AND PUBLIC UTILITIES

RADIO DEVICES AND TELECOM SHELTER

ADVATAGES TO USE SMART GRID HyREI SYSTEM

✓ **Fuel saving from 30% (in Smart Generator Mode) up to 90% (in Smart Hybrid Genertor Mode)**

The genset is running always at the rated point saving fuels

✓ **Reduce the refuelling frequency**

The reduced fuel consumption reduce the frequency of the refuelling very important for remote application

✓ **Increase the genset reliability**

The genset is running always at the rated point this means to reduce the maintainnce stops and increace the genset lifetime

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ADVATAGES TO USE SMART GRID HyREI SYSTEM

✓ **Voltage and frequency regulator**

The HyREI system has a function of voltage and frequency stabilizer, very helpful for electronic devices protection without to use local UPS

✓ **No break function**

The transition from batteries to genset or even national grid is done without any break for the loads

✓**Possibility to manage simultaneously**

- uninterruptible loads
- Standard loads
- AC and DC loads

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ADVATAGES TO USE SMART GRID HyREI STYSTEM

✓ **Possibility to manage different Renewable Energies (in Hybrid mode and Full renewable mode)**

- Photovoltaics
- Wind
- Hydropower
- Fuel cells
- Syngas
- Biogas

✓ **and storage system at the same time without any limits**

- Compressed air
- Hydrogen
- Lead acid batteries
- Lion batteries
- VANADIUM REDOX BATTERIES

ADVATAGES TO USE OF SMART GRID HyREI STYSTEM

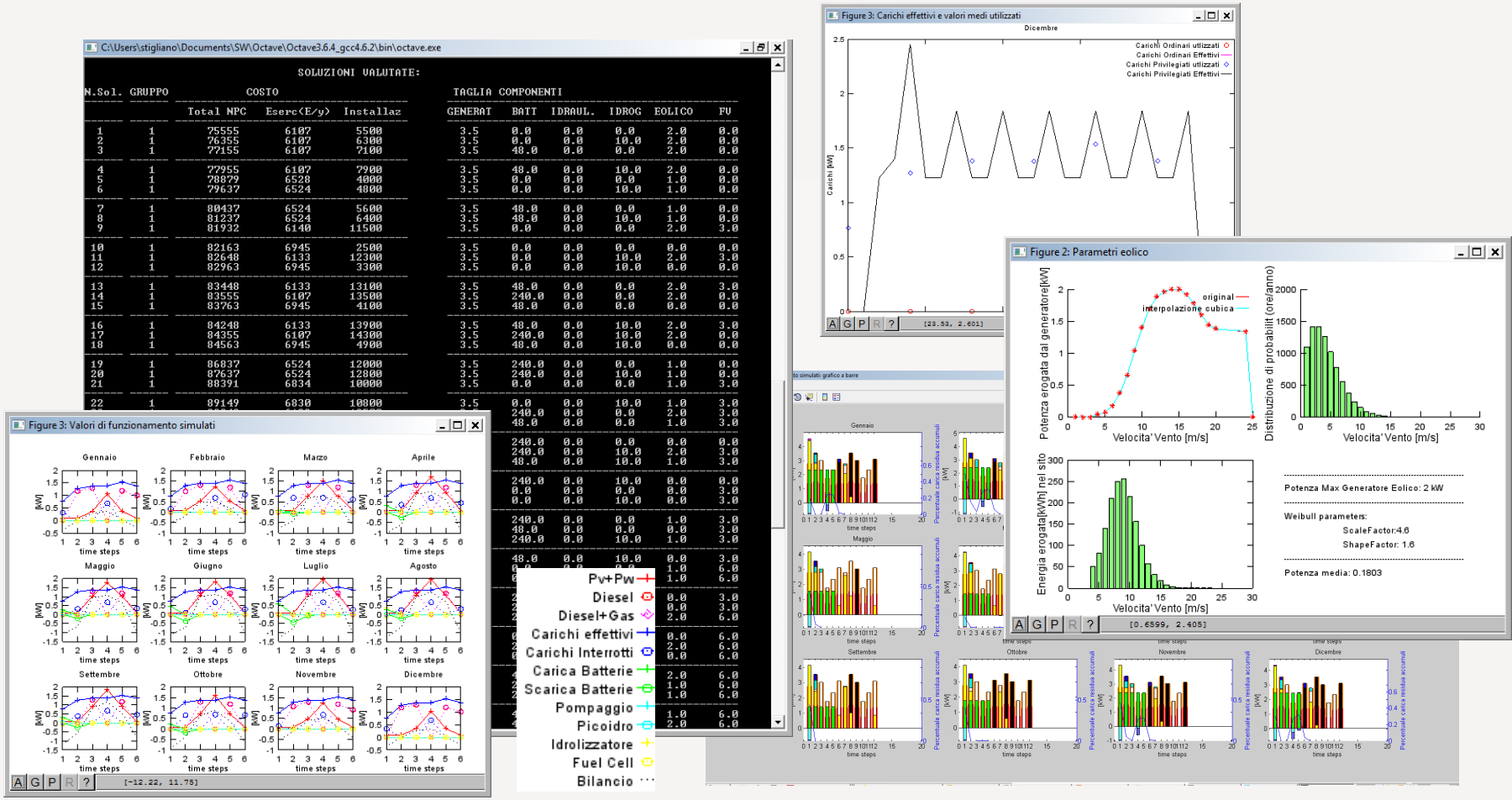
✓ **Optimized management of the system**

HyREI has an embedded algorithm for the optimization of the use of the all the energy sources and storage system that optimize the global cost function

✓ **Self learning system**

the HyREI managing software is able to self learn the loads curves and the habits of the user and the local environmental data (insulation, shades, wind speed, temperatures)to improve the forecasts of the management system

ADVATAGES TO USE SMART GRID HyREI SYSTEM



ADVATAGES TO USE SMART GRID HyREI SYSTEM

✓ **Modular system**

The range of application of HyREI system starts from 0,5 kW up to 4 MW in modular way

It is possible to have different HyREI system to create a distribuited smart grid system

ADVATAGES TO USE SMART GRID HyREI SYSTEM WITH GENSET

✓ **Exsisting genset with driving system**

The HyREI system is able to interface with any already exsisting genset with electronic or mechanical control system

✓ **for new installation is possible that the HyREI system manages directly genset with its own control system**

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Case Study 1 – Engine C4.4, Genset Cat D60-4 with HyREI 50 for housing

1. SMART GENERATOR MODE

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Case Study 1 – Engine C4.4, Genset Cat D60-4 with HyREI 50 kW for housing

Generator
Engine C4.4, Genset CAT D60-4 mod. 3-ph 60 Hz
Rated Power: 54 kW
Fuel consumption (load 100%/75%/50%): 17,2/12,4/9,6 liter/h
HyREI TP_50 - Smart Generator Mode
Rated Output Power: 50 kW
Battery pack: 300Ah@480V
3-ph 60 Hz

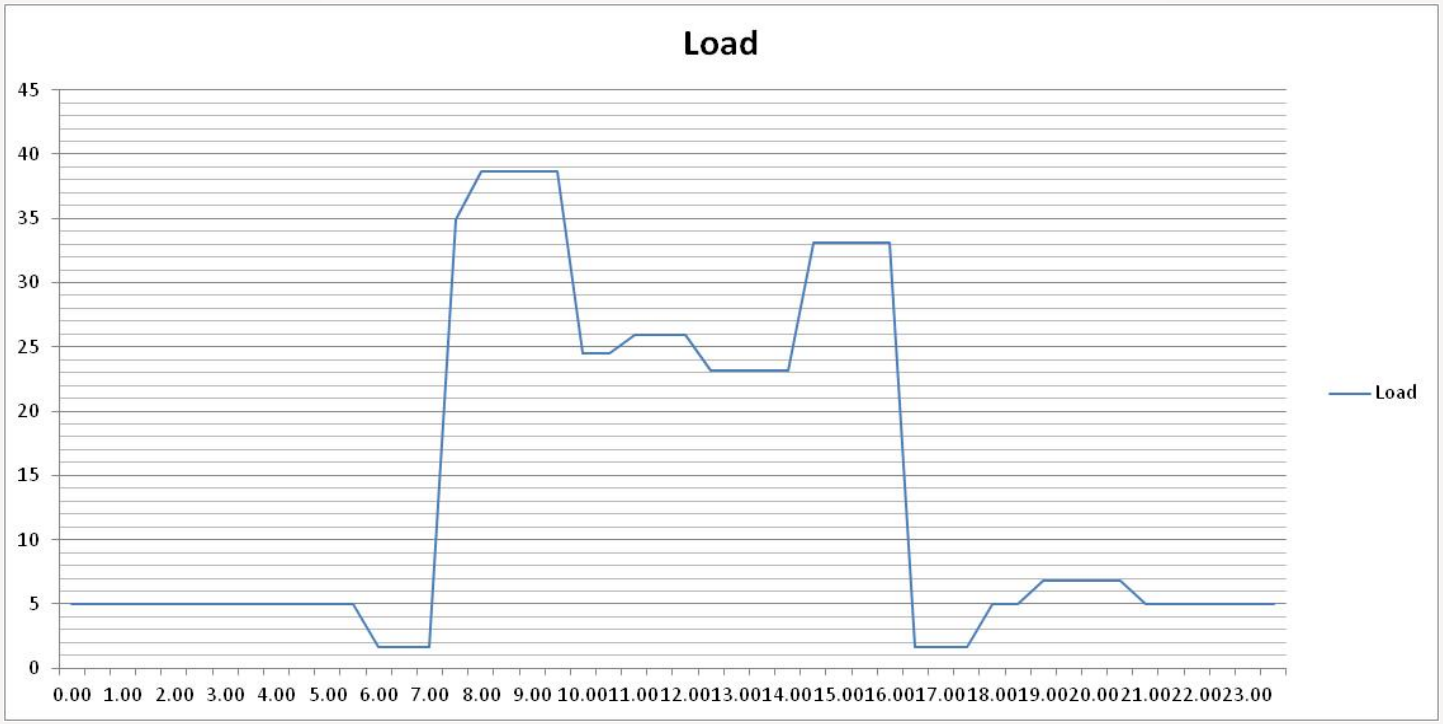
1- Smart Generator Mode

Traditionally, an AC generator is installed and started whenever power is required, however to ensure the optimal running, the generator should not operate with insufficient load or for prolonged periods with excessive (peak) loads. The cost per Watt is higher when AC power is supplied indirectly using an inverter / battery combination rather than directly from the generator. However, significant savings can still be made using indirect power, especially when there are varying periods with lower consumption.

When combining the HyREI with a Diesel generator, low AC demands can be covered by the batteries .This can decrease the generator running time during typical usage.

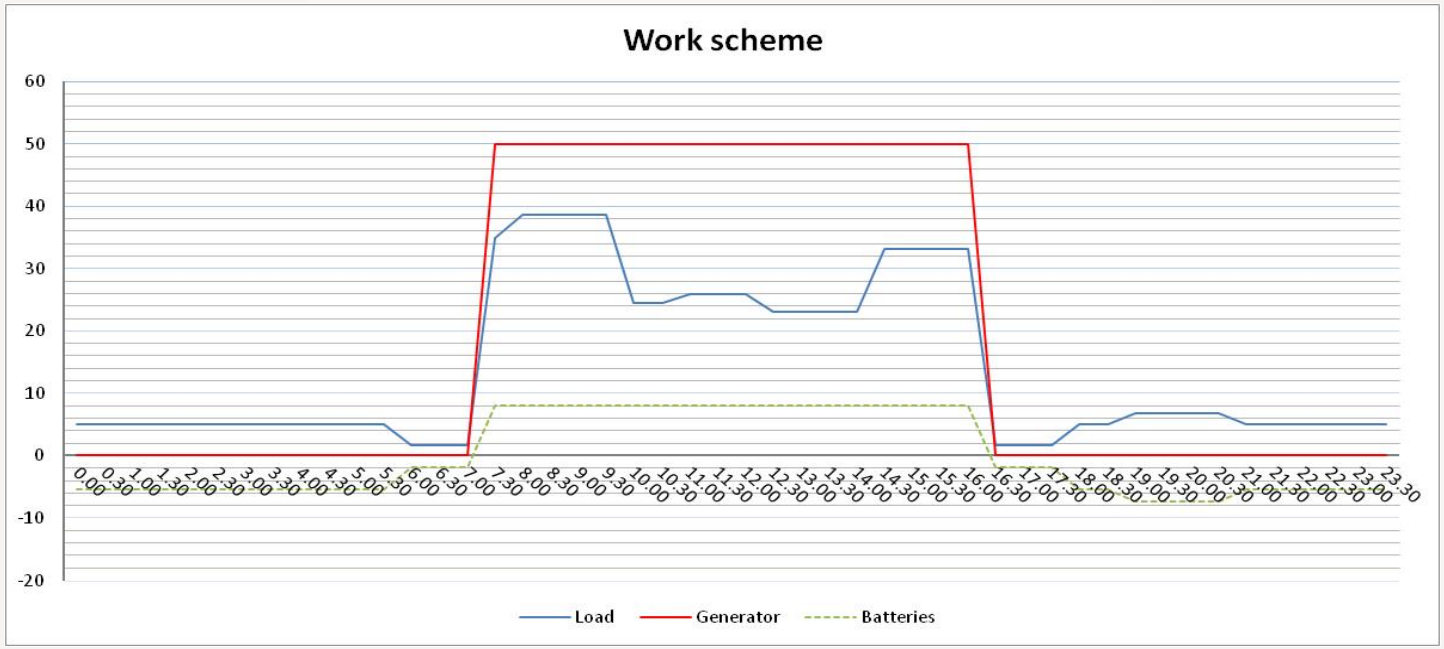
1- Smart Generator Mode

The typical AC requirements during a 24 hour period are shown in the example below. The generator would be required to run for a total of 24 hours each day and 70% of the running time would require less than 15% of its full capacity.



1- Smart Generator Mode

The running time can be reduced by using a generator and HyREI together. Low AC demands can be covered by the battery bank. The generator is not required to run during these times. The generator only runs to cover the main peaks which reduces the running time to 9 hours. During this time the remaining AC that is produced by the generator is converted by the HyREI and used for battery charging.



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1- Smart Generator Mode

Generator	HyREI - Smart Generator
Fuel consumption : 179 Liter/day	Fuel consumption : 139 Liter/day
Working hours: 24 h	Working hours: 9 h
Fuel cost : 125.3 $/day	Fuel cost : 97.54 $/day
O&M Generator cost (1.62 $/h): 38.9 $/day	O&M Generator cost (1.62 $/h): 14.58 $/day
-	Batteries O&M cost*: 22.8 $/day
Daily opex cost: 164.2 $/day	Daily opex cost: 134.92 $/day
Total opex cost: 59933 $/year	Total opex cost*: 50908.4 $/year
Savings (%): 15.06%	
ROI: 4.7 years	

*Scheduled time to replace the batteries: 2 years
**Considering 60 days without PV

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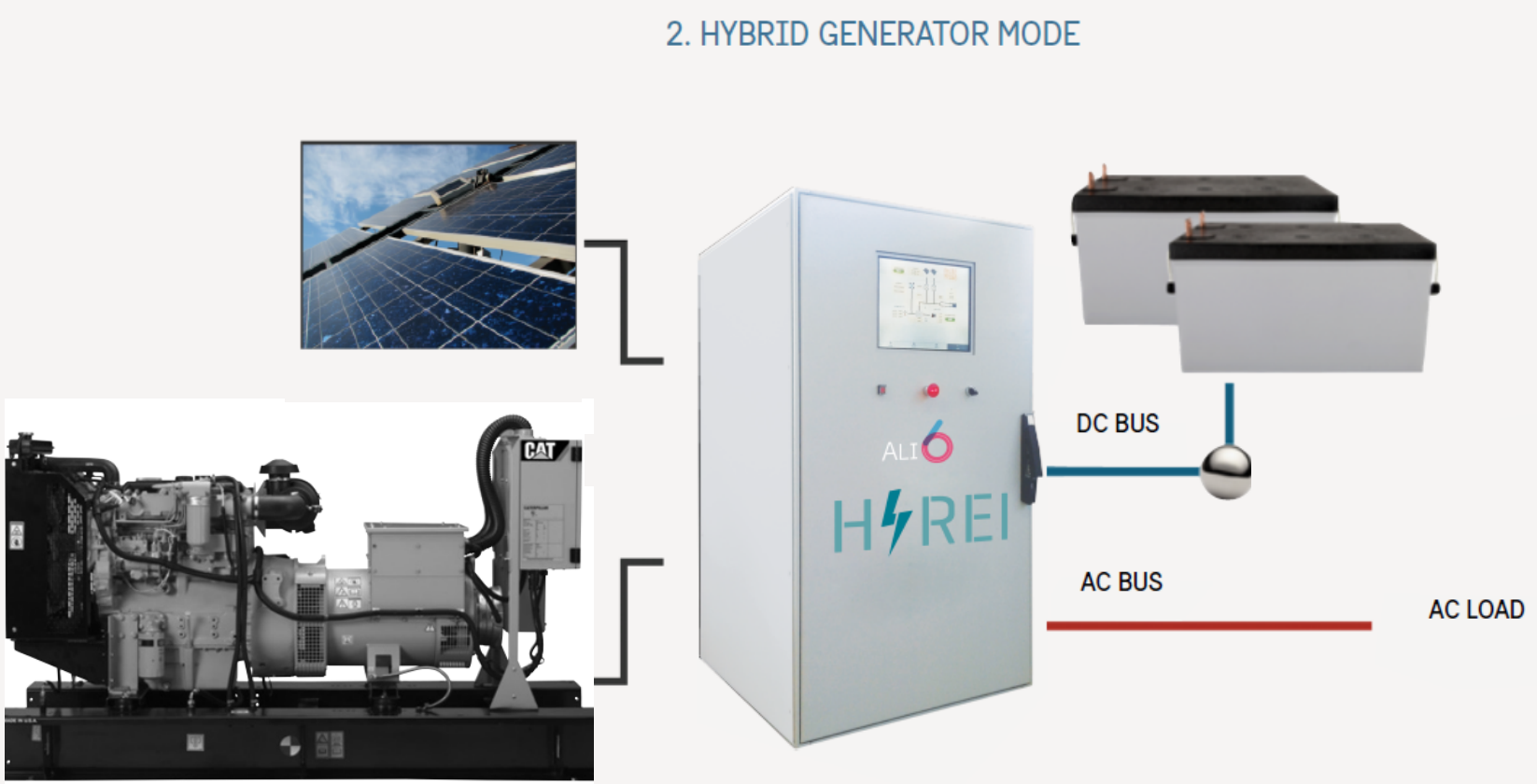
Case Study 2– Engine C4.4, Genset Cat D60-4 with HyREI 50 for housing



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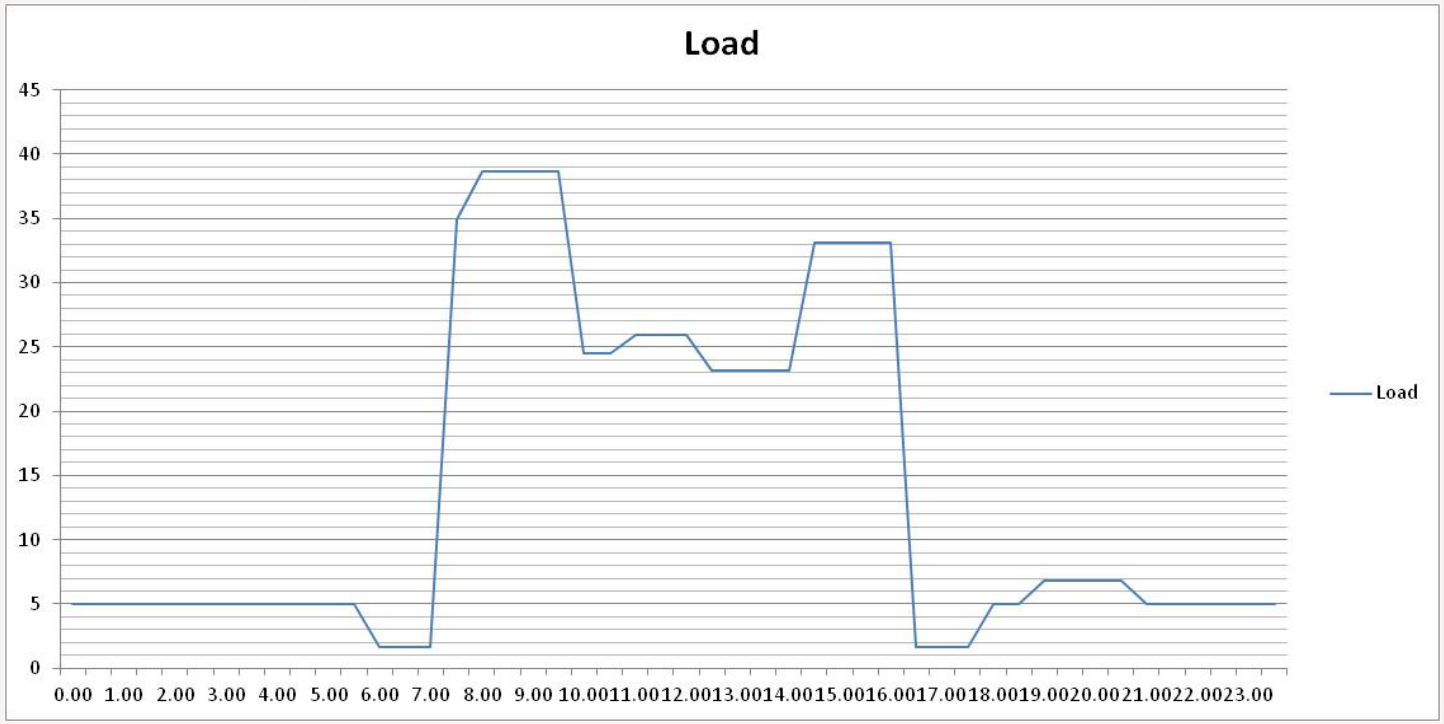
Case Study 2 – Engine C4.4, Genset Cat D60-4 with HyREI 50 kW for housing

Generator
Engine C4.4, Genset CAT D60-4 mod. 3-ph 60 Hz
Rated Power: 54 kW
Fuel consumption (load 100%/75%/50%): 17,2/12,4/9,6 liter/h
HyREI TP_50_50_B - Hybrid Mode
Rated Output Power: 50 kW
Battery pack: 300Ah@480V
PV rated power: 27.5 kW
3-ph 60 Hz

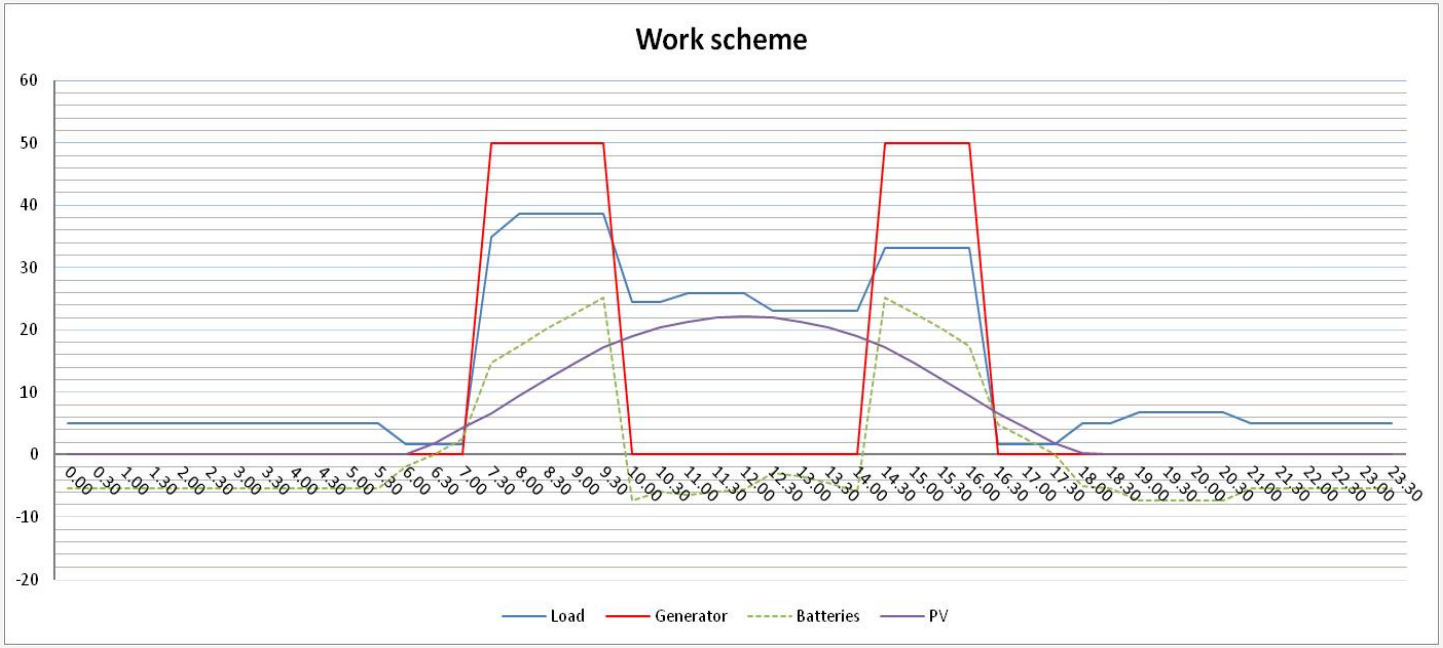
2 - Hybrid Mode

We considered the same loads to be able to make a comparison between the various modes.



2- Hybrid Mode

The running time can be reduced by using a generator, PV system and HyREI together. Low AC demands can be covered by the battery bank. During these times, the generator is not required to run and the PV doesn't work. In the central hours AC requirements can be covered by PV system and batteries. The generator only runs to cover the main peaks which reduces the running time to about 5 hours. During this time the remaining AC that is produced by the generator is converted by the HyREI and used for battery charging.



2 - Hybrid Mode

Generator	HyREI - Hybrid mode
Fuel consumption : 179 Liter/day	Fuel consumption : 70 Liter/day
Working hours: 24 h	Working hours: 5 h
Fuel cost : 125.3 $/day	Fuel cost : 48.8 $/day
O&M Generator cost (1.62 $/h): 38.9 $/day	O&M Generator cost (1.62 $/h): 7.3 $/day
-	Batteries + PV O&M cost*: 26.8 $/day
Daily opex cost: 164.2 $/day	Daily opex cost: 82.8 $/day
Total opex cost: 59933 $/year	Total opex cost*: 34802 $/year
Savings (%): 41.93%	
ROI: 3 years	

*Scheduled time to replace the batteries: 2 years
**Considering 60 days without PV

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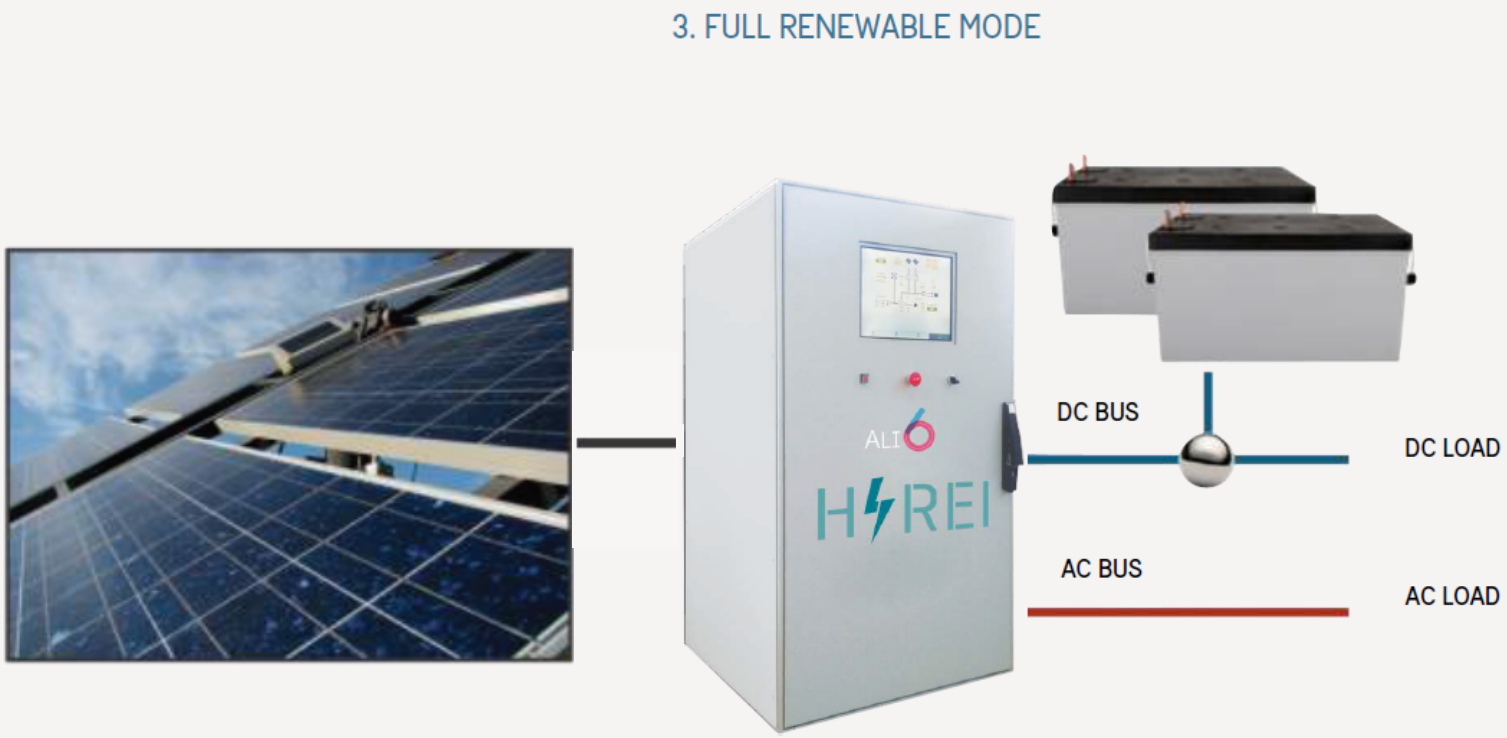
Case Study 3 – HyREI 50 for housing

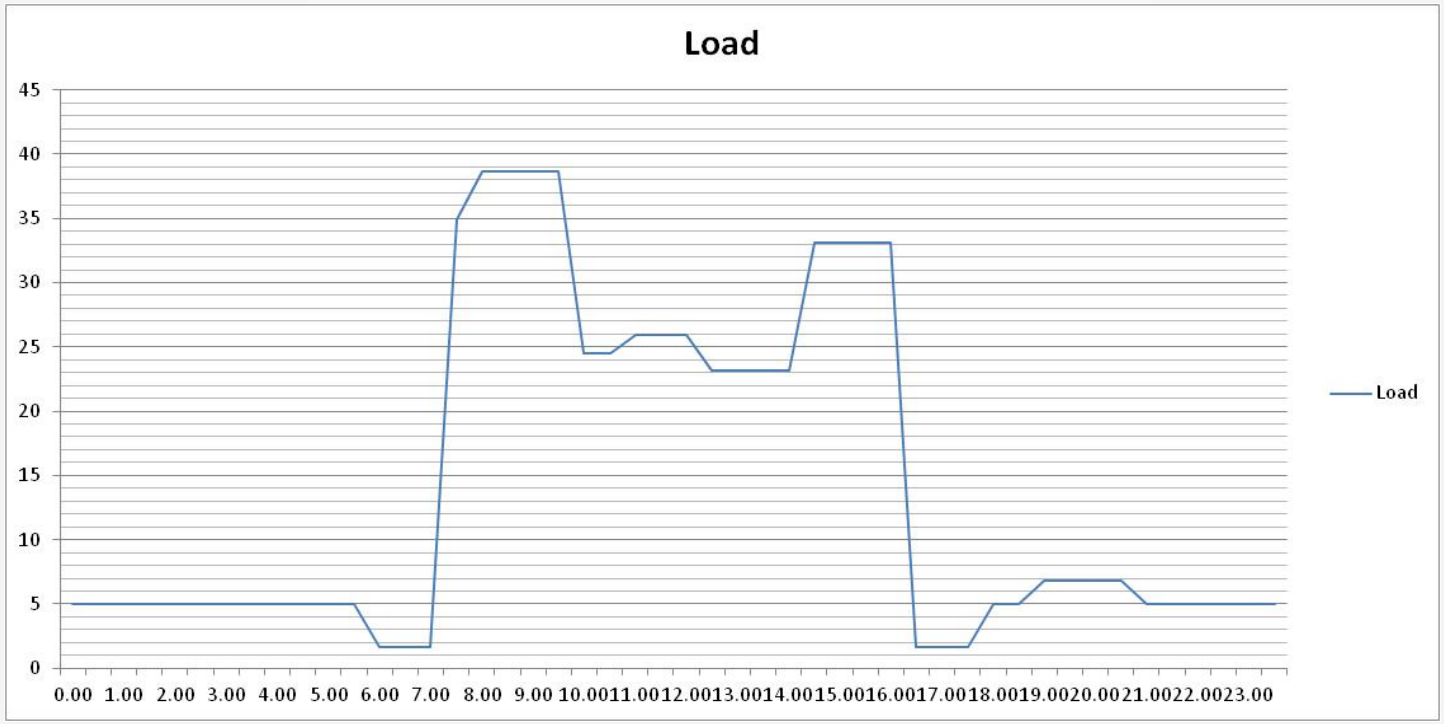


Case Study 3 – HyREI 50 kW for housing

HyREI TP_50_50_E - Full Renewable Mode
Rated Output Power: 50 kW
Battery pack: 1000Ah@480V
PV rated power: 126.5 kW
3-ph 60 Hz

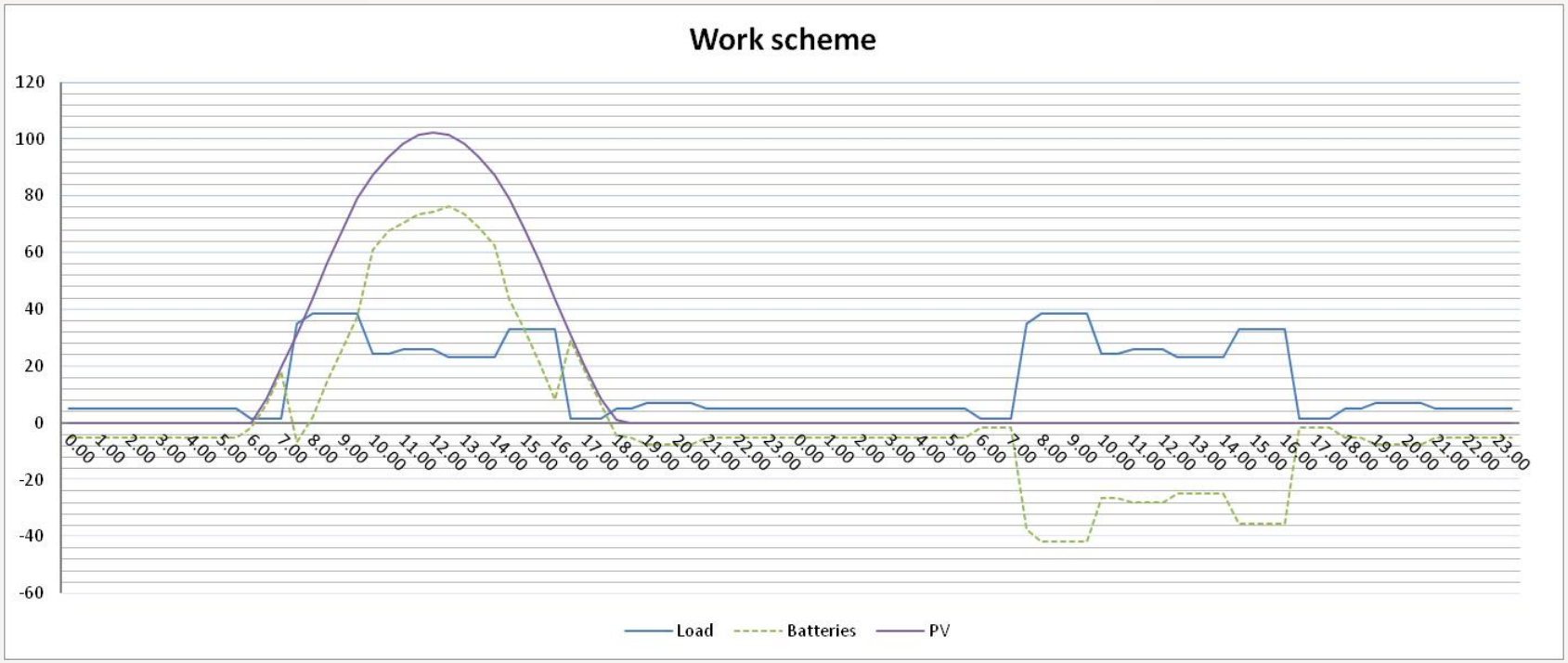
3 – Full Renewable Mode

We considered the same loads in this case as well, to be able to make a comparison between the various modes.



3 – Full Renewable Mode

In this case, the Genset is used only as a backup by using PV system and HyREI together. Low AC demands can be covered by the battery bank while in the central hours AC requirements can be covered by PV system. During this time, the remaining power that is produced by the PV system is used for battery charging that is able to guarantee 1 day of autonomy.



3 – Full Renewable Mode

Generator	HyREI - Full renewable mode
Fuel consumption : 179 Liter/day	-
Working hours: 24 h	-
Fuel cost : 125.3 $/day	-
O&M Generator cost (1.62 $/h): 38.9 $/day	-
-	Batteries + PV O&M cost*: 69 $/day
Daily opex cost: 164.2 $/day	Daily opex cost: 69 $/day
Total opex cost: 59933 $/year	Total opex cost: 25185 $/year
Savings (%): 58%	
ROI: 6.6 years	

*Scheduled time to replace the batteries: 3 years

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WHY CHOOSE HyREI

HyREI enables ***high performance:***

- ✓ ***Energy savings***
- ✓ **Power availability 24/7**
- ✓ **Simultaneous use of traditional and renewable energy sources**
- ✓ **Remote Monitoring on PC, tablet and smartphone**

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VALUE ADDED

Despite other technologies already present on the market, HyREI is:

- ✓ ***All in one (converter + charge regulator + control and monitoring system)***
- ✓ **Modular and scalable**
- ✓ **Easy generator coupling**
- ✓ **Adaptable to whatever you want (Smart Generator Mode → Hybrid Mode → Full Renewable Mode)**

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